

# Oracle Application Express Workshop I

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# 1

## Course Overview

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# Course Objectives

After completing this course, you should be able to do the following:

- Create a database application
- Develop and manage application components in a database application
- Create processes and validations within an application
- Use and manage shared components
- Implement security in an application
- Navigate within an application
- Extend and enhance your application by using some built-in wizards

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This course introduces you to Oracle Application Express, a rapid web application development tool for the Oracle database. In this course, you learn about its features and benefits, and you also learn how to log in and use its various components to build complete and secure web applications.

# Agenda: Day 1

1. Course Overview
2. Introducing Oracle Application Express
3. Creating a Database Application
4. Using and Creating Interactive Reports
5. Creating Classic Reports, Wizard Reports, and Reports for Mobile Applications

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This agenda is a suggested list of lessons to be covered on each day of the five-day course.

## Agenda: Day 2

6. Creating Forms
7. Working with Pages and Regions
8. Adding Items and Buttons
9. Understanding Session State

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## Agenda: Day 3

10. Adding Page Processing
11. Validating and Debugging Your Application
12. Adding Shared Components That Aid Navigation
13. Working with Themes, Templates and Files

## Agenda: Day 4

- 14. Implementing Security
- 15. Managing Application Navigation
- 16. Extending Your Application
- 17. Creating and Editing Charts

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## Agenda: Day 5

- 18. Using Dynamic Actions and Plug-ins
- 19. Adding Calendars and Trees
- 20. Utilizing Application Express Printing
- 21. Managing Application Feedback

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# Order Management Database Application

Welcome: TEACH Logout

Home Products Orders Customers Employees Help Admin

Employees

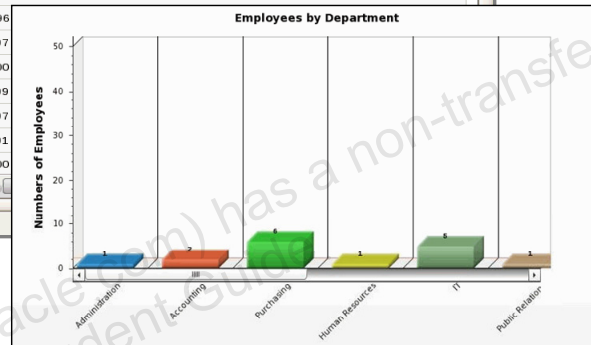
Reset Create

Search  Display 15

First Name	Last Name	Email	Phone Number	Hire Date	Job Id	Salary	Commission Pct	Manager Id	Department Id
Adam	Fripp	AFRIPP	650.123.2234	10-APR-1997	ST_MAN	8200		100	50
Alana	Walsh	AWALSH	650.507.9811	24-APR-1998	SH_CLERK	3100		124	50
Alberto	Errazuriz	AERRAZUR	011.44.1344.429278	10-MAR-1997	SA_MAN	12000	.3	100	80
Alexander	Hunold	AHUNOLD	590.423.4567	03-JAN-1990	IT_PROG	9000		102	60
Alexander	Khoo	AKHOO	515.127.4562	18-MAY-1995	PU_CLERK	3100		114	30
Alexis	Bull	ABULL	650.509.2876	20-FEB-1997	SH_CLERK	4100		121	50
Allan	McEwen	AMCEWEN	011.44.1345.829268	01-AUG-1996					
Alyssa	Hutton	AHUTTON	011.44.1644.429266	19-MAR-1997					
Amit	Banda	ABANDA	011.44.1346.729268	21-APR-2000					
Anthony	Cabrio	ACABRIO	650.509.4876	07-FEB-1999					
Britney	Everett	BEVERETT	650.501.2876	03-MAR-1997					
Bruce	Ernst	BERNST	590.423.4568	21-MAY-1991					
Charles	Johnson	CJOHNSON	011.44.1644.429262	04-JAN-2000					
Christopher									

Home Application 138 Edit Page 6 Create Session

Done



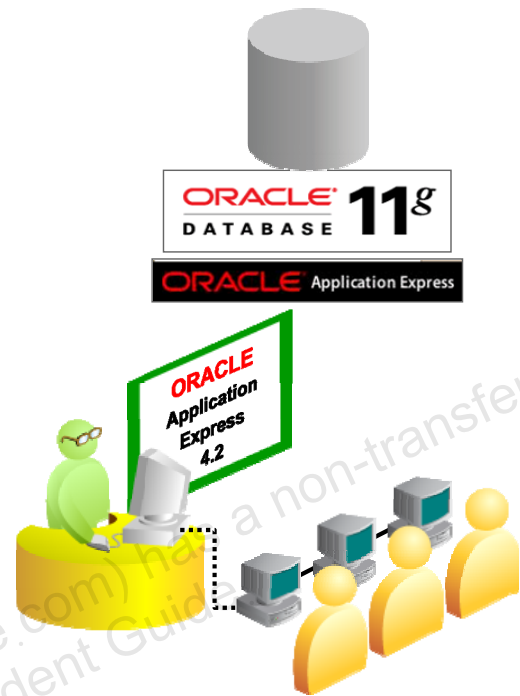
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In this course, you create an order management database application. You create reports, forms, master-detail forms, charts, lists, and calendars.

# Course Environment

- Operating system: Linux
- Installed products:
  - Oracle Database 11g R2
  - Oracle BI Publisher
  - Oracle Application Express 4.2
  - Embedded PL/SQL Gateway



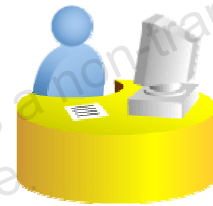
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The classroom setup uses a client/server architecture. The instructor machine is set up with Oracle Database and the required software to run Oracle Application Express. You will log on to the student machine that is assigned to you by using NX client. From the student machine, you access the Oracle Application Express workspace that is assigned to you by using a web browser.

## Workspace Details

- An Oracle Application Express workspace is assigned to you.
  - Workspace name: ora<n>
  - Username: ora<n>\_admin
  - Password: ora<n>
- Log in to your workspace to complete the practice tasks in the Activity Guide.



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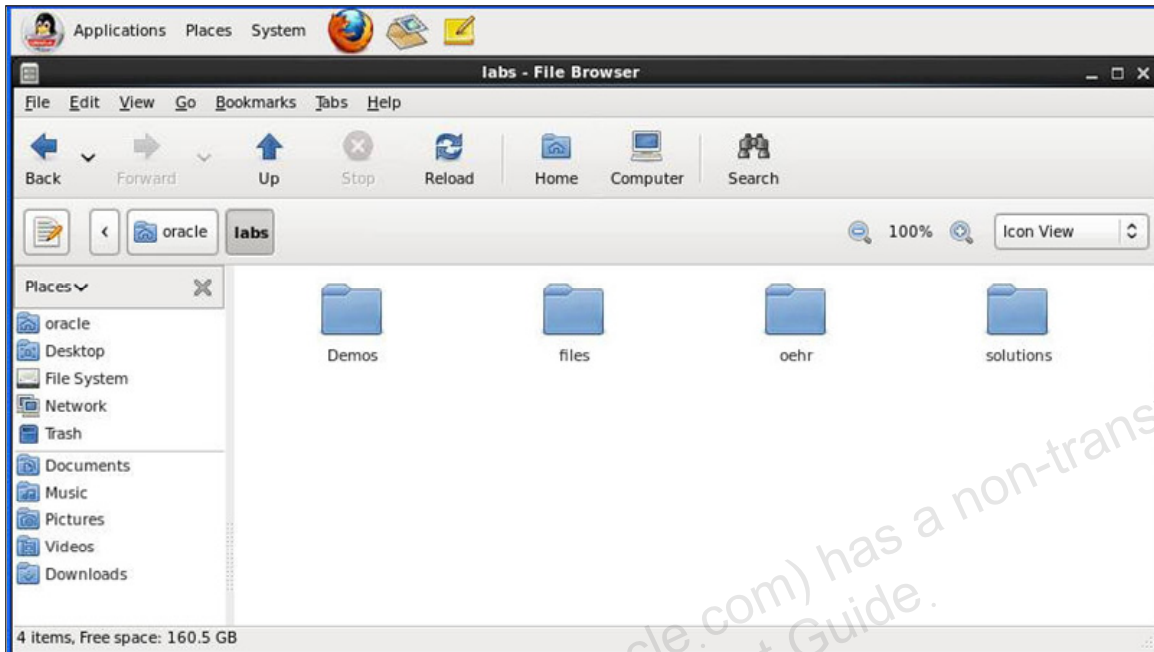
Your instructor assigns a workspace to you. The workspace name, username, and password details are listed in the slide. Replace <n> with the number assigned to you by your instructor, which ranges from 01 through 22. You need to log in to this workspace to complete all the practices in the Activity Guide for this course.

To access the Oracle Application Express development instance, open a web browser and enter the following URL in the address bar:

`http://<hostname>:8080/apex`

hostname is the IP address of the instructor machine.

# Accessing the labs Directory



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All the files that are required to complete the practices are available in the `labs` directory. To access the `labs` directory, from the Applications menu, select System Tools > File Browser. From the `oracle` directory, open the `labs` directory. You will see four folders and their contents:

- **Demos:** The demos referenced in the lesson notes
- **files:** All the files that you need to complete the practices. You can use this location to save the files while performing the practices, if required.
- **oehr:** The packaged application that you must import to install the database objects required for the practices
- **solutions:** The solution scripts given in the Activity Guide. This folder also contains the catch-up applications that you can import in case you were not able to complete a practice.

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# Introducing Oracle Application Express



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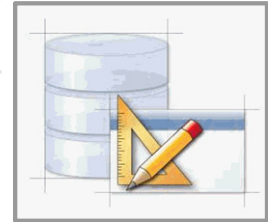
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# Objectives

After completing this lesson, you should be able to:

- Describe Oracle Application Express
- Explain Oracle Application Express concepts
- Identify the components of Oracle Application Express
- Run a sample application
- Install a packaged application
- Export and import applications
- Use Oracle Application Express in Oracle Database Cloud Service



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This lesson introduces you to Oracle Application Express. You identify the key features, benefits, and components of Oracle Application Express. You understand how Oracle Application Express works by learning about its architecture. You get started with Oracle Application Express by setting up the users and the environment used in this course. You are also introduced to Oracle Database Cloud Service that uses Oracle Application Express.

# Lesson Agenda

- Oracle Application Express Overview
  - What Is It?
  - Why Use It?
  - Types of Applications
  - Examples
  - High-Level Architecture
  - Types of Installation
- Oracle Application Express Concepts
- Using Oracle Application Express
- Using Oracle Application Express in Oracle Database Cloud Service

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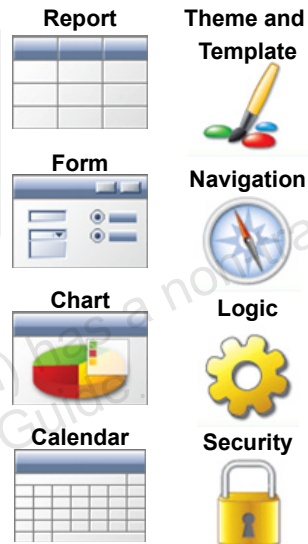
# What Is Oracle Application Express?

Oracle Application Express is a web application development, deployment, and maintenance tool.

## Oracle Application Express Home Page



## Key Features



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Oracle Application Express is a web-based development and deployment tool that is available with the Oracle database. It enables you to create database-centric web applications that are reliable, scalable, and secure. It has several built-in features and wizards that quicken your development process. Some of the key features are listed in the slide.

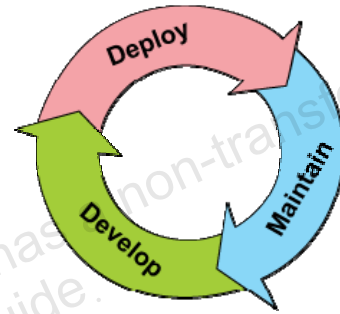
The tool has a user-friendly graphical interface. Using Oracle Application Express requires minimal programming knowledge.

The application definition is stored as metadata in the Oracle database tables. When you run your application, the Oracle Application Express engine assembles the pages from the database and displays them in your browser.

Oracle Application Express was first released in 2004 and was then called HTML DB.

# Why Use Oracle Application Express?

- Enables rapid application development
- Creates applications that are reliable, secure, and scalable
- Offers a user-friendly development environment
- Provides flexible look-and-feel options by using themes and templates
- Uses declarative programming
- Features a simple, self-contained architecture
- Provides a platform-independent environment
- Offers individual or shared workspaces for developers



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Using Oracle Application Express, you can develop web-based, database-centric applications that are reliable and fast, as well as secure and scalable. It has a user-friendly interface, which enables you to create and deploy applications in a short span of time. You can use the available themes and templates to provide a consistent look-and-feel across your web pages.

Oracle Application Express uses a declarative framework for web application development. This means that you specify what to do rather than how to do it. No code is generated or compiled. You interact with wizards and property sheets to define your application.

Oracle Application Express enables organizations to capitalize on their existing investment in SQL and PL/SQL skills. Few programming skills are required, and anyone can quickly learn to develop applications. With Oracle Application Express, applications are built faster, with fewer developers.

Oracle Application Express can be installed on a single workstation, or on a server that can support multiple developers. An administrator centrally manages and administers the development environment and creates a shared workspace in a single installation. The definition of an entire application can be easily packaged and exported for deployment and installation into another Oracle Application Express instance.

# Types of Applications



**Enterprise-wide**



**Tracking**



**Websheet**



**Lookup**



**Business Intelligence**



**Survey and Feedback**



**Text Index/Search**



**Mobile applications**

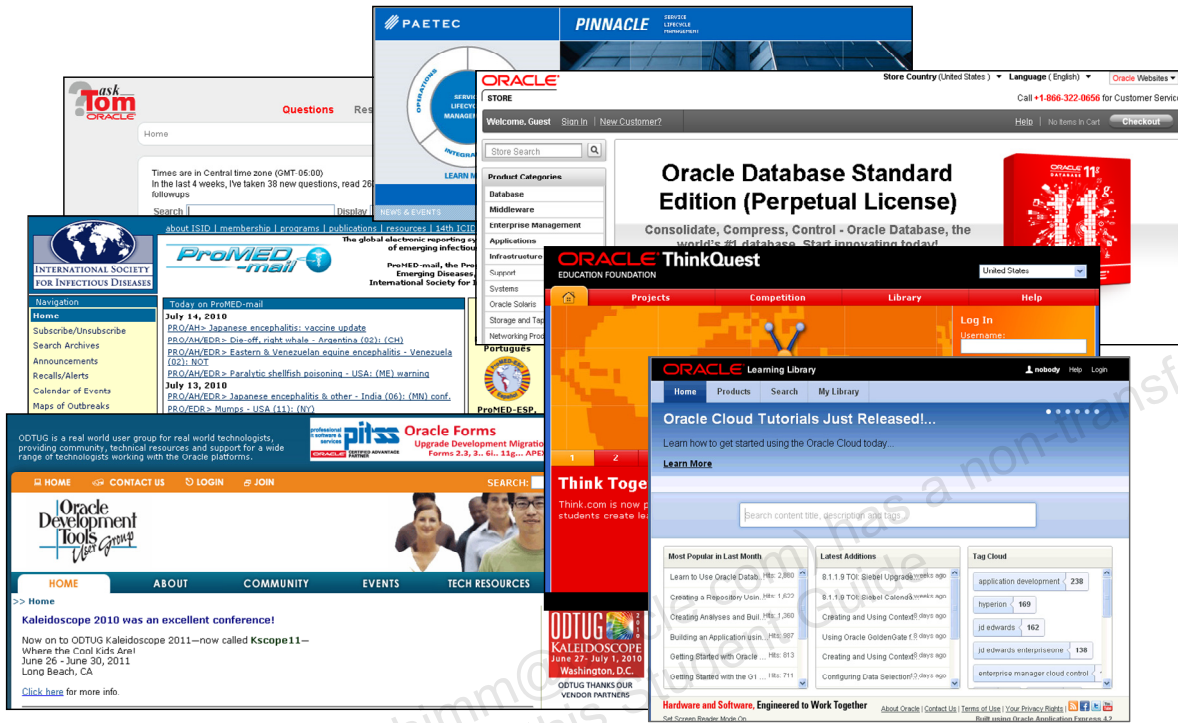
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Examples of the types of applications that are developed by using Oracle Application Express are as follows:

- Enterprisewide applications
- Web-based applications to track projects, contacts, customers, leads, and assets
- Websheet applications that enable end users to manage structured and unstructured data without developer assistance
- Applications to look up people and catalog items
- Lightweight business intelligence (BI) applications with reports, bar charts, line charts, and pie charts. These applications may be based on summarized data copied from a live database, or operate on live transaction data. The charts and reports enable drilling down and cross-referencing of information.
- Web-based applications that use the text indexing and search capability of the Oracle database
- Applications that must be built in a very short span of time (usually a week)
- Mobile applications

# Applications Developed by Using Oracle Application Express



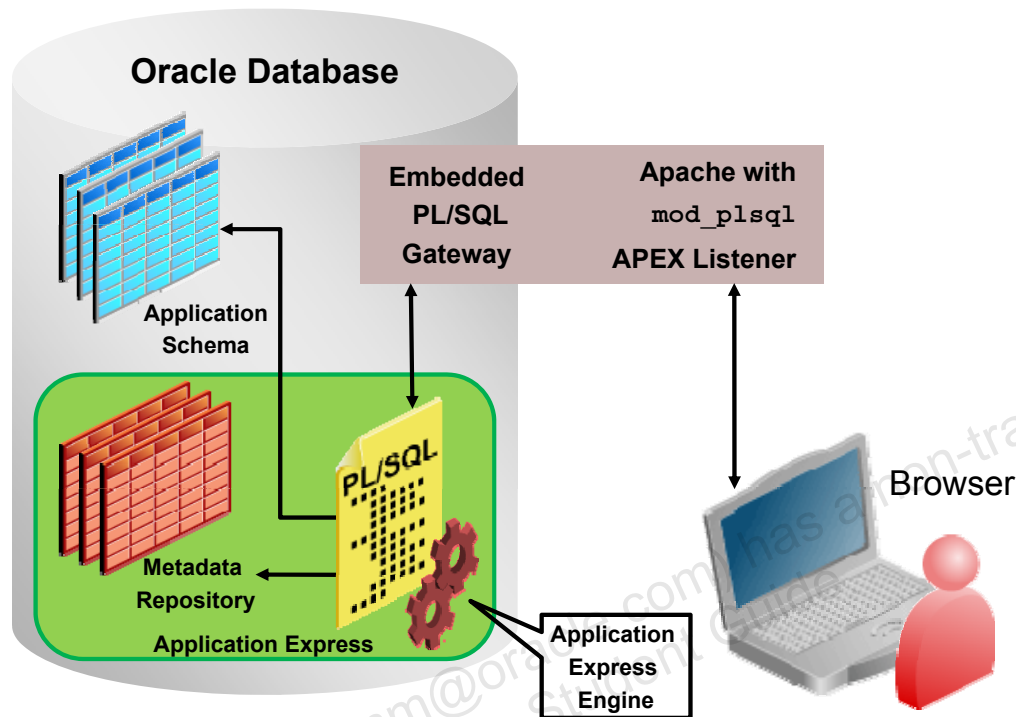
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This slide shows a variety of applications that have been developed by using Oracle Application Express.

**Note:** Oracle Application Express itself is developed by using Oracle Application Express.

# High-Level Architecture



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Oracle Application Express resides in your Oracle database. It consists of:

- Metadata stored in database tables
- The Application Express engine, which is written by using PL/SQL code

When you create an application, its definition is stored in the metadata repository. At every stage of application development, metadata is created or modified and stored in the repository tables. The Application Express engine assembles the application pages by accessing the metadata repository.

When you run your application from the browser, calls are made to the Application Express engine. The engine then processes and renders the application components in real time, based on the data in the metadata repository and the schema against which the application is running.

To enable your web browser to interact with the Application Express engine, you need a PL/SQL gateway. A PL/SQL gateway enables you to build PL/SQL-based applications for the web. In Oracle Application Express, you have three options to configure the gateway:

- Oracle HTTP Server (Apache) with `mod_plsql`
- Oracle APEX Listener
- Embedded PL/SQL gateway

The Oracle HTTP Server is an HTTP-compliant web server. `mod_plsql` is an Oracle HTTP Server plug-in that enables the web browser to communicate with the database. It maps browser requests to procedure calls, which are stored in the database, over an Oracle Net Services connection. It is generally indicated by a `/pls` virtual path. When you access a page in the application, the browser sends a URL request to Apache with `mod_plsql`. Apache then translates the URL to the appropriate PL/SQL stored procedure call in the Application Express engine. The engine processes the request and renders the page that you requested.

Oracle Application Express Listener is another option that can be used. Oracle Application Express Listener communicates directly with the Oracle Application Express engine, thus eliminating the need for the `mod_plsql` plug-in.

Starting with Oracle Database 11g Release 1, you can use the embedded PL/SQL gateway. The embedded PL/SQL gateway installs with Oracle Database 11g and does not require the Oracle HTTP Server. It provides the Oracle database with a web server and the necessary infrastructure to create dynamic applications. The embedded PL/SQL gateway runs in the Oracle XML DB HTTP server in the Oracle database. It includes the core features of `mod_plsql`.

The practice environment for this course uses the embedded PL/SQL gateway.

# Types of Installations

Oracle Application Express supports two types of installations:

## Full Development Environment



Complete access to develop applications

## Runtime Environment



Access only to run production applications

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Based on your requirements, you can install Oracle Application Express in one of the following ways:

- **Full development environment:** This installation provides complete access to the Application Builder environment to develop applications.
- **Runtime environment:** This installation is an appropriate choice for production implementations in which you want to run applications that cannot be modified.

An Oracle Application Express runtime environment enables you to run production applications. But it does not provide a web interface for administration. The runtime environment installation option minimizes the installed footprint and privileges. In a runtime instance, developers cannot inadvertently update a production application. Therefore, the runtime environment improves application security.

## Quiz

Which of the following is responsible for processing and rendering the web application pages?

- a. Oracle database
- b. Metadata repository
- c. Application Express engine
- d. PL/SQL gateway

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**Answer: c**

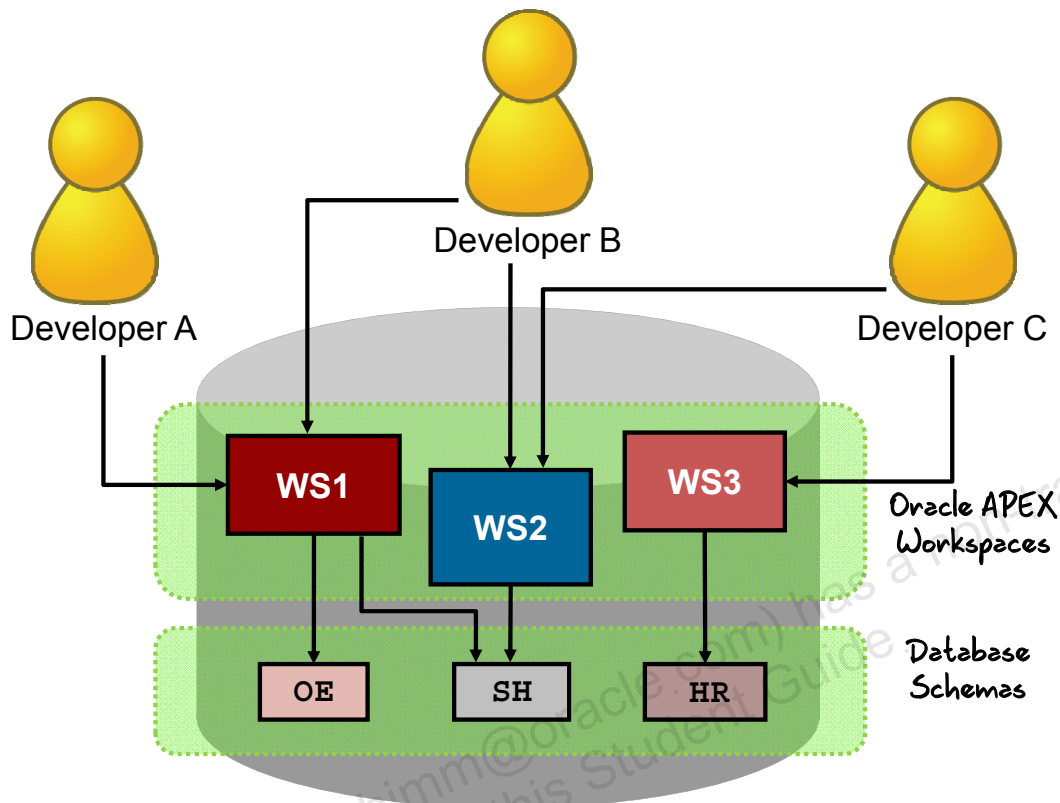
# Lesson Agenda

- Oracle Application Express Overview
- Oracle Application Express Concepts
  - Workspace
  - Internal Workspace
  - Roles
  - Components
- Using Oracle Application Express
- Using Oracle Application Express in Oracle Database Cloud Service

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# What Is a Workspace?



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A workspace is an area within Oracle Application Express where you create your applications. To create an application, you must first create or have access to a workspace. Each workspace is associated with one or more schemas. By associating a workspace with a schema, you can:

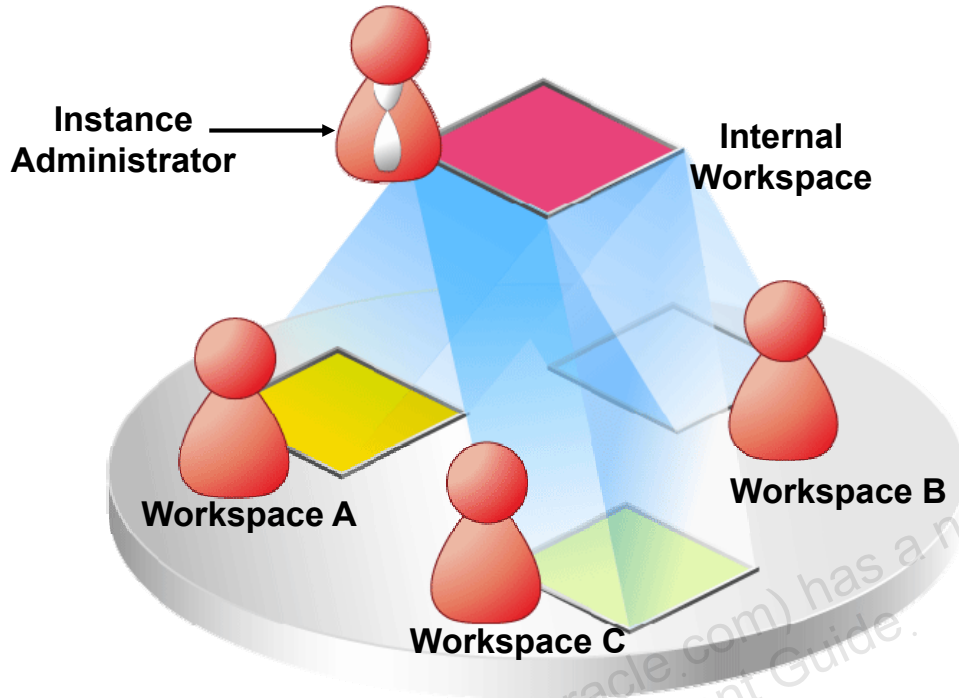
- Build applications that interact with the database objects in that schema
- Create new database objects in that schema

One or more developers or end users can access a workspace.

As shown in the graphic in the slide, a single Oracle database can contain multiple Oracle Application Express workspaces. In this example, you see three developers (A, B, and C) and three different workspaces (WS1, WS2, and WS3). A and B have access to WS1. In addition, B also has access to WS2. C has access to WS2 and WS3. Each workspace has access to one or more database schemas. For example, WS1 has access to OE and SH schemas, WS2 has access to SH, and WS3 has access to HR. Multiple developers can work by using the same database instance from different workspaces or the same workspace with access to the same or different schema.

Thus, Oracle Application Express turns a single Oracle database into a shared workgroup database service. This service can be accessed through a browser with no installation required on the desktop for the developer and the end user.

# What Is an Internal Workspace?



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An Internal workspace is:

- A special workspace that is created by default when Oracle Application Express is installed
- Accessible only to instance administrators
- Used to create and manage workspaces in the Oracle Application Express instance

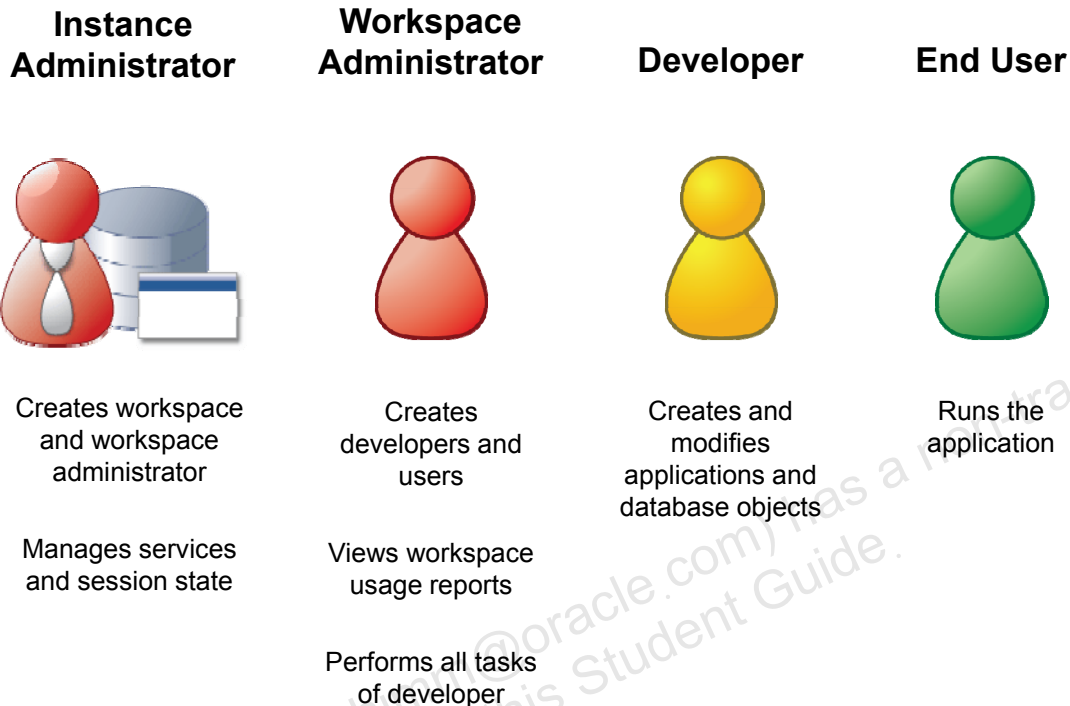
To log in to the Internal workspace, enter the following URL in the address bar:

`http://<hostname>:<port>/apex/apex_admin`

The login page appears. Enter `Admin` for Username, and for Password enter the password that was set during installation.

You can learn more about how to perform administration tasks by using the Internal workspace in the *Oracle Application Express: Administration* course.

# Defining Roles



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Four roles are defined in Oracle Application Express.

- Instance administrator
- Workspace administrator
- Developer
- End user

## Instance Administrator

An instance administrator manages the entire Oracle Application Express instance, including service administration and workspace administration. The instance administrator manages the workspaces of all the users, and is also responsible for managing session state and monitoring usage as a whole. The default Oracle Application Express administration privileged user is `admin`.

The instance administrator performs the following tasks:

1. Logs in to Oracle Application Express Administration
2. Creates a workspace and a workspace administrator. Both can be done at the same time by using the Create Workspace Wizard.

## Workspace Administrator

When a user is assigned administrative privileges for a workspace, that user becomes the workspace administrator. The workspace administrator can add new users to the workspace, create new user groups, and view usage reports of the workspace.

The workspace administrator performs the following tasks:

1. Logs in to Oracle Application Express by using the workspace that has been assigned by the instance administrator
2. Creates developer users for the workspace so that development can occur
3. Installs sample applications
4. Installs a packaged application with supporting objects

## Developer

Multiple users can log in to the same Oracle Application Express instance to develop and edit applications. Each of these users is called a *developer*.

Developers have access to a workspace through which they can access their own database objects. In addition to having private workspaces, users can also share a workspace to develop applications.

## End User

The end user is a user without development and administration privileges. This user has only the basic privileges needed to run an application.

## Quiz

Which of the following statements are true about Oracle Application Express workspaces? (Choose all that apply.)

- a. It is a private database shipped with the Oracle database.
- b. It enables multiple developers to create multiple applications simultaneously.
- c. It can be created by any Application Express user.
- d. It can access more than one database schema.

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**Answer: b, d**

# Lesson Agenda

- Oracle Application Express Overview
- Oracle Application Express Concepts
- Using Oracle Application Express
  - Logging In to a Workspace
  - Creating Users
  - About Workspace Home Page
    - SQL Workshop
    - Application Builder
      - Types of Applications
  - Installing and Using a Packaged Application
  - Exporting and Importing Applications
- Using Oracle Application Express in Oracle Database Cloud Service

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# Logging In to a Workspace

To log in to an Oracle Application Express workspace:

1. Enter the correct URL in your browser address bar.
2. Enter the workspace name.
3. Enter the username and password. Then click Login.

ORACLE Application Express

### Application Express Login

Workspace  
teach

Username  
TEACH

Password  
.....

[Reset Password](#)

**Login to Application Express**

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To log in to Oracle Application Express, you need a workspace name and the username and password created for that workspace. You can log in to Oracle Application Express as a workspace administrator or as a developer. You can access the Oracle Application Express application with the following URL:

`http://<hostname>:<port>/apex`

The login page appears. Enter the workspace name, username, and password. Click Login. You may be prompted to change your workspace password the first time you log in. This option is set when your username and password are created by the Oracle Application Express administrator. You can set your new password to be the same as your old password.

## Note

If your setup uses Oracle HTTP Server with `mod_plsql`, use:

`http://<hostname>:<port>/pls/apex`

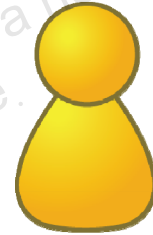
If your setup uses embedded PL/SQL gateway or Apex Listener, use:

`http://<hostname>:<port>/apex`

# Creating a Developer User

To create a developer user, perform the following steps:

- On the Oracle Application Express home page, click the down arrow on the Administration tab.
- Select “Manage Users and Groups” from the drop-down menu.
- Click the Create User button.
- Enter the username and email address for the user.
- Review the account privileges for the user.
- Enter the password for the user.
- Click the Create User button.



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Workspace administrators create the developer users who build applications. You can access the Create User button by performing one of the following:

- Select “Manage Users and Groups” from the Administration tab drop-down menu.
- Click the “Manage Users and Groups” icon on the Administration page.
- From the Tasks menu on the Administration page, select Create User.

On the Create User page, enter the details for the user. In the Account Privileges section, you can set the default schema for the user. You can restrict access to a specific set of schemas in a workspace or allow access to all schemas. You have an option to give the developer administrator privileges. You can also restrict access to the components of Oracle Application Express. The slide provides an overview of the steps to create a developer user. You can view a demonstration of this task by opening the `/home/oracle/labs/demos/les02_create_user.html` file.

## Workshop 2-1 Overview: Using Oracle Application Express as a Workspace Administrator

The practices for this lesson cover the following topics:

- Logging in to a workspace
- Creating a developer user

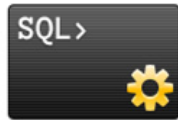
# Workspace Home Page

Oracle Application Express consists of the following components:



Application Builder

Create database applications, websheet applications and packaged applications.



SQL Workshop

Browse and create database objects.

Execute SQL commands and scripts.



Team Development

Track new features, bugs, milestones, to-do tasks, and feedback.



Administration

Create users.

Request service.

Monitor activity.

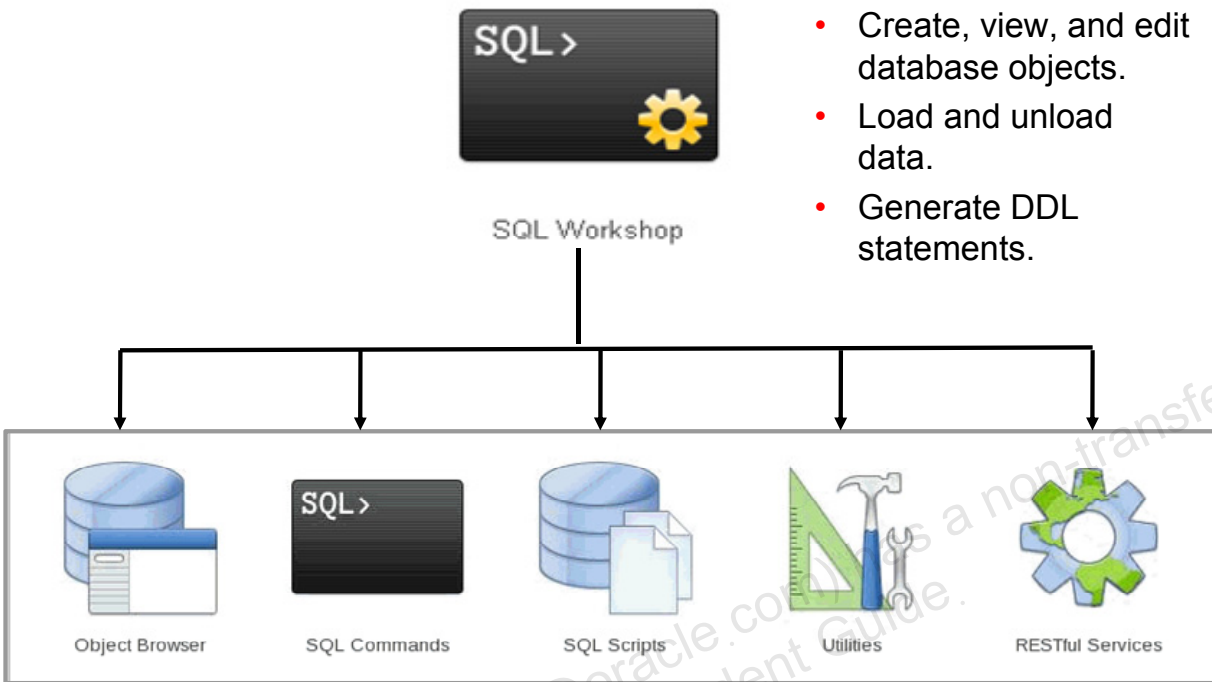
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When you log in to Oracle Application Express, the Workspace home page appears. The Oracle Application Express development environment consists of four components:

- **Application Builder:** Is used to create an application, composed of a set of HTML pages, based on database objects. You can create application pages and use the built-in features to add reports, forms, charts, calendars, and so on to an application. Using Application Builder, you can build database applications and websheet applications. You learn to create a database application in the lesson titled “Creating a Database Application.”
- **SQL Workshop:** Is used to access and manage database objects of an application. You can browse the objects in your application schema. You can create database objects, such as tables, views, sequences, and so on. You can execute SQL commands and run SQL scripts.
- **Team Development:** Provides a development management tool that enables you to track new features, bugs, milestones, to-do tasks, and feedbacks
- **Administration:** Is used to manage workspace users and services

# What Is SQL Workshop?



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SQL Workshop is a tool in Application Express that you use to interact with the database objects. You can create, view, and edit database objects. You can also perform tasks, such as loading and unloading data to and from database tables, generating data definition language (DDL) statements, and viewing reports. SQL Workshop consists of five components:

- **Object Browser:** Enables you to browse, create, and edit objects in a database
- **SQL Commands:** Enables you to create, edit, view, run, and delete database objects
- **SQL Scripts:** Is a set of SQL commands saved as a file in SQL Scripts. A SQL script can contain one or more SQL statements or PL/SQL blocks. You can use SQL Scripts to create, edit, view, run, and delete database objects.
- **Utilities:** Enables you to build SQL queries, load and unload data from an Oracle database, generate DDL, view object reports, manage User Interface defaults, restore dropped database objects, compare schemas, monitor the database, and view database details
- **RESTful Services:** Enables the declarative specification of RESTful Web Services used to access the database. These services work in conjunction with the Oracle Application Express Listener to enable the consumption of these services.

# Accessing SQL Workshop



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From the Oracle Application Express home page, you can access the SQL Workshop tool in two ways:

- Click the SQL Workshop icon or the SQL Workshop tab, and then select the component that you want to access.
- Click the down arrow on the SQL Workshop tab, and then select the component that you want to access from the drop-down menu.

# Running SQL Commands

1 Navigate to:

2 Enter the command in the command editor.

3 Click the Run button.

4 View the output on the Results tab.

5 Click Download to export the results to a spreadsheet.

```
SELECT first_name, last_name from OEHR_EMPLOYEES
where first_name like 'E%'
```

FIRST_NAME	LAST_NAME
Ellen	Abel
Elizabeth	Bates
Eleni	Zlotkey

3 rows returned in 0.00 seconds

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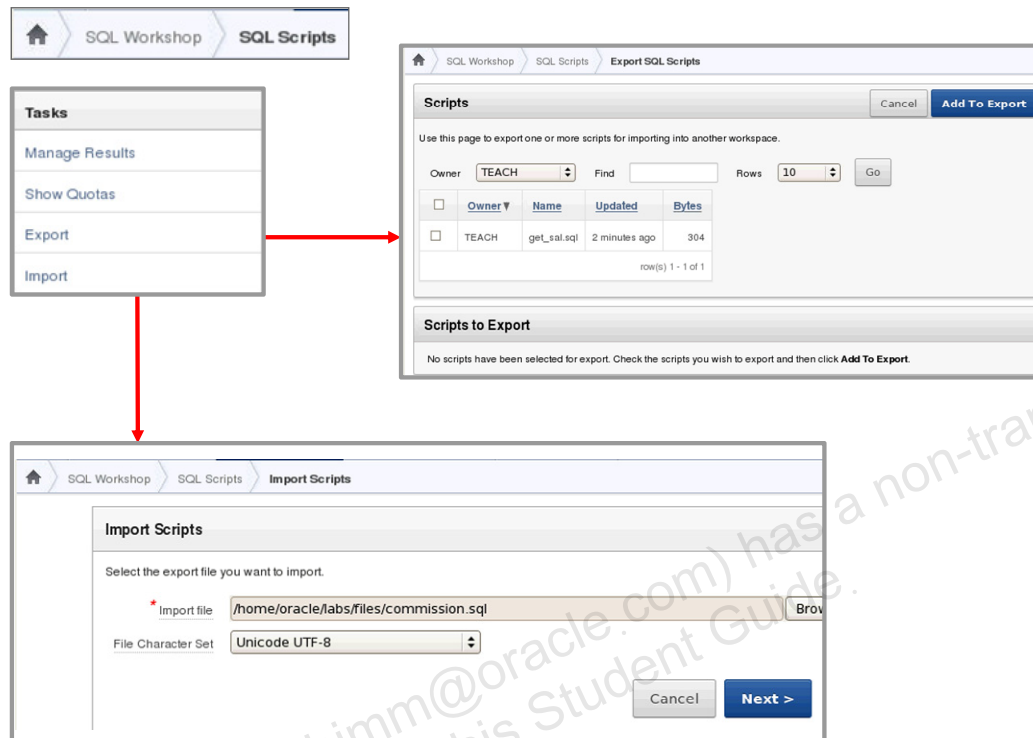
To execute SQL code with SQL Commands, perform the following steps:

1. Navigate to the SQL Commands page by selecting **SQL Commands** from the drop-down menu on the SQL Workshop tab.
2. Enter the SQL or PL/SQL statement in the command editor.
3. Click the **Run** button.
4. View the output on the Results tab of the display pane.
5. (Optional) Click the **Download** link to export the results of the query to a spreadsheet in Microsoft Excel.

## Note

- If you have multiple commands in the command editor, you can run only one command at a time. Select the command and click Run. Only the command that was selected is executed.
- SQL commands that are created and saved by using Query Builder can be executed from the SQL Commands page.

# Importing and Running a SQL Script



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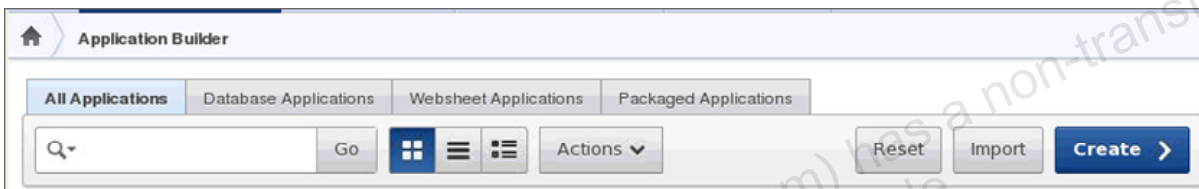
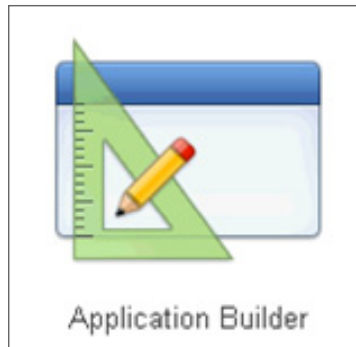
The Export and Import tasks enable you to transfer scripts between workspaces.

Using Export, you can export multiple scripts from your current workspace to another workspace. All the scripts that you select to export are encoded into a single script file. You can save this file to your local file system and import it to another workspace.

To export scripts, click the Export link. The scripts available in the script repository are listed in the Scripts pane. Select the scripts that you want to export and click the Add To Export button. The selected scripts are listed in the “Scripts to Export” pane. You can finalize the scripts that you want to export by removing or adding scripts. To export all the scripts, click the Export All button. The scripts are exported as a single export file, which you can save to your local file system.

Using Import, you can import a script file exported from a different workspace into your current workspace. To import a script file, click the Import link. Click the Browse button and locate the file to import from your local file system. Click Next and click Import Scripts to confirm. Only script files exported from the scripts repository can be imported. If you try to import any other script, you get a “script not compatible” error.

# What Is Application Builder?



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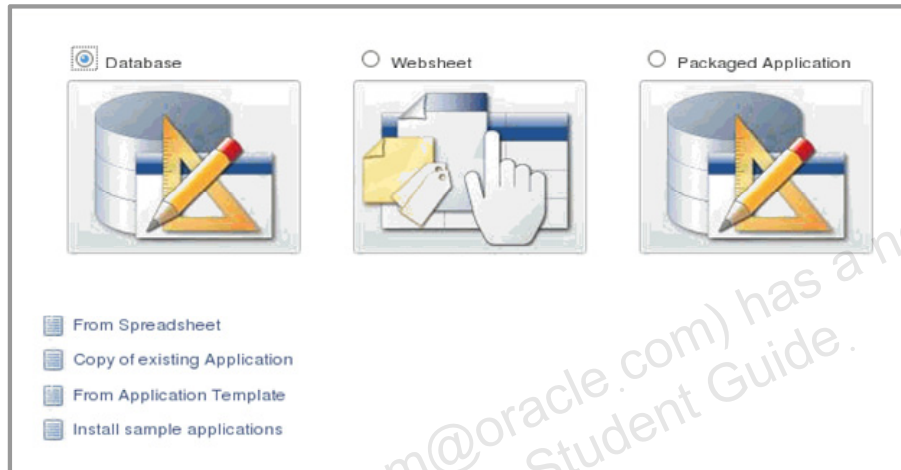
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An Oracle Application Express application enables you to manage and display data from an Oracle database. You build an application using Application Builder. Using Application Builder you can create two types of applications: database applications and worksheet applications.

**Note:** When you log in to Oracle Application Express and select Application Builder, you will find that a Sample Database Application, which is a packaged application, is already installed for you.

# Types of Applications

- Database
- Websheet
- Packaged Application



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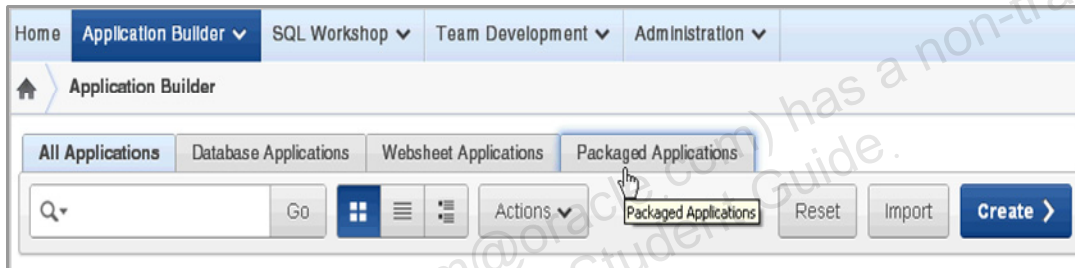
When you run the Create Application Wizard, the wizard prompts you to choose the type of application that you want to create. The options include:

- **Database:** A database application is a collection of pages that share a common session state and authentication. Database applications enable developers to have full control on all aspects of the development process. With database applications, developers can directly leverage their SQL and PL/SQL programming skills. You can manually add and customize components (reports, charts, or forms), page controls (buttons, items, or lists of values), and shared components (breadcrumbs, lists, or tabs).
- **Websheet:** A websheet application is geared toward the business user and requires no prior development experience. Each websheet application is a collection of pages designed for web-based data entry and reporting. Websheet applications are simplified and support pages, data grids, and reports. When you create a websheet application, Application Builder automatically handles the creation of tables, triggers, and sequences. Websheets offer an easy, declarative approach to report and form layout, as well as to the creation of lists of values and validations. For more details on websheet applications, see “Appendix B: More Information on Application Development.”
- **Packaged Application:** Packaged applications are fully functional applications that have been designed to address a specific business need. You can install, run, and use packaged applications as they are, or unlock productivity applications to customize the solution provided or analyze them to better understand how to use Application Builder to build specific types of functionality.

# Accessing a Packaged Application

To access the Packaged Applications page:

- Log in to Oracle Application Express. The Workspace home page appears.
- Click the Application Builder icon. The Application Builder home page appears.
- Click the Packaged Applications tab.



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# Selecting a Packaged Application

The screenshot shows the Oracle Application Express interface with the 'Packaged Applications' tab selected. At the top, there are two dropdown menus: 'All Categories' (labeled 'Category') and 'All Applications' (labeled 'Type'). Below these are 15 application cards arranged in a 3x5 grid. The first two columns are highlighted with red boxes and labeled with handwritten text: 'Productivity applications' and 'Sample applications'. The 'Productivity applications' group includes 'Customer Tracker' and 'Group Calendar'. The 'Sample applications' group includes 'Sample Calendar', 'Sample Dialog', and 'Sample Search'. Other applications include 'APEX Application Archive', 'Artwork Catalog', 'Bug Tracking', 'Decision Manager', 'Expertise Tracker', 'Incident Tracking', 'Issue Tracker', 'Sample Charts', 'Sample Collections', 'Sample Dynamic Actions', 'Sample File Upload and Download', 'Sample Tabular Form', and 'Sample Trees'.

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Oracle Application Express includes two types of packaged applications:

- Sample applications
- Productivity applications

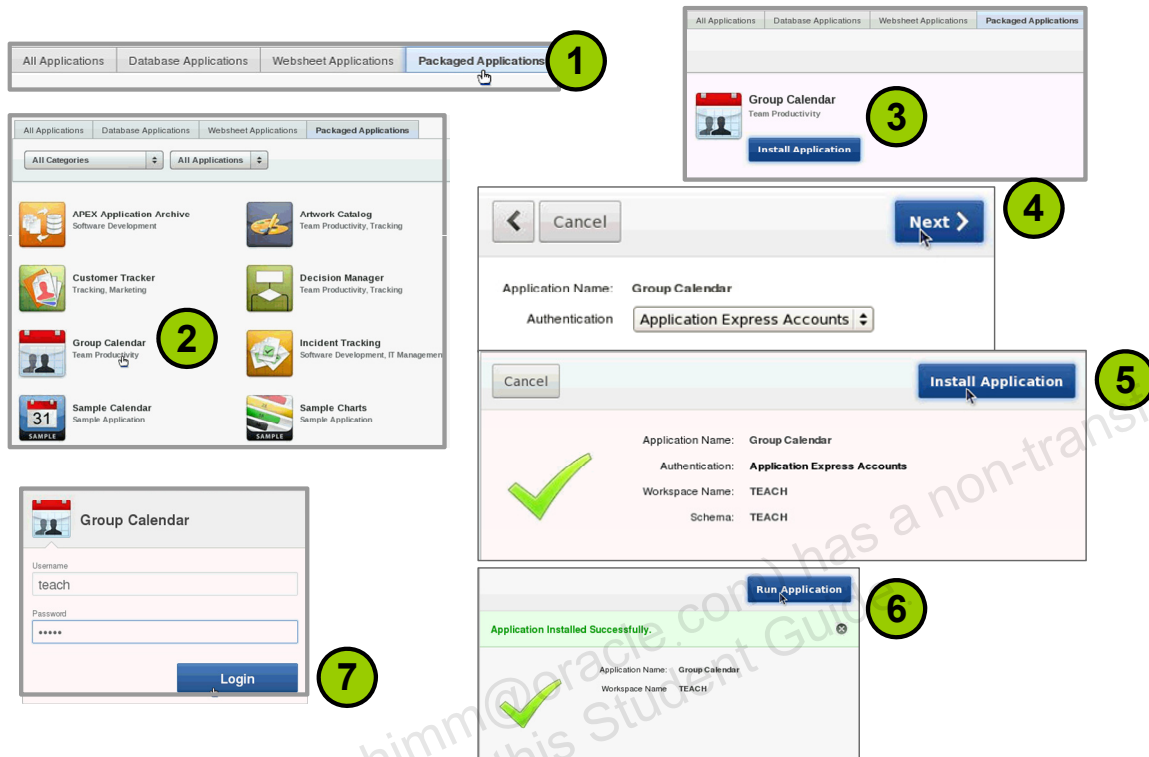
Both sample and productivity applications are fully functional applications that have been designed to address a specific business need. You can install, run, and use packaged applications as they are, or analyze them to better understand how to use Application Builder to build specific types of functionality.

The main difference between a sample application and a productivity application is the level of support. By default, sample applications are fully editable. In contrast, you must unlock productivity applications before you can edit them. Unlocking a productivity application makes it ineligible for future upgrades or support by Oracle support.

You can use the following lists at the top of the page to filter the display:

- **Category:** Is used to sort by application category. Options include: Community, IT management, Knowledge Management, Marketing, Project Management, Sample, Software Development, Team Productivity, and so on.
- **Type:** Is used to sort by application type. Options include: All Applications, Only Installed, Not Installed, Database Applications, or Websheets.

# Installing a Packaged Application

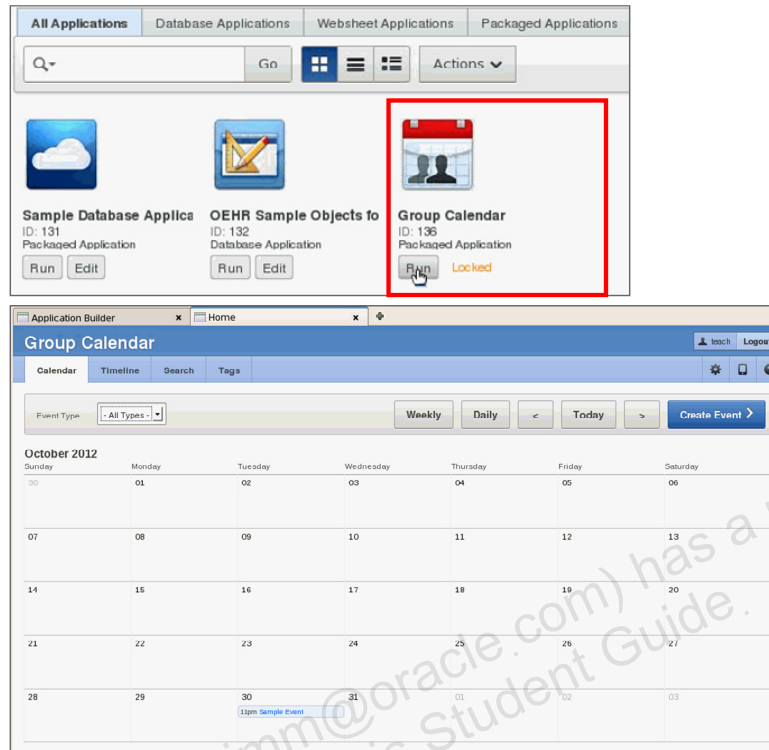


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To install a packaged application:

1. On the Application Builder Home Page, click the Packaged Applications tab. The Packaged Applications page appears.
2. Locate the application to be installed. In the example in the slide, the Sample Charts application is selected.
3. Click the application image. A summary page appears. Click Install Application.
4. Select an Authentication scheme and click Next.
5. Click Install Application again. A success message appears.
6. To run the application, click the Run Application icon.
7. Enter the appropriate login credentials and click Login.
8. The application has been installed.

# Running an Installed Packaged Application



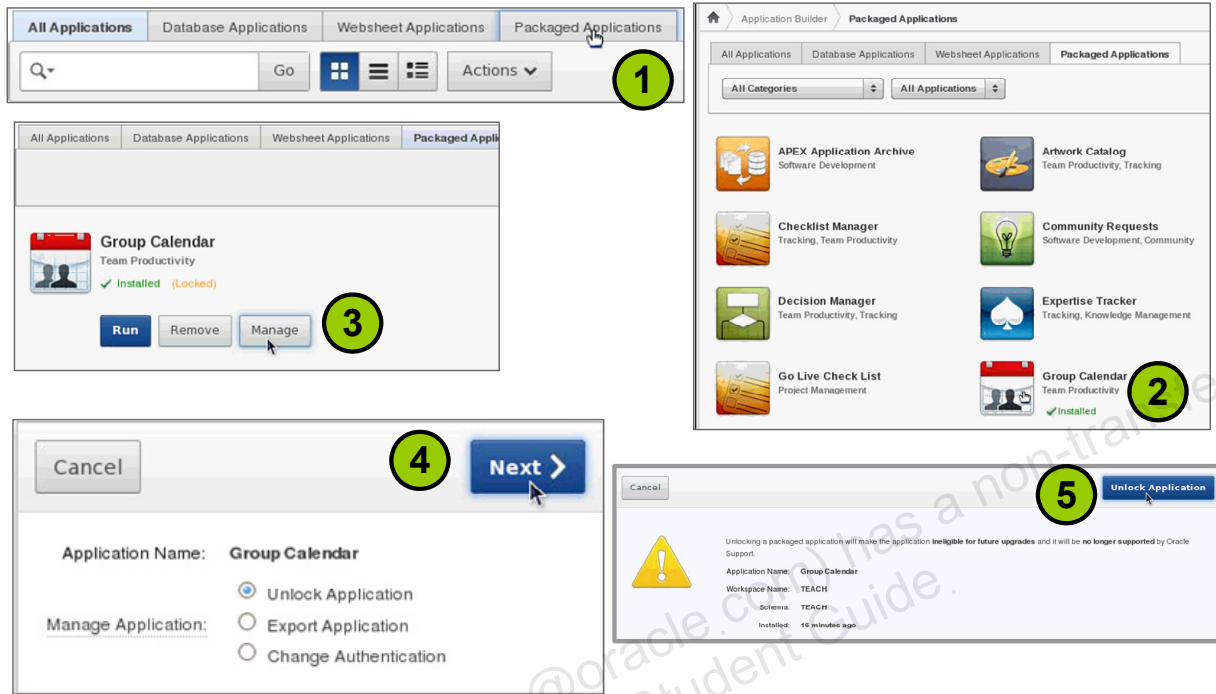
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To run an installed packaged application:

1. Click the Packaged Applications tab. The Packaged Applications page appears.
2. Locate the application.
  - a. Click the application image.
  - b. Click Run.
3. Enter the appropriate login credentials to view the application.

# Unlocking an Installed Productivity Application



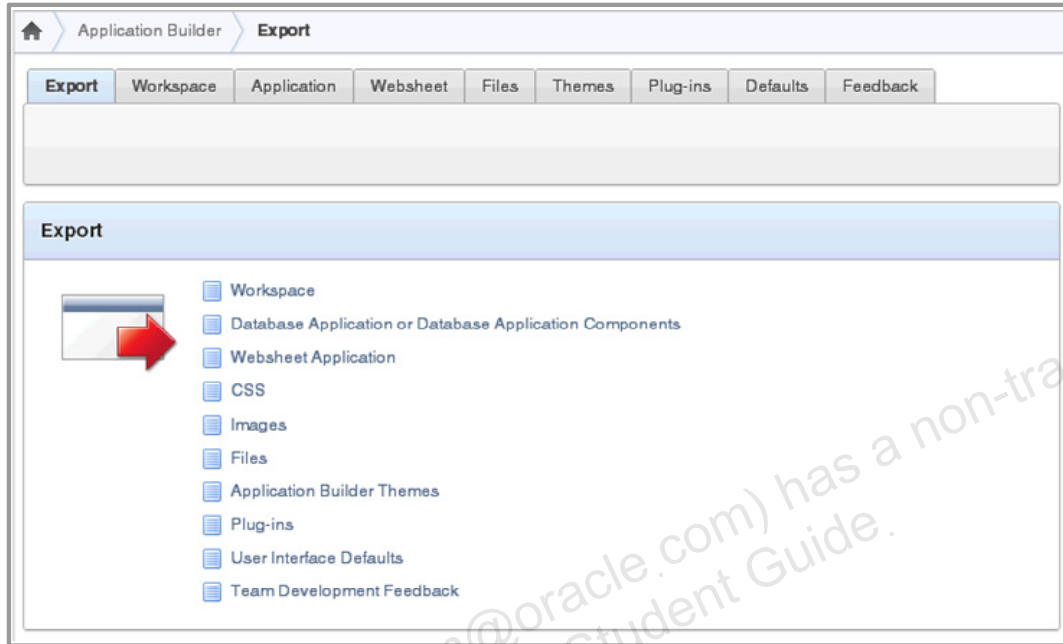
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After a productivity application is installed, you must unlock it before you can edit it. To unlock an installed productivity application:

1. Click the Packaged Applications tab. The Packaged Applications page appears.
2. Locate the application to be unlocked. Click the application image.
3. Click Manage.
4. Select Unlock Application and click Next.
5. When prompted, click Unlock Application.

# Exporting an Application

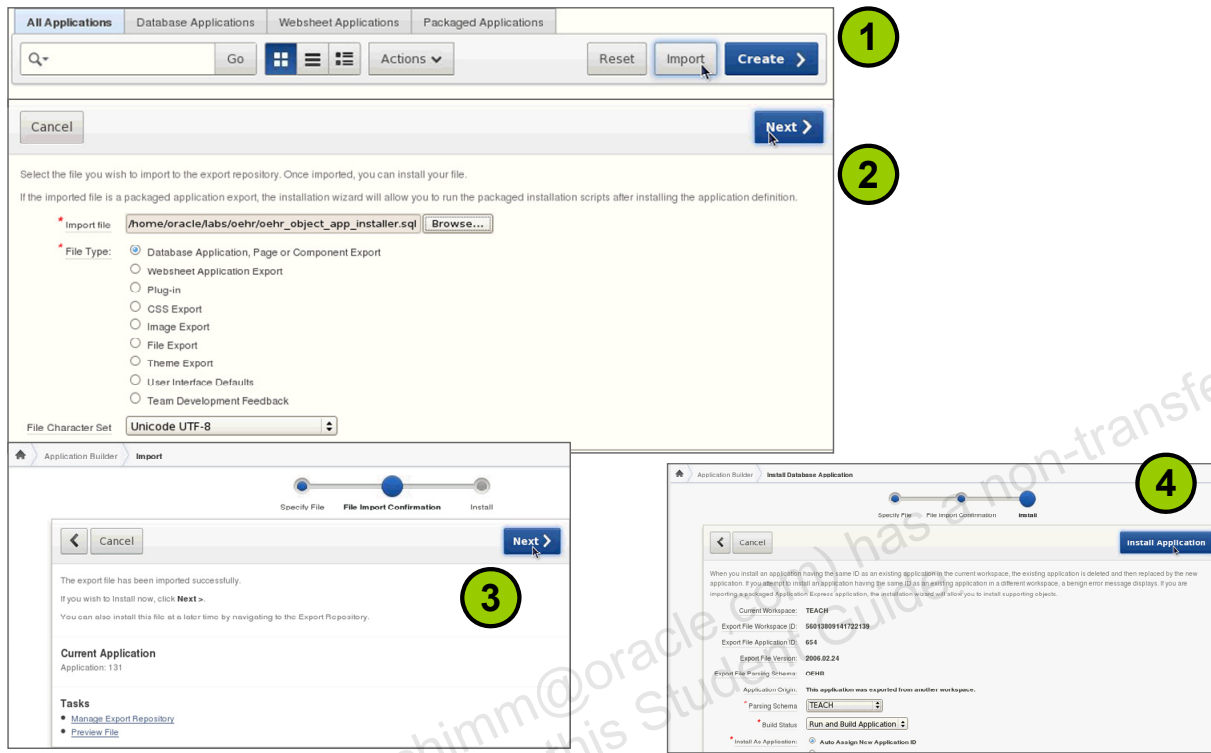


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Sometimes you may want to take a back up of your application or move it to a different workspace. You can do this by exporting your application. You export application definitions and all associated files using the Export, Workspace, Application, Worksheet, Files, Themes, Plug-ins, Defaults, and Feedback tabs located at the top of the Export page.

# Importing an Application



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After you export an application and any related files, you may import them into the target Oracle Application Express instance, and then install them. As a general rule, always import the application first and then the related files. To import an Application, Page, or Component Export into a target Oracle Application Express instance:

1. Navigate to the Import page by clicking the Application Builder icon on the Workspace home page. Click Import on the Application Builder home page.
2. To specify the file, navigate to the file and select the file type. Verify that the File Character Set is correct and click Next. After you import a file, you have the option to install it.
3. Click Next to install the file. The Install Database Application Wizard appears.
4. On the Install page, select the schema and select the build status of the application. You can select Run Application Only or Run and Build Application. In the Run Application Only status, users can only run an application, whereas in the Run and Build Application status, users can run an application and developers can both run and edit an application.
5. Click Install Application to install the application.

## Workshop 2-2 Overview: Using Oracle Application Express as a Developer

The practices for this lesson cover the following topics:

- Log in to Oracle Application Express as a Developer
- Run the sample database application
- Install a packaged application and use it
- Import the OEHR database application and its supporting objects

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# Lesson Agenda

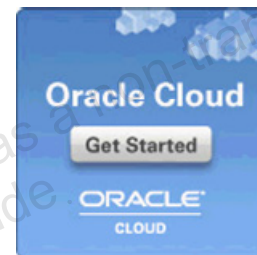
- Oracle Application Express Overview
- Oracle Application Express Concepts
- Using Oracle Application Express
- Using Oracle Application Express in Oracle Database Cloud Service

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# Oracle Database Cloud Service

- Is built on Oracle Database technology running on the Oracle Exadata Database machine
- Is accessible from any supported browser on any platform
- Includes a wide variety of tools and utilities



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The Database Cloud Service is built on Oracle Database technology, running on the Oracle Exadata Database machine. The Database Cloud Service has four main components:

- Oracle Database 11g R2 Enterprise Edition
- Oracle Application Express, which is used to create and deploy all varieties of applications in a browser-based environment
- RESTful Web Services, which allows access to the data in your Database Cloud Service through simple URIs
- Packaged Applications and Sample Code, which is a set of business productivity applications that are installed easily

The Oracle Database Cloud Service delivers the following advantages:

- You can access your Database Cloud Service from any supported browser on any platform.
- It comes in several sizes, based on a simple storage and transfer metrics.
- It has a simple monthly subscription cost, which includes all standard maintenance operations and Oracle Support.

- You can provision a complete Database Cloud Service environment in a few minutes and immediately start to be productive. The Database Cloud Service includes simple administrative tools that enable you to monitor usage, and add and drop user access. The Oracle Store allows you to modify your subscription package with a simple interface.
- The Database Cloud Service includes a variety of tools and utilities, including development wizards and flexible interactive reporting. Most importantly, the Database Cloud Service offers rapid application development and instant deployment, which enable developers and users to work together in real time to create optimal solutions for business needs.

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# Using Oracle Application Express in Oracle Database Cloud Service

Oracle Application Express:

- Is offered as a platform for rapid application development
- Resides within the Oracle Database Cloud Service
- Contains features that enable secure application development

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Oracle Application Express is used to create cloud-based applications in your Database Cloud Service. Oracle Application Express is provided as a platform for rapid application development on the Oracle Database Cloud Service. Oracle Application Express includes several features that help develop secure applications in Oracle Database Cloud service. Because Oracle Application Express and applications developed on it reside in an Oracle Database instance, you can develop and deploy applications using Oracle Application Express running on Oracle Database Cloud service.

You can log in to `cloud.oracle.com` for a free trial.

For more details about using Oracle Application Express in Oracle Database Cloud Service, refer to Appendix C of this course.

# Summary

In this lesson, you should have learned how to:

- Describe Oracle Application Express and its concepts
- Explain the Oracle Application Express architecture
- Identify the components of Oracle Application Express
- Identify the different types of applications available
- Install, run, and unlock a packaged productivity application
- Export and import applications

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Oracle Application Express is a rapid application development tool that is available in Oracle database. In this lesson, you were introduced to Oracle Application Express, the advantages of using Oracle Application Express to build applications, and the Oracle Application Express features that you use when building your application. You also learned about the architecture and the components of Oracle Application Express, as well as the steps to get started.

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# 3 Creating a Database Application

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# Objectives

After completing this lesson, you should be able to do the following:

- Identify the components of a database application
- Describe the database application user interfaces
- Explain the various ways of creating a database application

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This lesson introduces you to Application Builder. In this lesson, you learn about the different components of a database application and the concepts associated with building a database application from the beginning, from a spreadsheet, and instantly.

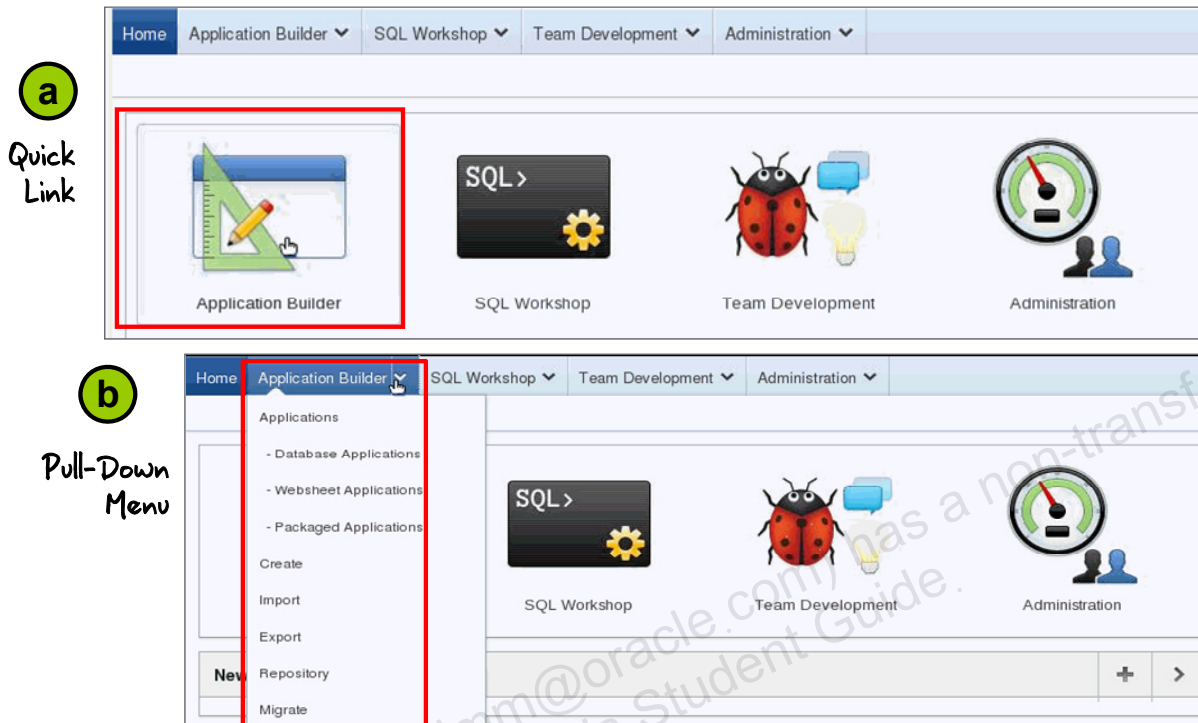
# Lesson Agenda

- Application Builder Overview
  - Accessing Application Builder
  - Application Builder Interface
- Introducing Database Applications
- Creating a Database Application

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# Accessing Application Builder



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When you log in to Oracle Application Express, the Workspace home page appears.

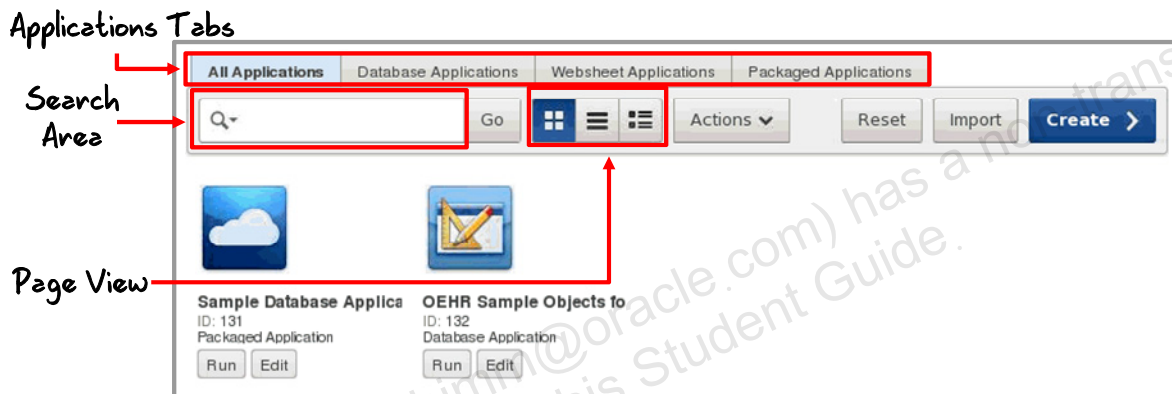
To view the Application Builder home page, you can choose one of the following options:

- Click the Application Builder icon to drill down to the Application Builder home page.
- Click the down arrow next to Application Builder to view the pull-down menu. You can then select the appropriate menu option.

# Application Builder Home Page

From the Application Builder home page, you can:

- Click an application tab
- Search for an application
- Change the page view
- Use the Actions menu
- Reset the application report
- Import or export an application
- Create an application
- View an application



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The Application Builder home page displays the currently installed applications. From the Application Builder home page, you can:

- **Click an application tab:** To narrow the list of applications displayed, click the applications tab.
- **Search for an application:** To search for a particular application, enter the name of the application in the Search area and click Go. You can also search a particular column by clicking the magnifying glass icon and selecting a column to search on. If no column is selected, all the columns are searched.
- **Change the page view:** You can change the appearance of a page by making a selection from the three View icons next to the Go button. These icons consist of:
  - **View Icons** (the default): Displays each application as an icon and identifies it by the application name
  - **View Report:** Displays a list of the applications in a report
  - **View Details:** Displays each application as a line in a report

- **Use the Actions menu:** The Actions menu enables you to perform different tasks for the data that is displayed.
- **Reset the application report:** This returns you to the default display.
- **Import or export an application:** Click Export to export an application file and click Import to import an exported application file.
- **Create an application:** Click Create to create a new application or to install a sample application.
- **View an application:** Click the application icon or application name to view a specific application. This opens the home page of that application.

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# Lesson Agenda

- Using Application Builder
- Introducing Database Applications
  - Database Application Home Page
  - Themes
  - Components of a Database Application
  - What Is a Page?
  - Different Views of a Page
  - Switching Between Pages and View Types
- Creating a Database Application

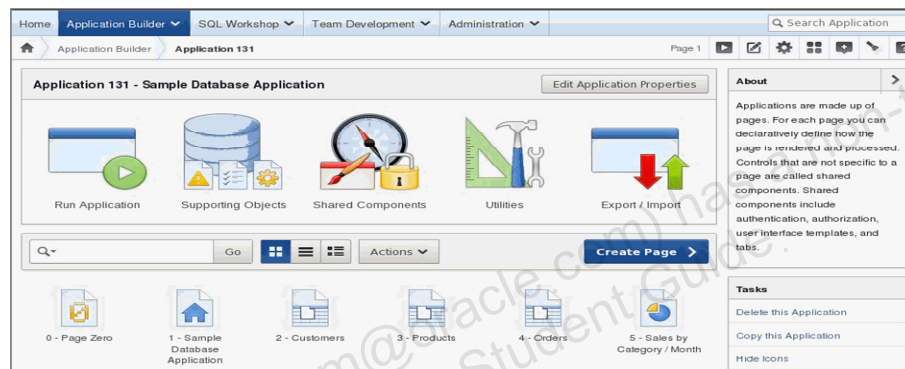
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# Database Application Home Page

From an application home page, you can:

- Run the application
- Use the Supporting Objects utility
- Create shared components
- Examine application utilities
- Export and import applications
- Edit application properties
- Create a page



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When you click the application icon or application name, the application home page appears. You can see the application ID and the name of the application at the top of the page.

From the application home page, you can:

- **Run the application:** Click the Run Application icon to submit the pages to the Oracle Application Express engine to render a viewable HTML page.
- **Use the Supporting Objects utility:** Click Supporting Objects to access the utility to define the database object definitions, images, and seed data to be included in your application export for your packaged application.
- **Create shared components:** Click Shared Components to build shared application components and user interface controls.
- **Examine application utilities:** Click Utilities to monitor developer activity, view dashboards, run the Advisor, and view numerous other reports.
- **Export and import an application:** Click the Export/Import icon to export or import an entire application or its components, such as cascading style sheets, images, static files, themes, and user interface defaults.

- **Edit application properties:** Click Edit Application Properties to edit the application name and availability, and to define static substitution strings. Additionally, the Edit Application page displays the defined build options, the associated theme, template defaults, and component defaults.
- **Create a page:** Click Create Page to add a page to your application.

On the application home page, you also see a list of icons for each page. To open a page, click one of the page icons.

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# Database Application User Interfaces

Select the user interface.

Desktop User Interface

Mobile User Interface

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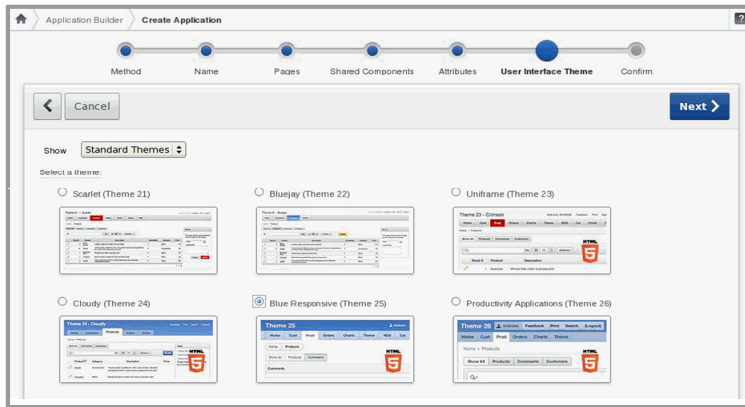
At the time of creating a database application, you have the option to choose the type of user interface that you can develop your application for.

Oracle Application Express supports two user interface models for database applications:

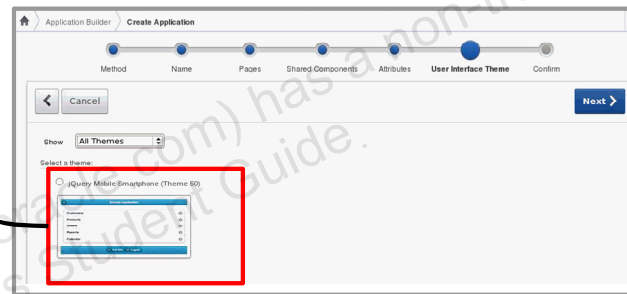
- **Desktop:** Used for applications that are primarily used on a desktop
- **jQuery Mobile Smartphone:** Used for applications that are developed for smartphones or tablets

# Themes

## Desktop user interface



## Mobile user interface



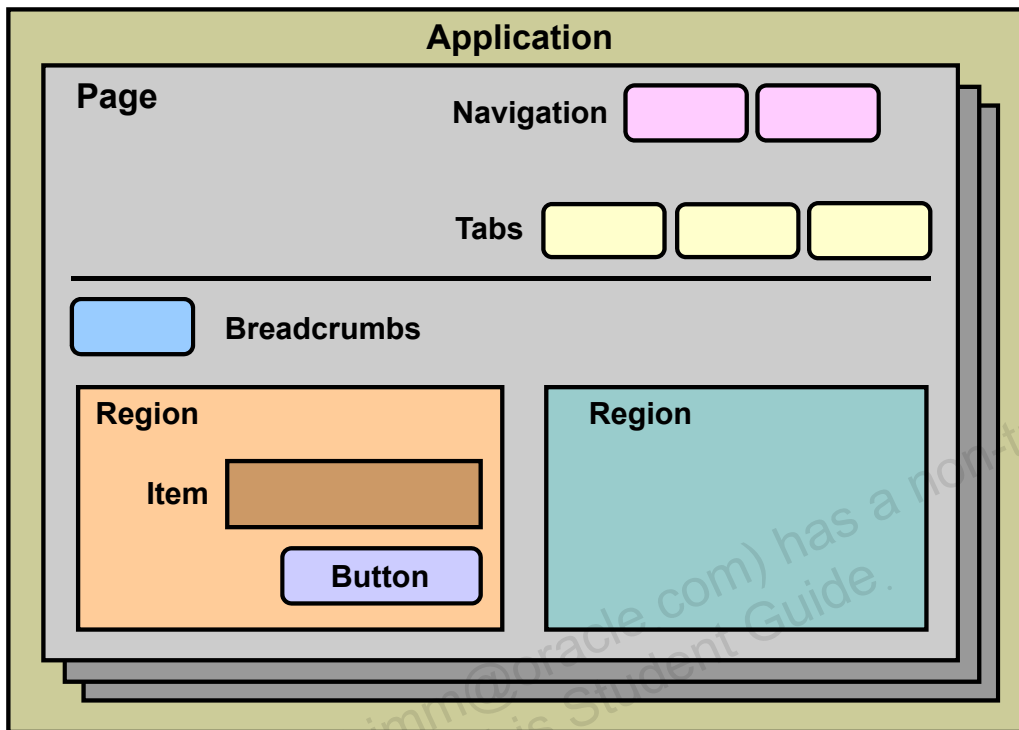
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Themes are used to define the layout and style of an entire application. Themes provide a set of templates that accommodate every User Interface pattern that may be needed in an application. Oracle Application Express supports three types of user interface themes for database applications built using the desktop user interface: Standard, Custom, and Legacy.

Standard themes are provided by Application Express. For example, the Blue Responsive theme (theme 25) is a standard theme that can be used to develop responsive web applications that can be used on desktop, smartphones, and tablets. Custom themes are additional themes available for use. These are themes that are built by the user and then made available for other workspaces in the same installation. Therefore, if an organization wants to create a company-specific theme, they can create it and then make it available to other workspaces. This topic is discussed in more detail in *Oracle Application Express: Workshop II* course. Legacy themes are themes developed prior to HTML5 and have an older look and feel. For nondesktop applications, jQuery Mobile Smartphone (theme 50) is used.

# Components of a Database Application



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A database application is a collection of database-driven web pages that are linked by navigational controls, such as tabs, buttons, and hypertext links.

A page is the basic element of an application. A page is divided into regions; a region is a section of a page that contains content. The content of the region is determined by the region source. For example, a region can contain a report based on a SQL query, or it can contain static HTML.

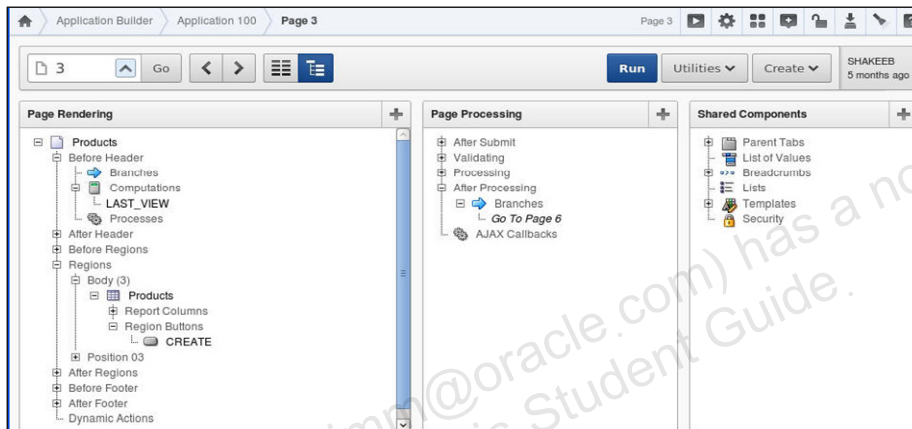
A region can also contain the following:

- Items such as a text field, text area, select list, and check box
- Buttons to direct users to a specific page or URL, and also to post and process information
- Breadcrumbs (locator links) to provide hierarchical navigation

Navigation entries are placed outside regions to enable users to navigate between the pages of an application.

# Page Definition: Overview

- A page is the basic building block of an application.
- The Page Definition is divided into three sections:
  - Page Rendering
  - Page Processing
  - Shared Components



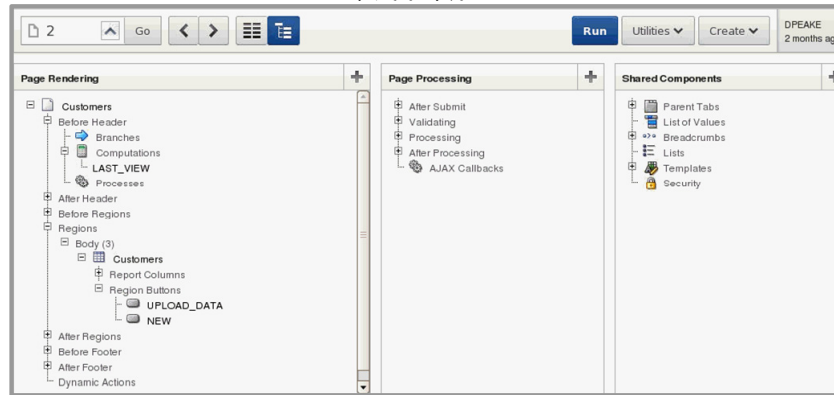
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You build an application by using pages. The Page Definition is divided into:

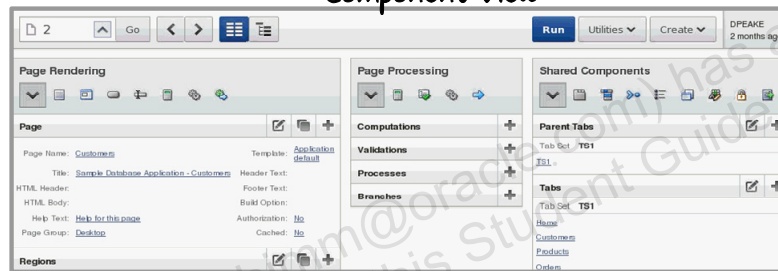
- **Page Rendering:** The process of generating a page from the database. You can use the Page Rendering section to modify the controls that impact the rendering of a page, including the page definition, regions, buttons, items, page-rendering computations, and page processes.
- **Page Processing:** The process of submitting a page. A page is typically submitted when a user clicks a button. You can use the Page Processing section of the Page Definition to specify application logic, such as computations, validations, processes, and branches. In general, the Application Express engine runs the logic of specific applications in the order in which they appear on the Page Definition.
- **Shared Components:** List of the common components that can be displayed or applied on every page within an application. Some of the shared components include tabs, lists of values, breadcrumbs, lists, and navigation bars.

# Different Views of a Page

Tree View



Component View



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There are two ways to view a page: Tree view and Component view.

The Tree view displays regions, page items, and application logic as nodes in a tree. The tree groups components based on an event sequence or on the way that Oracle Application Express processes them when rendering a page. This organization enables you to better understand when a component is processed. The key features of this view include:

- **Context menus:** Each tree node features a custom context menu. To access a context menu, right-click a tree node.
- **Quick access to attributes pages:** To edit attributes, double-click a node or select a node and press Enter. If available, an attribute page appears.
- **Easy reorder of components:** You can reorder page items, report columns, processes, validations, branches, or computations by dragging them to another display, processing point, or region.
- **Tool tips:** Each tree node features a tool tip, which displays basic information about the component, such as item type, condition, and authorization.
- **Identification of conditions, authorizations, and build options:** If a component has a condition, authorization, or build option, the tree node label is displayed in italic.

- **Inline Edit:** Tree nodes that have Rename in the context menu can be directly modified within the tree without having to go to the edit page. Pressing F2 enables inline edit. Use Show Names and Show Labels from the Utilities/Switch To menu to show component names or labels.
- **Direct access to default wizards:** Each context menu includes actions that link to default wizards. For example, selecting Create Validation for an item displays the Create Validation Wizard.

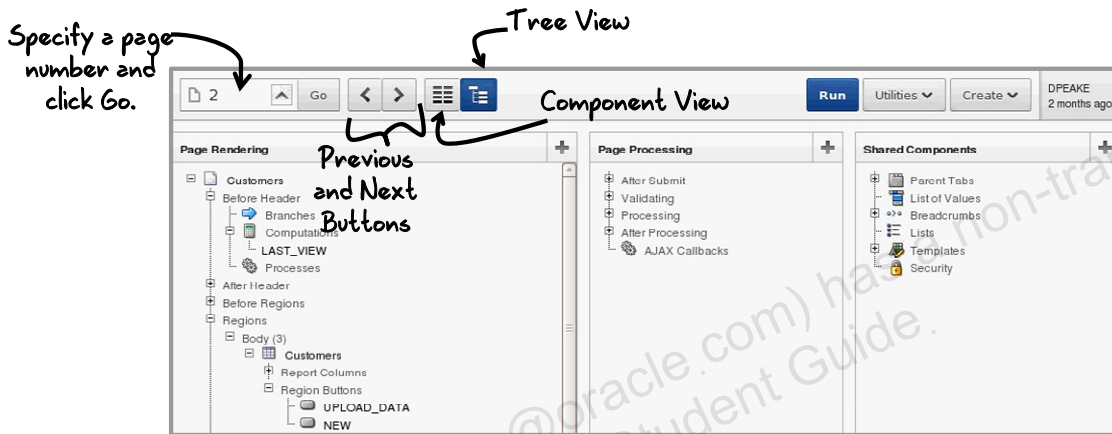
The Component view groups user interface elements and application logic by component type.

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# Switching Between Pages and View Types

The navigation bar enables you to:

- Specify a specific page
- Select the previous or next page
- Change view types



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The following are the three ways to switch from one page to another:

1. Enter a page number in the Page field, and then click Go.
2. Click the up arrow next to the Page field, and then select a page from the list.
3. Click the Previous and Next buttons to the right of the Go button.

To switch from the Tree view (which is the default) to the Component view, click the Component View icon on the navigation bar. To switch to the Tree view, click the Tree View icon on the navigation bar.

## Quiz

Application Builder enables you to create both database and websheet applications.

- a. True
- b. False

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**Answer: a**

## Quiz

Which of the following steps would you perform to navigate from one page to another? (Choose all that apply.)

- a. Click the Component View icon.
- b. Enter a page number in the Page field and click Go.
- c. Use the Previous and Next buttons.
- d. Click the Detail View icon on the application home page.

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**Answer: b, c**

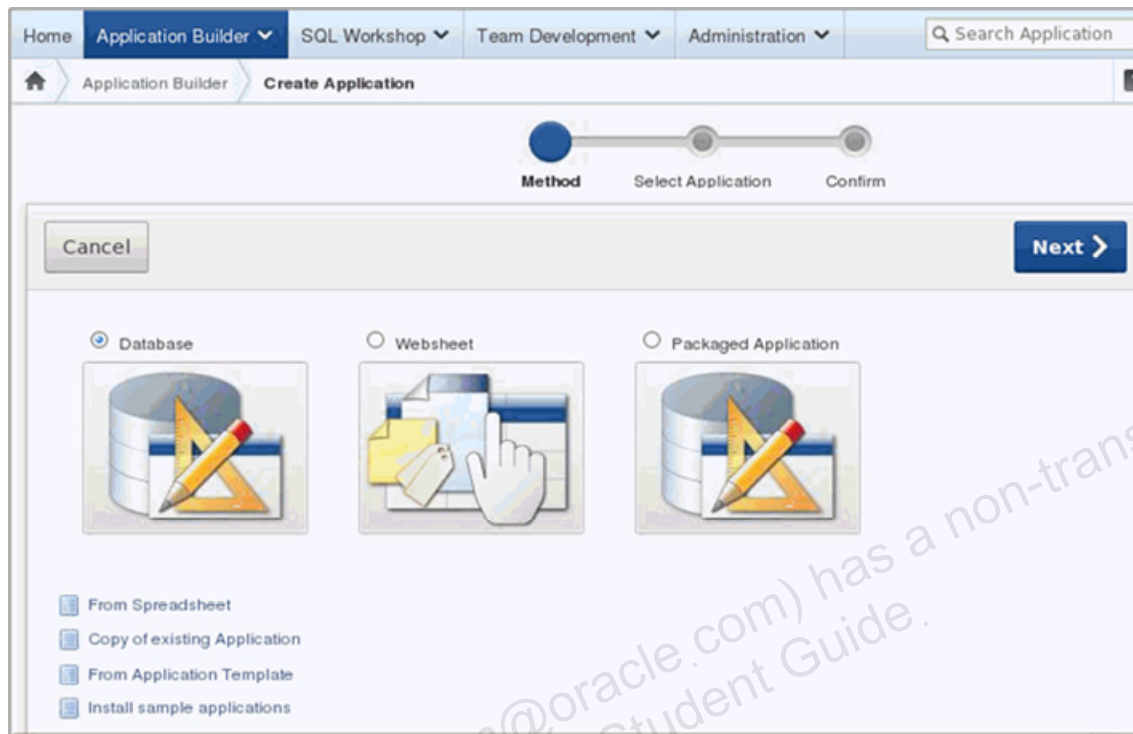
# Lesson Agenda

- Using Application Builder
- Introducing Database Applications
- Creating a Database Application
  - Accessing the Create Application Wizard
  - Different ways of Creating an Application
  - Using User Interface Types
  - Running an Application
  - Using the Developer Toolbar

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# Create Application Wizard



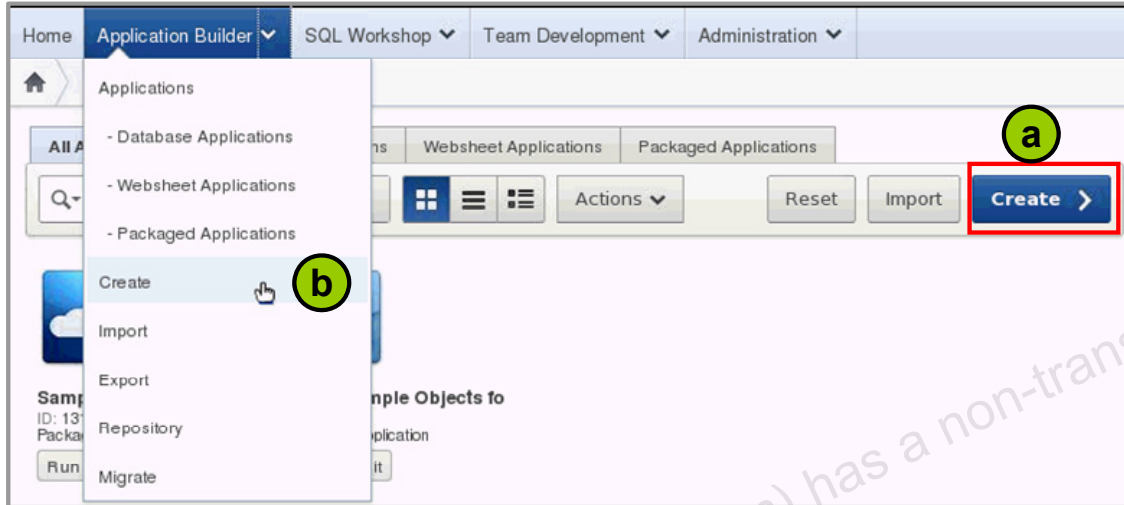
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You create an Oracle Application Express application by running the Create Application Wizard. To run the Create Application Wizard, click the Create button on the Application Builder home page.

While stepping through the wizard, there are some decisions that you have to take to choose the type of application you want to create. These options include Database, Worksheet, and Packaged Application.

# Accessing the Create Application Wizard



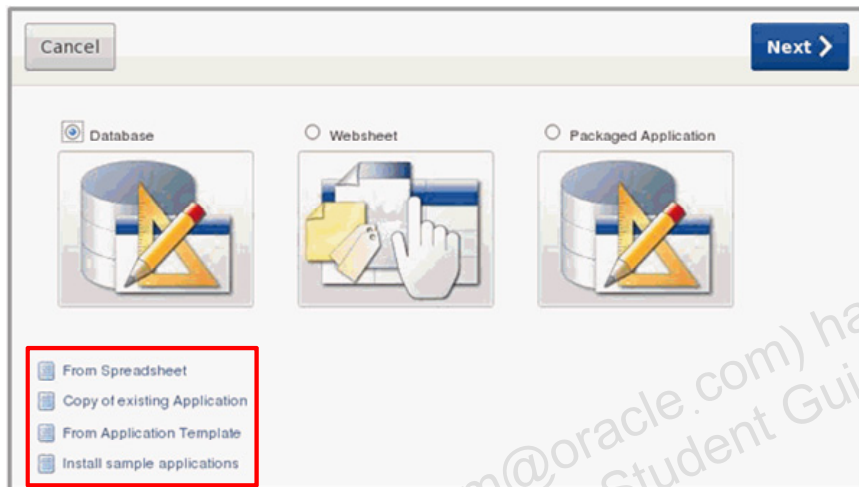
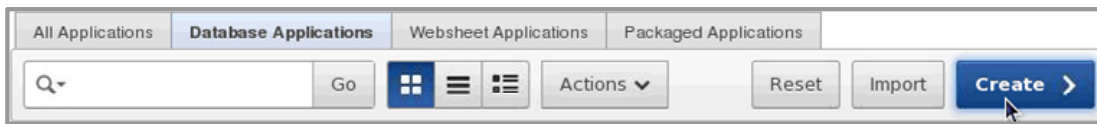
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To access the Create Application Wizard, perform either of the following steps:

1. Navigate to the Application Builder home page and click the Create button.
2. Select Create from the Application Builder menu.

# Different Ways of Creating a Database Application



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To create a database application, select Database for the application type, and then click Next. You have four options to create a database application:

- **From Spreadsheet:** You can create an application based on spreadsheet data. You first upload or paste the spreadsheet data to create a table. Then you select a default appearance. The resulting application enables end users to query, insert, or update records, or analyze the data.
- **Copy of existing Application:** You can create a copy of an existing application by running the Create Application Wizard or by selecting the application and then copying the application on the Application home page.
- **From Application Template:** You can create applications based on template applications stored in the template application repository.
- **Install sample applications:** Oracle Application Express includes several sample applications. You can install, run, and use sample applications as they are, or analyze them to better understand how to use Application Builder to build specific types of functionality.

You can also create a database application based on a table, query, or drill-down query.

# Creating a Database Application Based on a Table, Query, or Drill-Down Query



In the Create Application Wizard, after selecting Database, perform the following steps:

1. Specify an application name.
2. Select the type of page you want to add.
3. Specify whether you want to copy shared components from another application.
4. Specify the authentication scheme and date format.
5. Select a theme.
6. Confirm your selections to create the application.

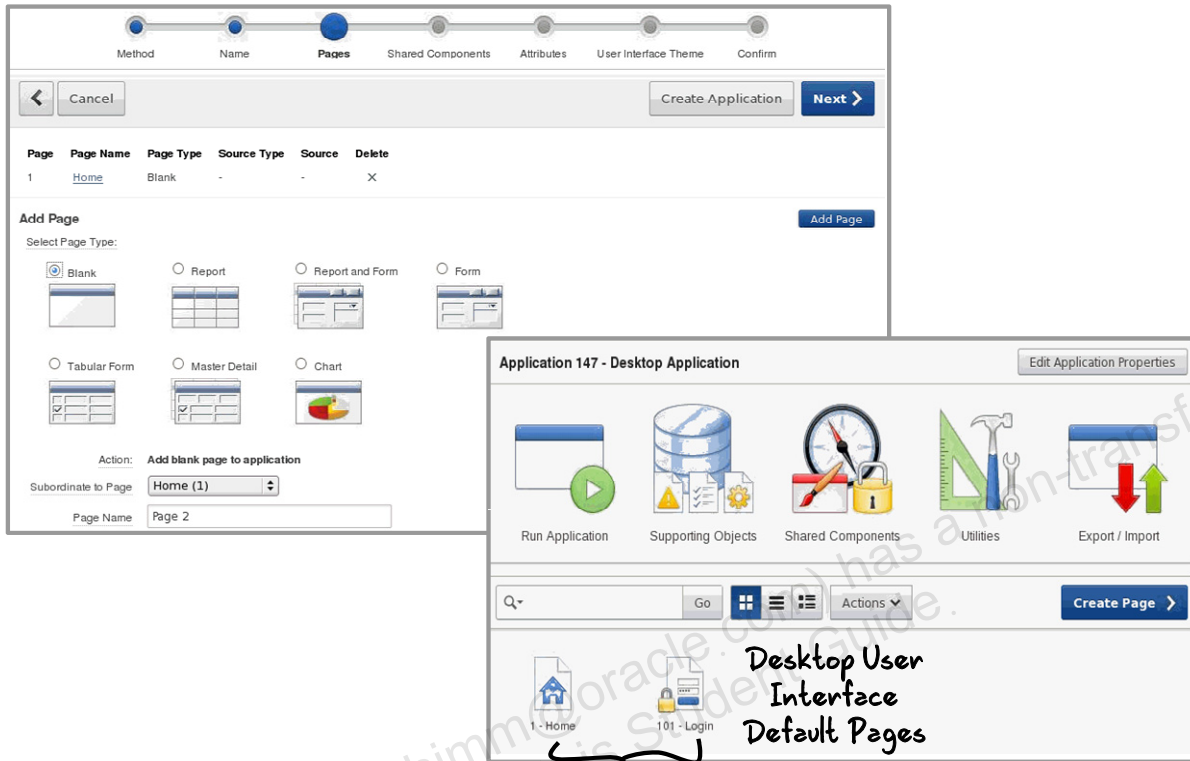
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You can create a database application based on a table, query, or drill-down query. When running the Create Application Wizard, you must choose a target user interface based on which the wizard is optimized to display the appropriate page types, attributes, and themes. The slide provides an overview of the steps to create a database application based on a table, query, or a drill-down query.

You can view the demonstration of creating a database application by opening the `/home/oracle/labs/demos/les03_create_database_application.html` file.

# Page Wizard for Desktop User Interface



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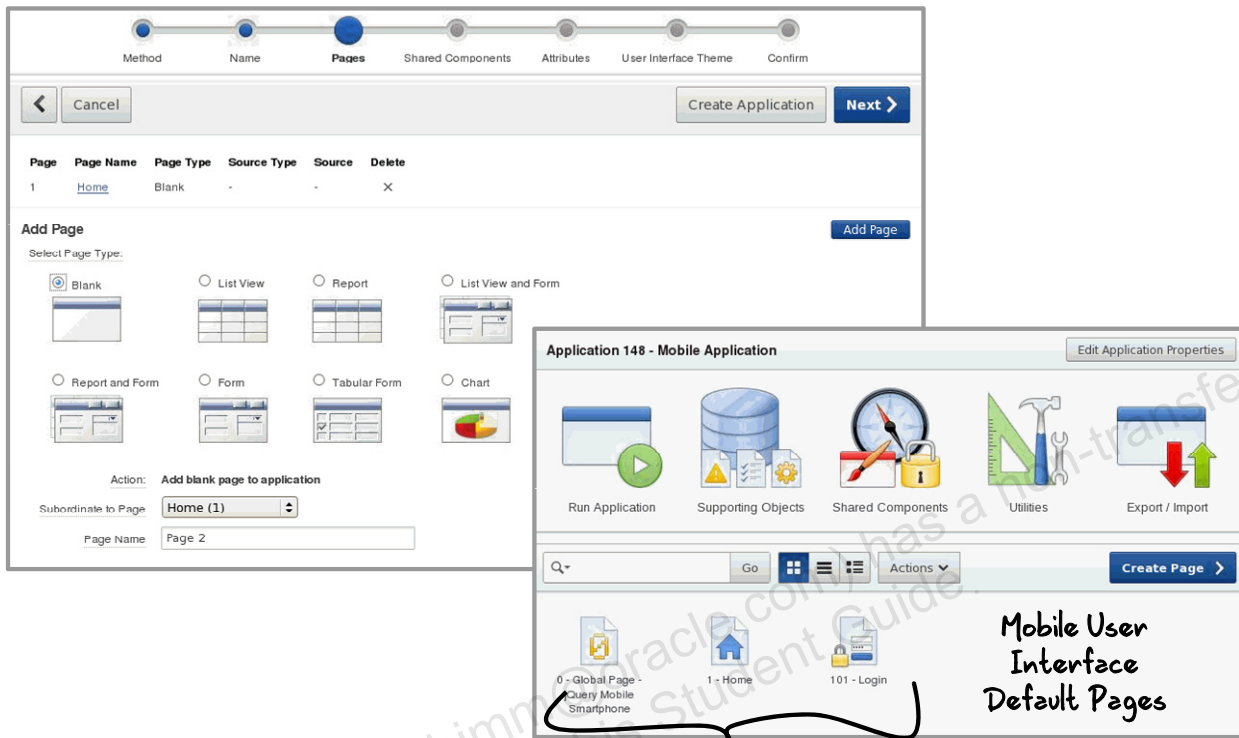
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The slide shows the page wizard for a database application using the desktop user interface. The page wizard displays the various page types available based on the type of user interface.

When you create an application using the desktop user interface, a blank page called the Home page is automatically created. The Home page acts as the parent of any new pages added to the application. The page number for the Home page is always 1.

A Login page also gets created at the time of creating an application. This page is used to enter the login credentials of the application. The page number for the Login page is 101.

# Page Wizard for Mobile User Interface



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The slide shows the page wizard for a database application using the mobile user interface. When you create an application using the mobile user interface, a blank page called the Home page, Login page, and Global Page are created. The Global page functions as the master page. The Global page renders all components you add to it on every page in your application.

You can view the demonstration of creating a database mobile application by opening the `/home/oracle/labs/demos/les03_create_database_application_mobile.html` file.

# Creating a Database Application from a Spreadsheet



In the Create Application Wizard, after clicking From Spreadsheet, perform the following steps:

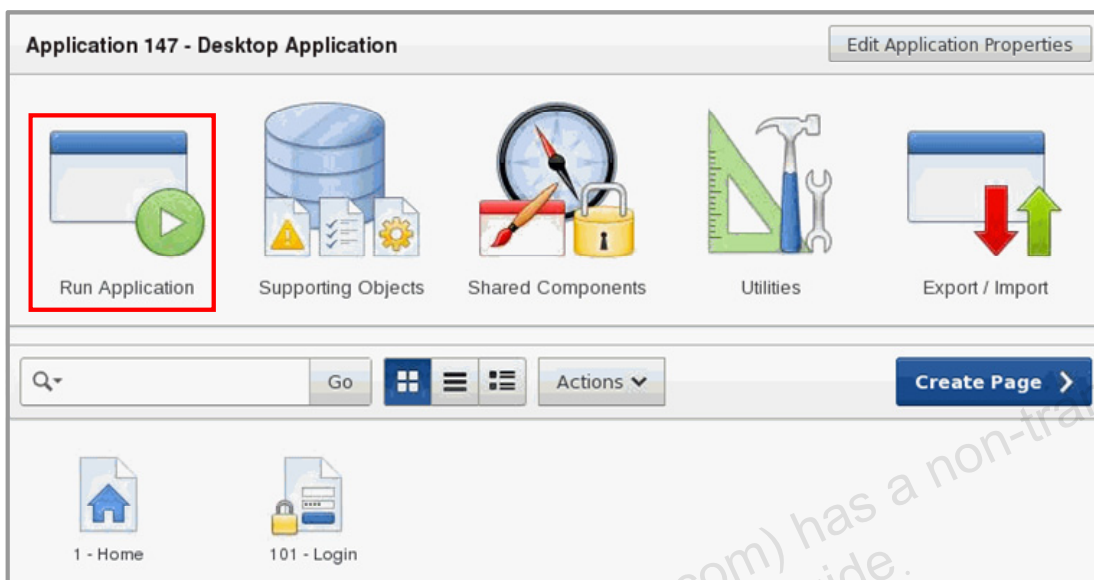
1. Specify how the data will be loaded.
2. Select a file, or copy and paste the data.
3. Specify the table name and column specifications.
4. Specify user interface defaults.
5. Enter the application name.
6. Select a theme.
7. Specify whether you want the data to be summarized, as well as which columns to use.

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You can create an application based on a spreadsheet by clicking From Spreadsheet in the Create Application Wizard. The slide provides an overview of the steps that are necessary to create a database application from a spreadsheet.

# Running an Application



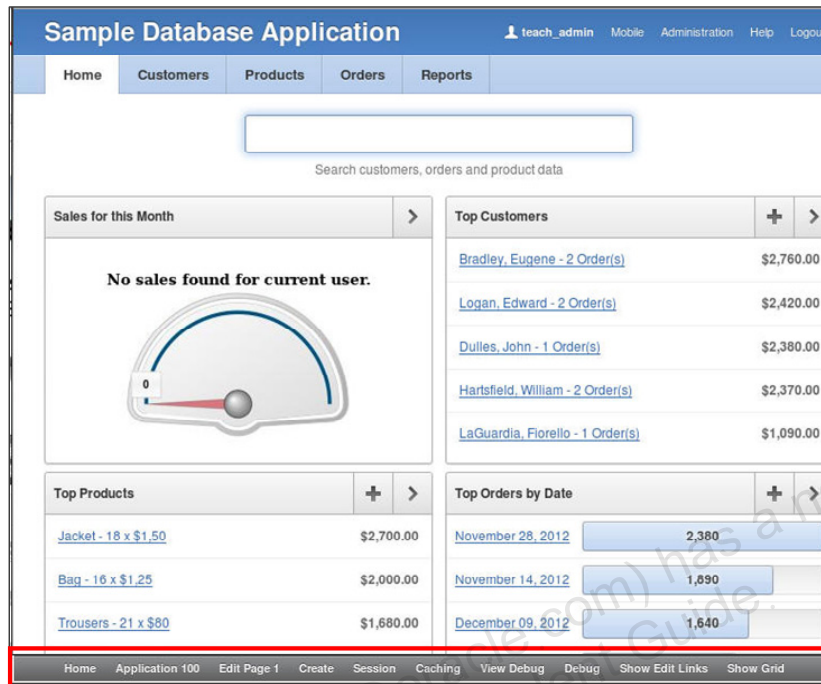
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Regardless of the application that you create, you can run the application by clicking the Run Application icon.

**Note:** If you have chosen the Application Express authentication scheme, the Login page appears. Enter your workspace username and password, and click Login to log in to your application.

# Using the Developer Toolbar



Developer  
Toolbar

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Users who log in to Oracle Application Express with developer privileges have access to the Developer toolbar. The Developer toolbar offers a quick way to accomplish the following:

- Edit the currently running page
- Create a new page, control, or component
- View session state
- Toggle the edit links on and off

**Note:** The Developer toolbar is displayed for applications with desktop user interface only.

The page displayed in this slide is the home page of the Sample Application in Oracle Application Express. The Developer toolbar is displayed at the bottom of every page in a running application, and has the following options:

- **Home:** Opens the Workspace home page
- **Application <n>:** Opens the application home page
- **Edit Page <n>:** Accesses the Page Definition for the current page
- **Create:** Opens a wizard for creating a new blank page, region, page control (branch, process, button, or item), or shared component (breadcrumb, list, or tab)
- **Session:** Displays a new window that contains session state information for the current page. You learn more about sessions in the lesson titled "Understanding Session State."

- **Caching:** Displays reports that offer details about the pages that are cached in the application
- **View Debug:** Displays another window with debug information by session
- **Debug:** Toggles the page between Debug and No Debug mode. To view the debug information after Debug is selected, click View Debug.
- **Show Edit Links:** Toggles between Show Edit Links and Hide Edit Links. Clicking Show Edit Links displays a small orange icon next to each editable object on the page. Each icon is orange and contains a triangle with two rules beneath it. Clicking the link displays another window in which to edit the object.
- **Show Grid:** Enables you to see how regions and page items are positioned on a page if a grid layout is used

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# Summary

In this lesson, you should have learned how to:

- Identify the components of a database application
- Describe the database application user interfaces
- Explain the various ways of creating a database application

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This lesson introduced you to Application Builder. You learned about the different types of applications that you can build and the various components of an application. You also learned how to create different types of database applications.

# Workshop 3 Overview: Creating Database Applications

This practice covers the following:

- Creating a database application by using a spreadsheet
- Creating a desktop database application
- Adding a mobile user interface to the application

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# Using and Creating Interactive Reports



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# Objectives

After completing this lesson, you should be able to do the following:

- Identify the types of reports that you can create in Oracle Application Express
- Manipulate interactive reports
- Create and customize interactive reports

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This lesson introduces you to reports in Oracle Application Express. You are introduced to the various built-in wizards that help you create reports. This lesson focuses on interactive reports. You learn how to create and manipulate interactive reports. You also learn how to change the way an interactive report is rendered to users.

# Lesson Agenda

- Overview
  - Accessing the Create Report Wizard
  - Types of Reports
  - Selecting the Appropriate Report Type
- Using Interactive Reports
- Creating and Customizing an Interactive Report

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# Accessing the Create Report Wizard

To access the Create Report Wizard by creating a new page:

1. Navigate to the Application home page and click Create Page.
2. From the “Select a page type” options, select the Report option.

To access the Create Report Wizard by creating a new region on an existing page:

1. From the page definition, right-click the Regions node and select Create.
2. From the “Select a page type” options, select the Report option.

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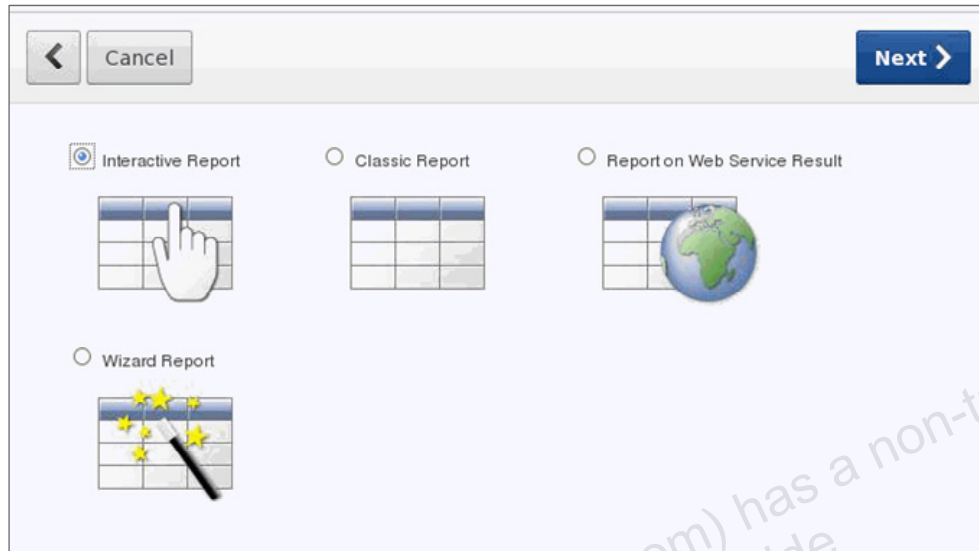
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You can access the Create Report Wizard in two ways:

- By creating a new page in the application
- By creating a new region on an existing page

You can view the demonstration of creating an interactive report by opening the `/home/oracle/labs/demos/les04_create_interactive_report.html` file.

# Types of Reports



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There are two basic types of reports: an interactive report and a classic (SQL or wizard) report. The interactive report is the default type when you create an application, convert forms, create regions, and create pages.

When you create a report by using the Create Page Wizard, you can select different report types:

- **Interactive Report:** Creates an interactive report based on a custom SQL `SELECT` statement that you provide. End users can customize the layout of their data by selecting the options from the Actions menu.
- **Classic (or SQL) Report:** Creates a report based on a custom SQL `SELECT` statement or a PL/SQL function that returns a SQL `SELECT` statement
- **Report on Web Service Result:** Creates a report based on a web service result
- **Wizard Report:** Creates a report without requiring any manual SQL coding. The report is created based on your specifications of the schema owner, table, columns in the table, and the result set display.

# Selecting the Appropriate Report Type

## Interactive Report

Employee Id	First Name	Last Name	Email	Hire Date
100	Steven	King	SKING	N-1987
101	Neena	Kochhar	NKOCHH	P-1989
102	Lex	De Haan	LDEHAA	N-1993
103	Alexander	Hunold	AHUNOL	
104	Bruce	Ernst	BERNST	
105	David	Austin	DAUSTIN	
106	Valli	Pataballa	VPATABAL	590.423.4560
107	Diana	Lorentz	DLORENTZ	590.423.5567
108	Nancy	Greenberg	NGREENBE	515.124.4569

## Classic Report

EMPLOYEE_ID	FIRST_NAME	LAST_NAME	EMAIL	PHONE_NUMBER	HIRE_DATE
198	Donald	OConnell	DOCONNEL	650.507.9833	21-JUN-99
199	Douglas	Grant	DGRANT	650.507.9844	13-JAN-00
200	Jennifer	Whalen	JWHALEN	515.123.4444	17-SEP-87
201	Michael	Hartstein	MHARTSTE	515.123.5555	17-FEB-96
202	Pat	Fay	PFAY	603.123.6666	17-AUG-97
203	Susan	Mavris	SMAVRIS	515.123.7777	07-JUN-94
204	Hermann	Baer	HBAER	515.123.8888	07-JUN-94
205	Shelley	Higgins	SHIGGINS	515.123.8080	07-JUN-94
206	William	Gietz	WGIEZT	515.123.8181	07-JUN-94
100	Steven	King	SKING	515.123.4567	17-JUN-87
101	Neena	Kochhar	NKOCHHAR	515.123.4568	21-SEP-89
102	Lex	De Haan	LDEHAAN	515.123.4569	13-JAN-93
103	Alexander	Hunold	AHUNOLD	590.423.4567	03-JAN-90
104	Bruce	Ernst	BERNST	590.423.4568	21-MAY-91
105	David	Austin	DAUSTIN	590.423.4569	25-JUN-97

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The slide examples show the classic and interactive reports. Both these reports are created by the Create Page Wizard. The classic report queries the same columns in the OEHR\_EMPLOYEES table as the interactive report.

- **Interactive report:** Notice the automatically built-in search bar, column heading menu links, and icons in the first column of each row. These options allow you to drill down to view row details. With interactive reports, you can provide end-user customizations, such as searching, filtering, and sorting.
- **Classic report:** The SQL and Wizard report types are considered as classic reports. Notice that there is no search bar, no column heading links, and no drill-down capability. A classic report does not, by default, include any of the interactive report features.

An interactive report has many options available to the user for report customization. Therefore, if you want built-in customization capability, select interactive reports. If your report needs no such controls, a classic report is a better option. You can create only one interactive report on a page. Therefore, if you want multiple reports on a single page, you must create some classic reports.

## Quiz

Which of the following report types would be appropriate if you want to include end-user customization?

- a. Report based on a SQL query
- b. Interactive report
- c. Wizard report
- d. End-user report

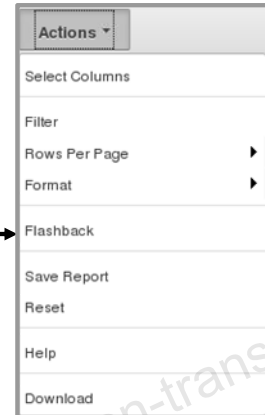
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**Answer: b**

# Lesson Agenda

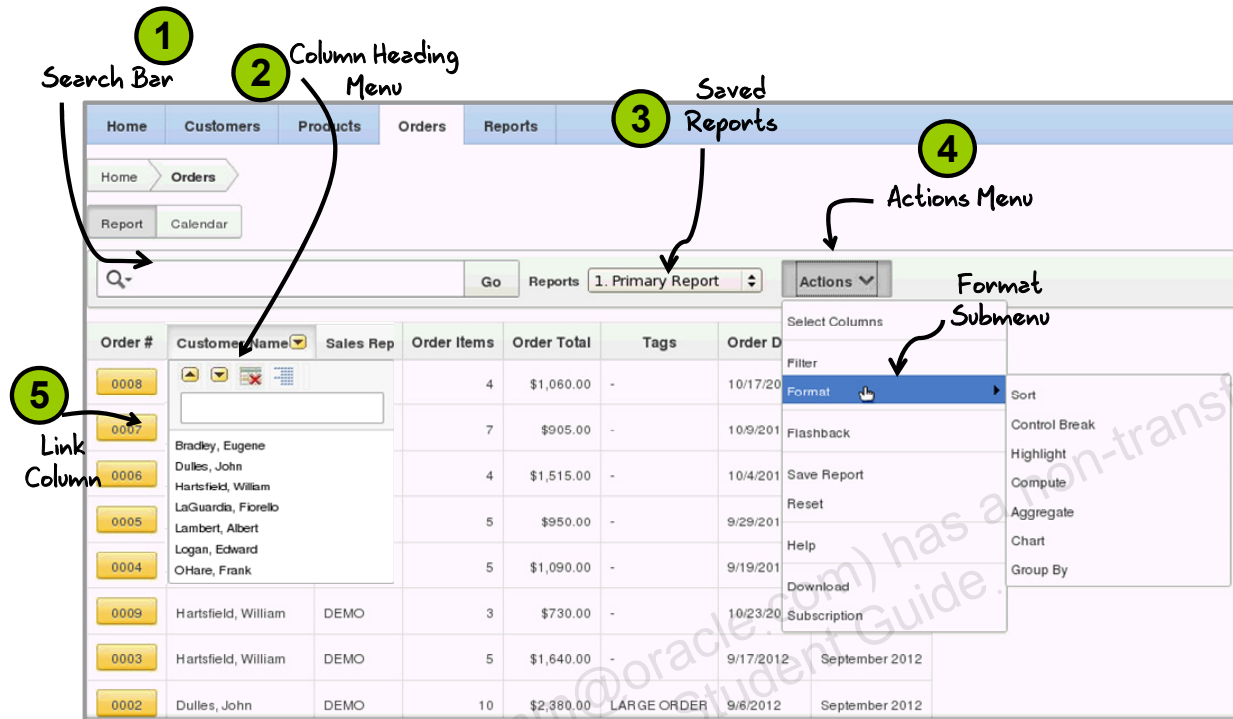
- Overview
- Using Interactive Reports
  - Interactive Report Interface
  - Searching for Information
  - Using the Actions Menu
  - Manipulating the Report by Using Column Headers
  - Different Views of the Interactive Report
- Creating and Customizing an Interactive Report



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# Interactive Report Components



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In an interactive report, you can customize the layout of the data by selecting the columns that you are interested in, applying filters, highlighting, and sorting. You can also define control breaks, aggregations, and computed columns, and include a chart of the query results. You can create multiple variations of the report and save them as named reports, output to comma-delimited files, and print as PDF documents.

The following components are, by default, included on an interactive report page:

1. **Search bar:** The search bar is at the top of an interactive report and provides features such as the Select Columns icon, Text Area, Go button, and Actions menu button.
2. **Column heading menu:** Click any column heading to see a column heading menu. This menu allows you to change the sort order, hide columns, create break groups on a column, view Help about the column, and create a filter.
3. **Saved reports:** You can create and save alternative views of a report.
4. **Actions menu:** This menu is used to customize the display of your interactive report.
5. **Link to custom target:** You can link to another page in your application.

In the next few slides, you learn about each of these components in detail.

# Searching for Information

**Scenario 1**

1 Search Criteria

2 Filter Applied

Order #	Customer Name	Sales Rep	Order Items	Order Total	Tags	Order Date	Order Month
0007	Logan, Edward	DEMO	7	\$905.00	-	10/9/2012	October 2012
0006	Logan, Edward	DEMO	4	\$1,515.00	-	10/4/2012	October 2012

**Scenario 2**

1

2

3

Remove and enable or disable filter options

Order #	Customer Name	Sales Rep	Order Items	Order Total	Tags	Order Date	Order Month
0006	Logan, Edward	DEMO	4	\$1,515.00	-	10/4/2012	October 2012

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You can perform a non-case-sensitive search on the entire report or on a specific column.

To search in the entire report, enter the search criteria in the text area and click the Go button. A filter is applied on the report and all the rows that contain the search criteria are displayed. (Scenario 1).

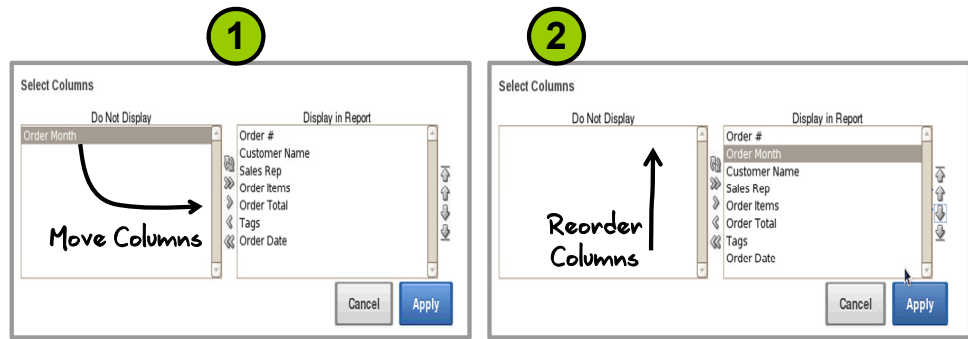
To search within a specific column, perform the following steps: (Scenario 2)

1. Click the icon before the text area and select the column to search on.
2. Enter the search criteria and click the Go button.
3. The search is applied and the results are displayed.

You can create multiple filters on a report. For the row to be displayed, the row must satisfy all the filters (an AND condition is implied).

You can remove a filter by clicking the Remove Filter icon (it looks like a filter with a red X over it) next to the filter that you want to remove. Alternatively, you can enable or disable the filter by using the Enable/Disable check box.

# Selecting Columns



The resulting report table is displayed below the dialog boxes. It has 8 columns: Order #, Order Month, Customer Name, Sales Rep, Order Items, Order Total, Tags, and Order Date. The data rows are as follows:

Order #	Order Month	Customer Name	Sales Rep	Order Items	Order Total	Tags	Order Date
0010	October 2012	Bradley, Eugene	DEMO	3	\$870.00	-	10/26/2012
0001	August 2012	Bradley, Eugene	DEMO	3	\$1,890.00	-	8/23/2012
0002	September 2012	Dulles, John	DEMO	10	\$2,380.00	LARGE ORDER	9/6/2012
0009	October 2012	Hartsfield, William	DEMO	3	\$730.00	-	10/23/2012
0003	September 2012	Hartsfield, William	DEMO	5	\$1,640.00	-	9/17/2012
0004	September 2012	LaGuardia, Fiorello	DEMO	5	\$1,090.00	-	9/19/2012
0005	September 2012	Lambert, Albert	DEMO	5	\$950.00	-	9/29/2012

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The Actions menu contains many tasks that are useful for manipulating an interactive report. Using the Select Columns option, you can specify which columns to display and in what order. To specify the columns to be displayed in a report, from the Actions menu, select **Select Columns**. Then perform the following steps:

1. To show a column in the report display, select a column and click the right arrow (>) to move the column to the “Display in Report” region. In the example in the slide, **Order Month** from the Do Not Display region is moved to the “Display in Report” region.
2. To reorder the columns, select the column and click the up or down arrow. In the example in the slide, Order Month is placed directly above Customer Name. Click Apply. The report is displayed, showing the changes made.

# Adding a Column Filter

Only rows that meet the filter criteria are displayed.

Order #	Customer Name	Sales Rep	Order Items	Order Total	Tags	Order Date	Order Month
0010	Bradley, Eugene	DEMO	3	\$870.00	-	10/26/2012	October 2012
0002	Dulles, John	DEMO	10	\$2,380.00	LARGE ORDER	9/6/2012	September 2012
0009	Hartsfield, William	DEMO	3	\$730.00	-	10/23/2012	October 2012
0003	Hartsfield, William	DEMO	5	\$1,640.00	-	9/17/2012	September 2012
0004	LaGuardia, Fiorello	DEMO	5	\$1,090.00	-	9/19/2012	September 2012
0005	Lambert, Albert	DEMO	5	\$950.00	-	9/29/2012	September 2012
0007	Logan, Edward	DEMO	7	\$905.00	-	10/9/2012	October 2012
0006	Logan, Edward	DEMO	4	\$1,515.00	-	10/4/2012	October 2012

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As you previously saw, you can create a filter by using the search bar. You can also use the Filter option from the Actions menu to add or modify a filter. There are two types of filters: column and row. A column filter shows the rows that match the criteria from all the filters (an AND condition is implied) applied together. A row filter contains an expression (shown in the next slide). Note that a filter adjusts the WHERE clause on the query. To add a column filter by using the Actions menu, perform the following steps:

1. Click the Actions menu button and select Filter.
2. Select a column (which does not have to be the one that is displayed).
3. Select from a list of standard Oracle operators (=, !=, not in, between).
4. Enter an expression to compare against. The expression is case-sensitive and you can use % as a wildcard (for example, STATE\_NAME like A%).
5. Click Apply.

You can have multiple filters for a report. If you decide that you want to disable a particular filter, select the Remove Filter check box.

The example in the slide shows a filter created on the ORDER\_DATE column.

# Adding a Row Filter

A row filter allows for more than one search criterion, without an implied AND condition.

Order #	Customer Name	Sales Rep	Order Items	Order Total	Tags	Order Date	Order Month
0010	Bradley, Eugene	DEMO	3	\$870.00	-	10/26/2012	October 2012
0002	Dulles, John	DEMO	10	\$2,380.00	LARGE ORDER	9/6/2012	September 2012
0009	Hartsfield, William	DEMO	3	\$730.00	-	10/23/2012	October 2012
0003	Hartsfield, William	DEMO	5	\$1,840.00	-	9/17/2012	September 2012
0004	LaGuardia, Fiorello	DEMO	5	\$1,090.00	-	9/19/2012	September 2012
0005	Lambert, Albert	DEMO	5	\$950.00	-	9/29/2012	September 2012
0007	Logan, Edward	DEMO	7	\$905.00	-	10/9/2012	October 2012
0006	Logan, Edward	DEMO	4	\$1,515.00	-	10/4/2012	October 2012

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A row filter allows you to specify multiple column filters, by using an expression. In the example in the slide, the filter selects rows where order date is after August **OR** where the number of items is greater than or equal to 7. If two column filters were created rather than one row filter, the rows satisfying both the conditions will be displayed. To add a row filter by using the Actions menu, perform the following steps:

1. From the Actions menu, select Filter.
2. Select the Row Filter type.
3. Specify the expression by using the Columns and Functions/Operators values, or simply type in the Filter Expression field.
4. Click Apply.

# Sorting Columns

The 'Sort' dialog box is shown with the following configuration:

Column	Direction	Null Sorting
1 Order Items	Ascending	Default
2 Order Date	Descending	Default
3 Order #	Descending	Default
4 - Select Column -	Ascending	Default
5 - Select Column -	Ascending	Default
6 - Select Column -	Ascending	Default

The report table below shows the data after sorting by Order Items (ascending):

Order #	Order Month	Customer Name	Sales Rep	Order Items	Order Total	Tags	Order Date
0010	October 2012	Bradley, Eugene	DEMO	3	\$870.00	-	10/26/2012
0009	October 2012	Hartsfield, William	DEMO	3	\$730.00	-	10/23/2012
0001	August 2012	Bradley, Eugene	DEMO	3	\$1,890.00	-	8/23/2012
0008	October 2012	Ortore, Frank	DEMO	4	\$1,080.00	-	10/17/2012
0006	October 2012	Logan, Edward	DEMO	4	\$1,515.00	-	10/4/2012
0005	September 2012	Lambert, Albert	DEMO	5	\$950.00	-	9/29/2012
0004	September 2012	LaGuardia, Fiorello	DEMO	5	\$1,090.00	-	9/19/2012
0003	September 2012	Hartsfield, William	DEMO	5	\$1,640.00	-	9/17/2012
0007	October 2012	Logan, Edward	DEMO	7	\$905.00	-	10/9/2012
0002	September 2012	Dulles, John	DEMO	10	\$2,380.00	LARGE ORDER	9/6/2012

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The sort action is used to specify which columns to sort on and whether to sort in ascending or descending order. You can also specify how to handle nulls (use the default setting, display them first, or display them last). The sort icon is displayed to the right of the column heading in the report for the column specified in the 1 slot. In the example in the slide, Order Items is sorted first, so it has the sort icon.

To sort columns, perform the following steps:

1. Click the Actions menu button and select Format > Sort.
2. Select a column from the Column drop-down list. In the slide example, Order Items is selected.
3. Specify whether to sort the report in Ascending or Descending order.
4. Specify how null values should be displayed in the sort column. If this is set to Default, nulls will default to the value set in the Direction field for this sort entry.
5. Click Apply.

Another way to sort is by using the column header, which is discussed later in this lesson.

# Creating Control Breaks

The screenshot shows the Oracle BI report interface. On the left, the 'Format' menu is open, and 'Control Break' is selected. The 'Control Break' dialog box is open, showing a list of columns to break on. The first column, 'Order Month', is selected and its status is 'Enabled'. The 'Apply' button is highlighted. Below the dialog, the report table is displayed, showing data grouped by Order Month. The table has columns: Order #, Customer Name, Sales Rep, Order Items, Order Total, Tags, and Order Date. The data is grouped into three sections: August 2012, September 2012, and October 2012.

Order Month : August 2012						
Order #	Customer Name	Sales Rep	Order Items	Order Total	Tags	Order Date
0001	Bradley, Eugene	DEMO	3	\$1,890.00	-	8/23/2012
Order Month : September 2012						
Order #	Customer Name	Sales Rep	Order Items	Order Total	Tags	Order Date
0005	Lambert, Albert	DEMO	5	\$950.00	-	9/29/2012
0004	LaGuardia, Fiorello	DEMO	5	\$1,090.00	-	9/19/2012
0003	Hartsfield, William	DEMO	5	\$1,640.00	-	9/17/2012
0002	Dulles, John	DEMO	10	\$2,380.00	LARGE ORDER	9/6/2012
Order Month : October 2012						
Order #	Customer Name	Sales Rep	Order Items	Order Total	Tags	Order Date
0010	Bradley, Eugene	DEMO	3	\$870.00	-	10/26/2012
0009	Hartsfield, William	DEMO	3	\$730.00	-	10/23/2012

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You can use the Control Break option to create a break group on one or several columns. This pulls the columns out of the interactive report and displays them as a master record.

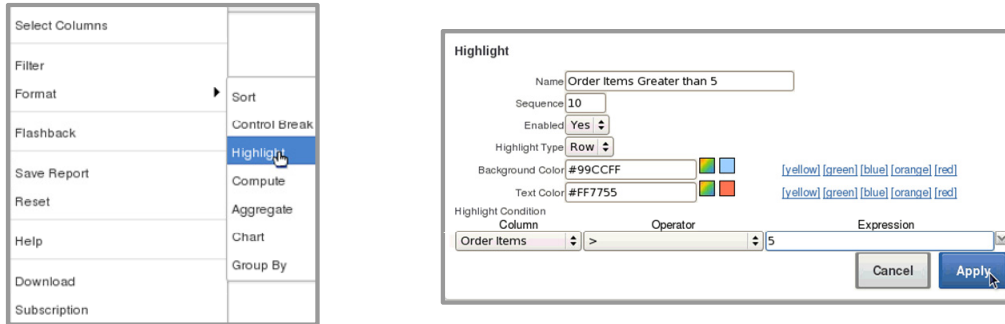
To create a break group, perform the following steps:

1. Click the Actions menu button and select Format > Control Break.
2. Select a column from the Column drop-down list.
3. Click Apply.

The example in the slide creates a control break on Order Month. Notice that the Order Month column is extracted from the report and displayed as a master record.

You can also break a particular column from the column header, which is discussed later in this lesson.

# Highlighting a Row or Cell



Order #	Order Month	Customer Name	Sales Rep	Order Items	Order Total	Tags	Order Date
0010	October 2012	Bradley, Eugene	DEMO	3	\$870.00	-	10/26/2012
0009	October 2012	Hartfield, William	DEMO	3	\$730.00	-	10/23/2012
0001	August 2012	Bradley, Eugene	DEMO	3	\$1,890.00	-	8/23/2012
0008	October 2012	OHare, Frank	DEMO	4	\$1,060.00	-	10/17/2012
0006	October 2012	Logan, Edward	DEMO	4	\$1,515.00	-	10/4/2012
0005	September 2012	Lambert, Albert	DEMO	5	\$950.00	-	9/29/2012
0004	September 2012	LaGuardia, Fiorello	DEMO	5	\$1,090.00	-	9/19/2012
0003	September 2012	Hartfield, William	DEMO	5	\$1,640.00	-	9/17/2012
0007	October 2012	Logan, Edward	DEMO	7	\$993.00	-	10/8/2012
0002	September 2012	Dukes, John	DEMO	10	\$2,300.00	LARGE ORDER	9/8/2012

These rows are highlighted because the condition is true.

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You can highlight specific rows or cells based on a filter. The rows or cells that meet the condition are highlighted by using the characteristics associated with the highlight.

To highlight a row or cell, perform the following steps:

1. Click the **Actions** menu button and select **Format > Highlight**.
2. Enter a name, and select either a row or cell for Highlight Type. You can select any color from the palette for the background and text.
3. Under Highlight Condition, select a column from the drop-down list. Then select an operator and an expression to be evaluated.
4. Click **Apply**.

The example in the slide shows that the rows are highlighted when Order Items is set to greater than 5.

# Adding Computed Columns

The screenshot shows the Oracle report interface. On the left, the 'Format' menu is open, and the 'Compute' option is selected. The 'Compute' dialog box is open, showing the 'Column Heading' as 'Price with Tax' and the 'Computation Expression' as 'D \*1.05'. The 'Format Mask' is set to '\$5,234.10'. Below the dialog, a report table is displayed with the following data:

Order #	Order Month	Customer Name	Sales Rep	Order Items	Order Total	Tags	Order Date	Price with Tax
0010	October 2012	Bradley, Eugene	DEMO	3	\$870.00	-	10/26/2012	913.5
0009	October 2012	Hartsfield, William	DEMO	3	\$730.00	-	10/23/2012	766.5
0001	August 2012	Bradley, Eugene	DEMO	3	\$1,890.00	-	8/23/2012	1984.5
0008	October 2012	OHare, Frank	DEMO	4	\$1,060.00	-	10/17/2012	1113
0006	October 2012	Logan, Edward	DEMO	4	\$1,515.00	-	10/4/2012	1590.75
0005	September 2012	Lambert, Albert	DEMO	5	\$950.00	-	9/29/2012	997.5
0004	September 2012	LaGuardia, Fiorello	DEMO	5	\$1,090.00	-	9/19/2012	1144.5
0003	September 2012	Hartsfield, William	DEMO	5	\$1,640.00	-	9/17/2012	1722
0007	October 2012	Logan, Edward	DEMO	7	\$905.00	-	10/9/2012	950.25
0002	September 2012	Dulles, John	DEMO	10	\$2,380.00	LARGE ORDER	9/6/2012	2499

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You can use the Compute option to add computed columns to a report. These can be mathematical computations (for example,  $NBR\_HOURS/24$ ) or standard Oracle functions that are applied to existing columns (some columns have been displayed; other columns, such as `TO_DATE`, can also be used).

To add a computed column to your report, perform the following steps:

1. Click the **Actions** menu button and select **Format > Compute**.
2. Enter a name for Column Heading. In the slide example, **Price with Tax** is entered.
3. Select a value for Format Mask. In the slide example, **\$5,234.10** is selected.
4. Place your cursor in the Computation field and click a column from the list of columns. A column alias appears in the Computations area.
5. Use numbers and symbols from the Keypad. For example, to specify multiplication, click **\***. If required, use functions displayed in the table. In the slide example, **\*1.05** is specified.
6. Click **Apply**. The new computed column now appears in the report.

The example in the slide shows a computed column that has the calculation  $Price * 1.05$ . The "Price with Tax" computed column is displayed in the report. Notice that the format mask \$5,234.10 is applied to the report.

# Aggregating Columns

Order #	Order Month	Customer Name	Sales Rep	Order Items	Order Total	Tags	Order Date	Price with Tax
0010	October 2012	Bradley, Eugene	DEMO	3	\$870.00	-	10/26/2012	913.5
0009	October 2012	Hartsfield, William	DEMO	3	\$730.00	-	10/23/2012	766.5
0001	August 2012	Bradley, Eugene	DEMO	3	\$1,890.00	-	8/23/2012	1984.5
0008	October 2012	OHare, Frank	DEMO	4	\$1,060.00	-	10/17/2012	1113
0006	October 2012	Logan, Edward	DEMO	4	\$1,515.00	-	10/4/2012	1590.75
0005	September 2012	Lambert, Albert	DEMO	5	\$950.00	-	9/29/2012	997.5
0004	September 2012	LaGuardia, Fiorello	DEMO	5	\$1,090.00	-	9/19/2012	1144.5
0003	September 2012	Hartsfield, William	DEMO	5	\$1,640.00	-	9/17/2012	1722
0007	October 2012	Logan, Edward	DEMO	7	\$905.00	-	10/9/2012	950.25
0002	September 2012	Dulles, John	DEMO	10	\$2,380.00	LARGE ORDER	9/6/2012	2499
								13681.5

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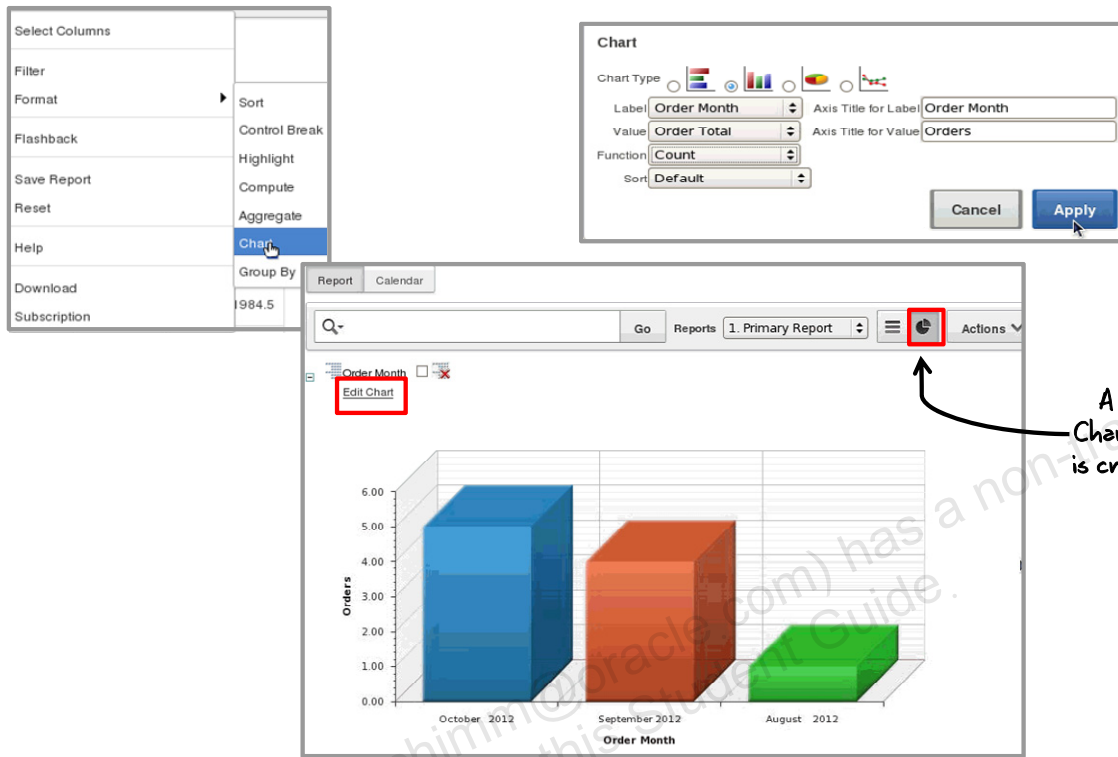
You can use the Aggregate option to perform mathematical computations against a column in your report. Aggregates are displayed after each control break and at the end of the report within the column for which they are defined.

To aggregate columns in your report, perform the following steps:

1. Click the **Actions** menu button and select **Format > Aggregate**.
2. Select a function from the Function drop-down list. The following functions are available in the Function drop-down list: Sum, Average, Count, Minimum, Maximum, and Median. In the example in the slide, **Sum** is selected.
3. Select a column from the list of columns. Only base columns can be used in aggregates, and not computed columns. In the example in the slide, **Price with Tax** is selected.
4. Click **Apply**.

The slide example shows an aggregate that is a sum of "Price with Tax."

# Creating a Chart



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You can create a chart based on the data contained in the report. You can include only one chart per interactive report. After a chart is defined, you can change the definition of the chart by clicking the Edit Chart link below the search bar. You can return to the detailed report by clicking the desired icon on the search bar.

To create a chart, perform the following steps:

1. Click the **Actions** menu button and select **Format > Chart**.
2. Specify the chart type.
3. Select a column for Label.
4. Select a column for Value.
5. Select a function.
6. Select a sort value.
7. Click **Apply**. You can edit the chart or switch back to the report.

The slide example creates a horizontal bar chart that shows the number of orders per month.

# Creating a Group By Report

The screenshot illustrates the steps to create a Group By report. On the left, the 'Format' menu is open, and 'Group By' is highlighted. The 'Group By' dialog box is shown with the following configuration:

Group By Column	Functions	Column	Label	Format Mask	Sum
1 Order Month	1 Sum	Order Items	Total Order		<input type="checkbox"/>
2 - Select Column -	2 Sum	Order Total	Total Order Price		<input checked="" type="checkbox"/>
3 - Select Function -	3 - Select Function -	- Select Column -			<input type="checkbox"/>

The resulting report shows a table with the following data:

Order Month	Total Order	Total Order Price
October 2012	21	5,080
August 2012	3	1,890
September 2012	25	6,060

A red box highlights the 'Group By' icon in the search bar, with a handwritten note: "A Group By icon is created."

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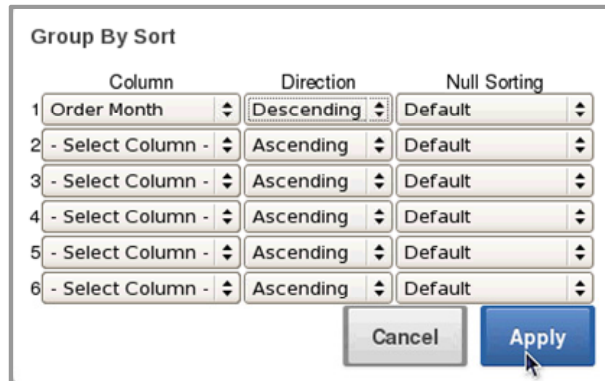
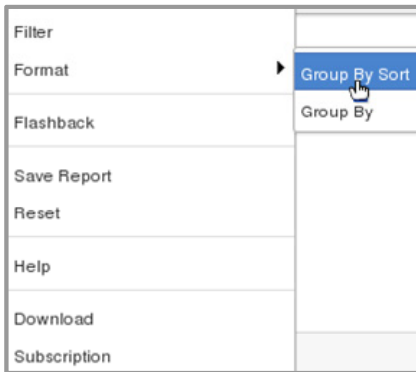
You can create a Group By report for multiple columns based on multiple functions. You can include only one Group By report per interactive report. After a Group By report is defined, you can change the definition of the Group By report by clicking the Edit Group By link below the search bar. You can return to the detailed report by clicking the desired icon on the search bar.

To create a Group By report, perform the following steps:

1. Click the **Actions** menu button and select **Format > Group By**.
2. Select at least one Group By column.
3. Select at least one function and column to base the function on. Enter a label and format mask.
4. Click **Apply**. You can edit the Group By report or switch back to the report (by using the icon on the search bar).

The slide example creates a Group By report that shows the total order and the total order price for each month.

# Creating a Group By Sort Order



A screenshot of the 'Edit Group By' report. The report has three columns: 'Order Month', 'Total Order', and 'Total Order Price'. The data is grouped by Order Month, showing the total order count and price for each month.

Order Month	Total Order	Total Order Price
October 2012	21	5,080
September 2012	25	6,060
August 2012	3	1,890

1 - 3 of 3

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You can specify group by column sort order (ascending or descending) by either clicking the group by column heading or selecting Group By Sort from the Format submenu. You can also specify how to handle NULL values. Using the default setting always displays NULL values last or always displays them first.

To sort a group by column, perform the following steps:

1. Access a Group By view as shown in the previous slide.
2. Click the **Actions** menu, and select **Format** and then **Group By Sort**. The Group By Sort region appears.
3. Select a column, the sort direction (ascending or descending), and Null Sorting behavior.
4. Click **Apply**.

The slide example creates a Group By report with the Order Month in descending order. Note that the Group By Sort menu is only visible when you are using the Group By view.

## Quiz

Which of the following actions would you choose from the Actions menu if you want to pull a column from an interactive report and display it as a master record?

- a. Select Columns
- b. Compute
- c. Control Break
- d. Highlight

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**Answer: c**

# Performing a Flashback Query

Flash back ten minutes to see the order details before the edit.

An order is edited.

Order #	Customer Name	Sales Rep	Order Items	Order Total	Tags	Order Date	Order Month
0010	Bradley, Eugene	DEMO		\$620.00	-	10/26/2012	October 2012
0009	Hartsfield, William	DEMO	3	\$730.00	-	10/23/2012	October 2012
0008	OHare, Frank	DEMO	4	\$1,060.00	-	10/17/2012	October 2012
0007	Logan, Edward	DEMO	7	\$905.00	-	10/9/2012	October 2012
						10/4/2012	October 2012
						9/29/2012	September 2012
						9/19/2012	September 2012

Report data as of 10 minutes ago.

Order #	Customer Name	Sales Rep	Order Items	Order Total	Tags	Order Date	Order Month
0010	Bradley, Eugene	DEMO	3	\$870.00	-	10/26/2012	October 2012
0009	Hartsfield, William	DEMO	3	\$730.00	-	10/23/2012	October 2012
0008	OHare, Frank	DEMO	4	\$1,060.00	-	10/17/2012	October 2012
0007	Logan, Edward	DEMO	7	\$905.00	-	10/9/2012	October 2012
0006	Logan, Edward	DEMO	4	\$1,515.00	-	10/4/2012	October 2012

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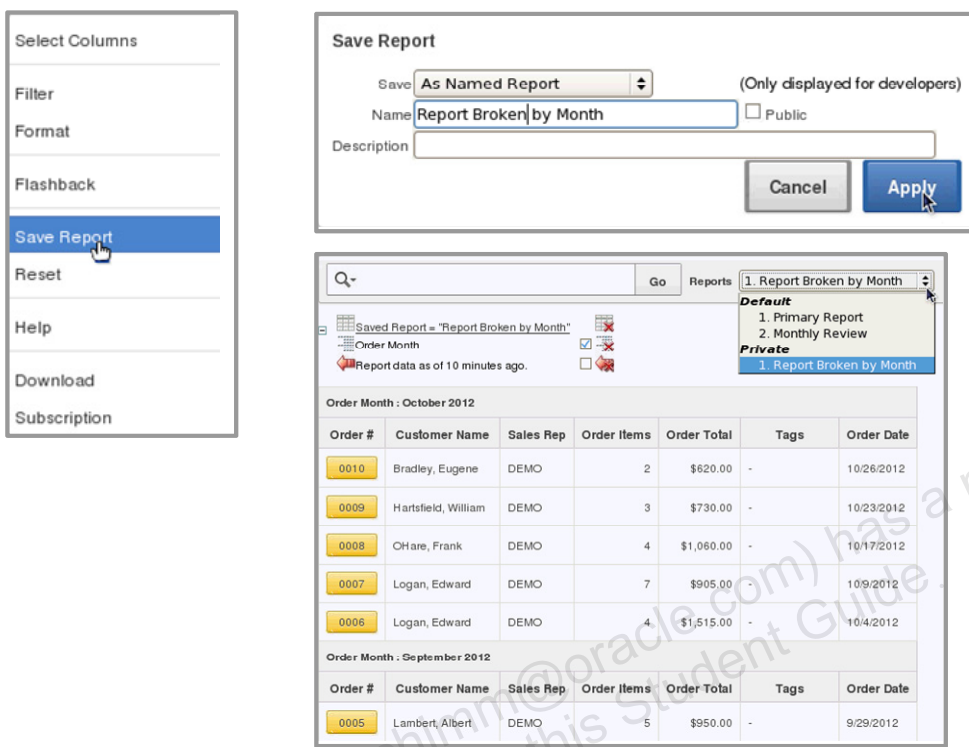
You can use the Flashback option to perform a flashback query. This allows you to view the data as it existed at a previous point in time. The default amount of time that you can flash back is three hours (or 180 minutes), but the actual amount differs per database.

To perform a flashback on a report, perform the following steps:

1. Click the **Actions** menu button and select **Flashback**.
2. Enter a value in the “As of” field.
3. Click **Apply**. The flashback query is applied and you view the data as it existed at a previous point in time.

In the example in the slide, an order is edited. After the flashback query is applied, you see the order details before the edit was made.

# Saving a Report



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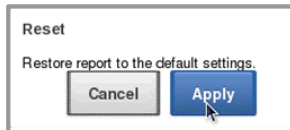
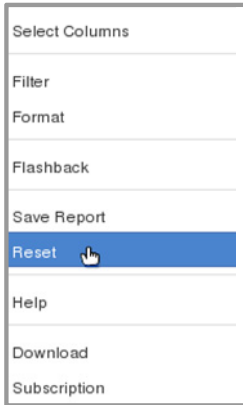
You can save a customized report for future use. While navigating between pages in an application, if you select the report from the list in the Reports drop-down list, your changes (filters, control breaks, and so on) will still be available. If you log out, however, your changes will not be saved unless you have saved the report. You can save multiple versions of a report and each will appear as a separate report.

You can save a report as private or public. Private reports are accessible only to the creator. Public reports are available to all authenticated users. There are two types of public reports: a primary and an alternative. The Primary Report is the default view. If a developer wants certain changes to be made to the Primary Report, the developer must save the changes as Default Report Settings. You can have only one primary report but multiple alternative reports. To save a report, perform the following steps:

1. From the **Actions** menu, select **Save Report**.
2. In the Save Report dialog box, specify the following:
  - **Save:** Select the As Named Report option.
  - **Name:** Enter a name for the report. If you do not select the Public check box, the report will be a private report.
  - **Description:** Enter an optional description.
3. Click **Apply**. Your report is added to the list of reports in the drop-down list.

# Resetting Reports

## Before reset



Order #	Customer Name	Sales Rep	Order Items	Order Total	Tags	Order Date	Order Month
0010	Bradley, Eugene	DEMO	2	\$620.00	-	10/26/2012	October 2012
0009	Hartsfield, William	DEMO	3	\$730.00	-	10/23/2012	October 2012
0008	OHare, Frank	DEMO	4	\$1,060.00	-	10/17/2012	October 2012
0007	Logan, Edward	DEMO	7	\$905.00	-	10/9/2012	October 2012
0006	Logan, Edward	DEMO	4	\$1,515.00	-	10/4/2012	October 2012
0005	Lambert, Albert	DEMO	5	\$950.00	-	9/29/2012	September 2012

Order #	Customer Name	Sales Rep	Order Items	Order Total	Tags	Order Date	Order Month
0010	Bradley, Eugene	DEMO	2	\$620.00	-	10/26/2012	October 2012
0009	Hartsfield, William	DEMO	3	\$730.00	-	10/23/2012	October 2012
0008	OHare, Frank	DEMO	4	\$1,060.00	-	10/17/2012	October 2012
0007	Logan, Edward	DEMO	7	\$905.00	-	10/9/2012	October 2012
0006	Logan, Edward	DEMO	4	\$1,515.00	-	10/4/2012	October 2012

## After reset

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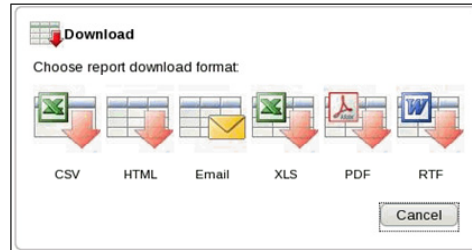
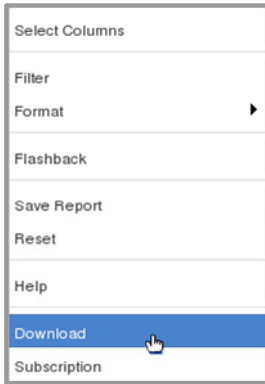
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You can reset an interactive report back to the default settings and remove any customizations that you have made. To reset the defaults, perform the following steps:

1. Click the **Actions** menu button and select **Reset**.
2. Click **Apply** to confirm that you want the reset to be performed.

**Note:** Each saved report can be reset to its own default settings.

# Downloading Reports



HTML Format

Search:  Search

Order #	Customer Name	Sales Rep	Order Items	Order Total	Tags	Order Date	Order Month
0010	Bradley, Eugene	DEMO	2	\$620.00	-	10/26/2012	October 2012
0009	Hartsfield, William	DEMO	3	\$730.00	-	10/23/2012	October 2012
0008	OHare, Frank	DEMO	4	\$1,060.00	-	10/17/2012	October 2012
0007	Logan, Edward	DEMO	7	\$905.00	-	10/9/2012	October 2012
0006	Logan, Edward	DEMO	4	\$1,515.00	-	10/4/2012	October 2012
0005	Lambert, Albert	DEMO	5	\$950.00	-	9/29/2012	September 2012
0004	LaGuardia, Fiorello	DEMO	5	\$1,090.00	-	9/19/2012	September 2012
0003	Hartsfield, William	DEMO	5	\$1,640.00	-	9/17/2012	September 2012
0002	Dulles, John	DEMO	10	\$2,380.00	LARGE ORDER	9/6/2012	September 2012
0001	Bradley, Eugene	DEMO	3	\$1,890.00	-	8/23/2012	August 2012

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You can use the Download option to download the current result set. The download formats differ depending on your installation and report definition but may include CSV, HTML, XLS, PDF, or RTF. You can also email the HTML file by using the Email option.

The example in the slide shows the HTML format of the report data.

# Subscribing to a Report

Select Columns

Filter

Format

Flashback

Save Report

Reset

Help

Download

Subscription

**Add Subscription**

Email Address:

Subject:

Frequency:

Starting From:    +00:00

Ending:

*Specify the time period and frequency for your subscription.*

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You may want to subscribe to a report where the email address that you enter will receive an email of the report for a specified length of time and frequency. Note that you can subscribe to a report only when the report is contained on an authenticated page.

In the slide example, the report will be emailed on a daily basis for five days. The report that is emailed is contained in HTML format.

# Manipulating the Interactive Report by Using a Column Header



The screenshot shows an Oracle Interactive Report table with the following columns: Order #, Customer Name, Sales Rep, Order Items, Order Total, Tags, Order Date, and Order Month. The 'Order Month' column header is selected, and a context menu is displayed. The menu options are: Last 5 Years, Last 2 Years, Last Year, Last Month, Last Week, Last 2 Days, Last Day, Last 12 Hours, Last 2 Hours, Last Hour, Next Hour, September 2012, and September 2012. The table data includes 10 rows of order information.

Order #	Customer Name	Sales Rep	Order Items	Order Total	Tags	Order Date	Order Month
0010	Bradley, Eugene	DEMO	2	\$620.00	-	10/26/2012	
0009	Hartfield, William	DEMO	3	\$730.00	-	10/23/2012	
0008	OHare, Frank	DEMO	4	\$1,060.00	-	10/17/2012	
0007	Logan, Edward	DEMO	7	\$905.00	-	10/9/2012	
0006	Logan, Edward	DEMO	4	\$1,515.00	-	10/4/2012	
0005	Lambert, Albert	DEMO	5	\$950.00	-	9/29/2012	
0004	LaGuardia, Fiorello	DEMO	5	\$1,090.00	-	9/19/2012	
0003	Hartfield, William	DEMO	5	\$1,640.00	-	9/17/2012	September 2012
0002	Dulles, John	DEMO	10	\$2,380.00	LARGE ORDER	9/6/2012	September 2012

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You can click any column heading to display the Column Heading menu. You can also perform all the functions in the Column Heading menu by using the Actions menu. The Column Heading menu contains the following functions:

- Sorting columns
- Hiding a column
- Creating a control break on a column
- Displaying column information
- Creating a filter

The Column Information icon appears only if there is Help defined for the column. The help text is defined by the developer who created the report.

The slide example shows the Column Heading menu on the Order Month column. Notice that the list of values for that column is displayed.

You can break a particular column from the column header. When control break is created, the column becomes a master record for the report.

When you add some text in the text field, a filter is created on the column.

You can view the demonstration of using and customizing and interactive report by opening the

`/home/oracle/labs/demos/les04_using_and_customizing_interactive_report.html` file.

## Quiz

Which of the following functions in the Column Heading menu can also be performed by using the Actions menu?

(Choose all that apply.)

- a. Sorting columns
- b. Creating a control break
- c. Hiding a column
- d. Creating a filter

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**Answer: a, b, c, d**

Note that you can also hide a column by using Select Columns.

# Lesson Agenda

- Overview
- Using Interactive Reports
- Creating and Customizing an Interactive Report
  - Creating an Interactive Report
  - Accessing the Report Attributes Page
  - Editing Report Attributes
  - Customizing the Search Bar
  - Specifying the Download Formats
  - Specifying Detail View and Icon View
  - Using Link Column
  - Modifying Interactive Report Query

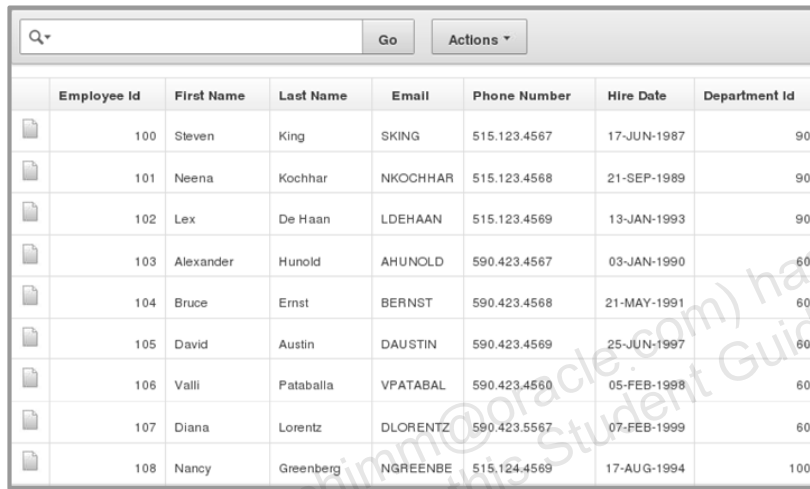
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# Creating an Interactive Report

Ways to create an interactive report:

- When creating a new database application
- By creating a new page in an existing database application
- By creating a new region on an existing page



Employee Id	First Name	Last Name	Email	Phone Number	Hire Date	Department Id
100	Steven	King	SKING	515.123.4567	17-JUN-1987	90
101	Neena	Kochhar	NKOCHHAR	515.123.4568	21-SEP-1989	90
102	Lex	De Haan	LDEHAAN	515.123.4569	13-JAN-1993	90
103	Alexander	Hunold	AHUNOLD	590.423.4567	03-JAN-1990	60
104	Bruce	Ernst	BERNST	590.423.4568	21-MAY-1991	60
105	David	Austin	DAUSTIN	590.423.4569	25-JUN-1997	60
106	Valli	Pataballa	VPATABAL	590.423.4560	05-FEB-1998	60
107	Diana	Lorentz	DLORENTZ	590.423.5567	07-FEB-1999	60
108	Nancy	Greenberg	NGREENBE	515.124.4569	17-AUG-1994	100

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There are numerous ways to create an interactive report. You can create the report when you create the following:

- A new database application
- A new page in an existing database application
- A new region on an existing page in a database application

How to access the Create Report Wizard has already been covered in the Overview topic of this lesson. An interactive report is based on a SQL query that can be entered or created by using the Query Builder.

## Accessing the Report Attributes Page

To access the Report Attributes page:

1. Access the page definition where the interactive report is created.
2. Under Regions > Body, right-click the interactive report.
3. Select Edit Report attributes. The Report Attributes page is displayed.

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As a developer, you can change the way an interactive report is rendered to users by editing the Report Attributes page. The steps to access the Report Attributes page is shown in the slide.

There are various tabs on the Report Attributes page where you can edit information to modify the interactive report properties. The next few slides explain the tabs in detail.

# Editing Report Attributes

The screenshot displays the 'Column Attributes' dialog box with four tabs: Column Attributes, Column Groups, Pagination, and Sorting. The Column Attributes tab is active, showing a table with columns for EMPLOYEE\_ID, FIRST\_NAME, LAST\_NAME, EMAIL, PHONE\_NUMBER, HIRE\_DATE, JOB\_ID, and SALARY. Each row has a pencil icon for editing. The Column Groups tab is empty, showing 'No groups defined.' The Pagination tab shows settings for Row Ranges X to Y, Bottom - Right display position, and a maximum row count of 1,000,000. The Sorting tab shows options for Ascending and Descending images and attributes.

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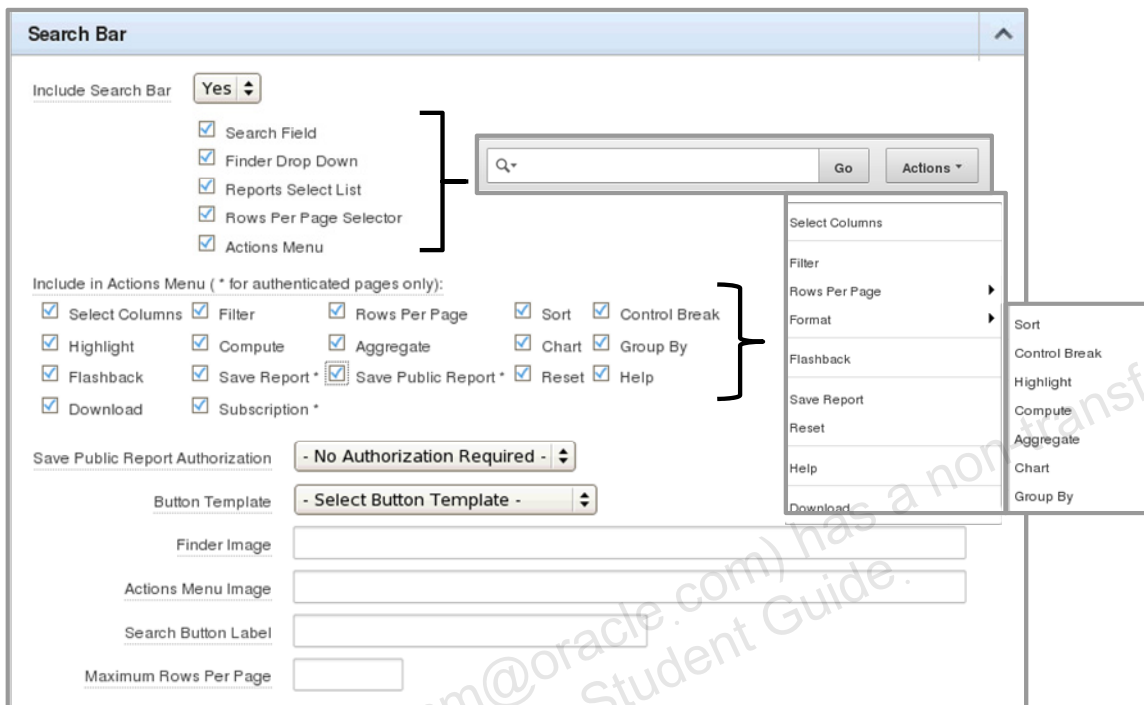
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You can modify various interactive report properties from the tabs on the Report Attributes page as follows:

- **Column Attributes tab:** Edit the properties of individual columns in the report. You can alter column heading text, change column positioning, or hide a column. If you select Hidden in the Display Text As field, the column will no longer appear in the Do Not Display area under Select Columns of the Actions menu. Click the pencil icon next to a column name to edit the column properties.
- **Column Groups tab:** Group columns into groups. If you create a single-row view in the report, the grouped columns are displayed together under the group name. To create a group, click the Add Group button. Then from the Column Attributes tab, you can add columns to the group.
- **Pagination tab:** Specify if you want to use pagination, and where and how it should appear.
- **Sorting tab:** Specify the image to be used next to the column name in the column heading when the sort is applied. Click the **set defaults** link to accept the default images.

Click **Apply Changes** to save the changes that you made to the report attributes.

# Customizing the Search Bar



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You can choose whether or not to include a search bar in an interactive report. By default, a search bar is included in an interactive report. If you set Include Search Bar to No, the search bar and all its components are removed from the interactive report. You can specify which components of the search bar should be displayed. You can also control the options that are displayed under the Actions menu. All the actions are selected by default. Deselect the option that you do not want in the Actions menu of the report.

Click **Apply Changes** to save the changes that you made to the report attributes.

# Specifying the Download Formats

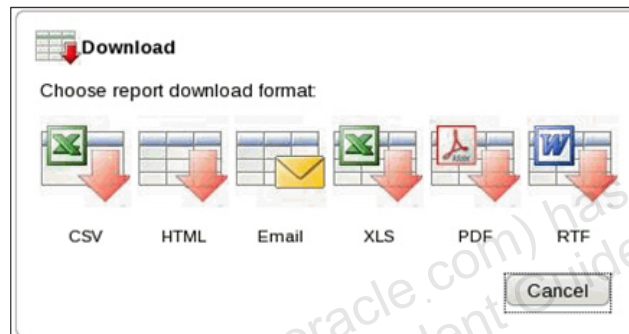
**Download**

Download Formats (\* for authenticated pages only):

CSV  HTML  Email\*  XLS  PDF  RTF

CSV Separator  CSV Enclosed By

Filename



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On the Download tab, you can specify the formats in which users can download the report data. The available formats are CSV, HTML, Email, XLS, PDF, and RTF.

Click **Apply Changes** to save the changes that you made to the report attributes.

# Using the Link Column

The screenshot shows the 'Link Column' configuration dialog in Oracle APEX. The 'Link Column' dropdown is set to 'Link to Single Row View', which is highlighted with a red box. Other options include 'Link to Custom Target' and 'Exclude Link Column'. The 'Single Row View' dropdown is also set to 'Link to Single Row View'. The 'Uniquely Identify Rows by' dropdown is set to 'ROWID'. The 'Link Icon' field contains the HTML code: ``. The 'Link Attributes' field is empty. The 'Target' dropdown is set to 'Page in this Application'. The 'Request' field is empty. The 'Page Checksum' dropdown is set to '- Use default -'. The 'Condition Type' dropdown is set to '- No Condition -'. Below the dialog, a 'Report View' window is shown, displaying a single row of data for Employee Id 101, Neena Kochhar, with various attributes like First Name, Last Name, Email, Phone Number, Hire Date, Job Id, Salary, Commission Pct, Manager Id, and Department Id.

Single-row view of the report →

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For an interactive report, you can specify a link column. You can create a column link to a single-row view or to another page in the application.

The single-row view is used by default when you create an interactive report. The single-row view is a display-only view of all the columns in the report. If you have a column in your query but it is hidden in Column Attributes, it will not be displayed in the single-row view. If you have a column that you have hidden in the report by using Select Columns in the Actions menu, it will appear in the single-row view. From the single-row view, you can navigate through all the rows by clicking the Previous and Next buttons. To return to the report, you can click the Review View button.

If you choose to link to a custom page, you can pass item session state values. Linking to a custom page is explained in detail in the lesson titled "Creating Forms."

You can also completely remove the link column from the report. A link column cannot be sorted, hidden, or moved by an end user.

Click **Apply Changes** to save the changes that you made to the report attributes.

# Icon and Detail Views

The top row shows the configuration panels for 'Icon View' and 'Detail View'. The 'Icon View' panel includes settings for 'Icon View Enabled' (Yes), 'Use Custom Icon Link' (No), 'Columns Per Row' (5), 'Link Column' (ICON\_LINK), 'Image Source Column' (DETAIL\_IMG\_NO\_STYLE), 'Label Column' (PRODUCT\_NAME), 'Image Attributes' (width=75\* height=75\*), 'HTML ALT Text', 'HTML TITLE Text', and 'Custom Link'. The 'Detail View' panel includes 'Detail View Enabled' (Yes) and a large text area for HTML formatting, showing code for 'Before Rows', 'For Each Row', and 'After Rows'.

The bottom row shows two report outputs. The left report is in 'Icon View' mode, displaying a grid of product images with labels: Bag, Belt, Blouse, Business Shirt, Jacket, Ladies Shoes, Men's Shoes, Skirt, Trousers, and Wallet. The right report is in 'Detail View' mode, displaying a table with columns for Category, Description, Price, Units, Sales, Customers, Available, and Last Date Sold. The 'Bag' row shows: Category: Accessories, Description: Unisex bag suitable for carrying laptops with room for many additional items, Price: \$125.00, Units: 16, Sales: \$2,000.00, Customers: 6, Available: Yes, Last Date Sold: 10/23/2012. The 'Belt' row shows: Category: Accessories, Description: Leather belt, Price: \$30.00, Units: 11, Sales: \$330.00, Customers: 3, Available: Yes, Last Date Sold: 10/9/2012.

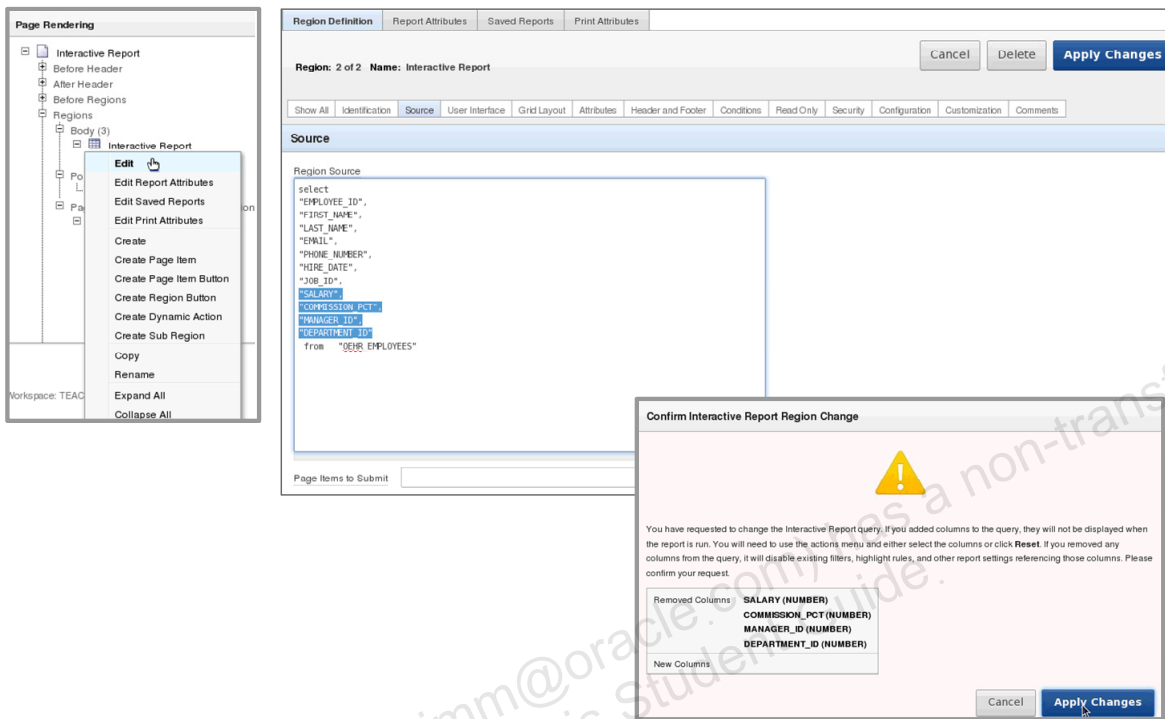
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On the Icon View and Detail View tabs, you can define Icon and Detail views for an interactive report. When you enable each of these views, an icon is created on the search bar of the interactive report.

Icon View is ideal when you have an image column in your report. Detail View enables you to display the report data by using HTML formatting. Examples of these views (shown in the screenshot in the slide) are included on the Products tab in the Sample Database application that is installed in each Application Express workspace by default.

# Modifying the Interactive Report Query



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You can change the query that is executed when the report is run. To do this, perform the following steps:

1. From the page definition, right-click the interactive report and select **Edit**.
2. Under Region Definition, click **Source**.
3. Modify the report query.
4. Click **Apply Changes**.
5. In the confirmation window, click **Apply Changes**.

If you add columns to the query, they are not displayed when the report is run. In this case, to see the changes in your report, you must reset the report.

## Quiz

Which of the following must you define when creating an interactive report?

- a. A SQL query
- b. A control break
- c. Page and region names
- d. A filter

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**Answer: a**

## Quiz

Which of the following must you do to hide a column so that it is not shown in the report but allows the value to be passed to another page?

- a. Make sure that it is not displayed in Select Columns.
- b. Hide the column in the report and make sure that it is saved.
- c. Hide the column in Column Attributes.
- d. Delete the column from the SQL query.

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**Answer: c**

# Summary

In this lesson, you should have learned how to:

- Identify the types of reports that you can create in Oracle Application Express
- Manipulate interactive reports
- Create and customize interactive reports

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# Workshop 4-1 Overview: Building and Manipulating an Interactive Report

This practice covers creating and manipulating two interactive reports.

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# Workshop 4-2 Overview: Customizing an Interactive Report

This practice covers customizing the interactive reports.

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# 5

## Creating Classic Reports, Wizard Reports, and Reports for Mobile Applications

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# Objectives

After completing this lesson, you should be able to create the following reports:

- Classic
- Wizard
- List View

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This lesson introduces you to SQL reports in Oracle Application Express. It focuses on Classic and Wizard reports. In this lesson, you also learn how to create reports for mobile applications.

# Lesson Agenda

- Creating Classic Reports
  - Classic SQL Report
  - Creating a Classic SQL Report
- Creating Wizard Reports
- Creating List View for Mobile Applications

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# Classic (SQL) Report

EMPLOYEE_ID	FIRST_NAME	LAST_NAME	EMAIL	PHONE_NUMBER	HIRE_DATE	JOB_ID	SALARY	COMMISSION_PCT	MANAGER_ID	DEPARTMENT_ID
100	Steven	King	SKING	515.123.4567	17-JUN-1987	AD_PRES	24000			90
101	Neena	Kochhar	NKOCHHAR	515.123.4568	21-SEP-1989	AD_VP	17000		100	90
102	Lex	De Haan	LDEHAAN	515.123.4569	13-JAN-1993	AD_VP	17000		100	90
103	Alexander	Hunold	AHUNOLD	590.423.4567	03-JAN-1990	IT_PROG	9000		102	60
104	Bruce	Ernst	BERNST	590.423.4568	21-MAY-1991	IT_PROG	6000		103	60
105	David	Austin	DAUSTIN	590.423.4569	25-JUN-1997	IT_PROG	4800		103	60
106	Valli	Pataballa	VPATABAL	590.423.4560	05-FEB-1998	IT_PROG	4800		103	60
107	Diana	Lorentz	DLORENTZ	590.423.5567	07-FEB-1999	IT_PROG	4200		103	60
108	Nancy	Greenberg	NGREENBE	515.124.4569	17-AUG-1994	FL_MGR	12000		101	100
109	Daniel	Faviet	DFAVIET	515.124.4169	16-AUG-1994	FL_ACCOUNT	9000		108	100
110	John	Chen	JCHEN	515.124.4269	28-SEP-1997	FL_ACCOUNT	8200		108	100
111	Ismael	Sciarra	ISCIARRA	515.124.4369	30-SEP-1997	FL_ACCOUNT	7700		108	100
112	Jose Manuel	Urman	JMURMAN	515.124.4469	07-MAR-1998	FL_ACCOUNT	7800		108	100
113	Luis	Popp	LPOPP	515.124.4567	07-DEC-1999	FL_ACCOUNT	6900		108	100
114	Den	Raphaely	DRAPHEAL	515.127.4561	07-DEC-1994	PU_MAN	11000		100	30

row(s) 1 - 15 of 107 Next

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Sometimes an interactive report may not be appropriate, as in the following situations:

- When you want to build the SQL query dynamically by using a PL/SQL function that returns a SQL query
- When you want multiple reports on a page. Currently, you can have only one interactive report on a page.

The two types of classic reports, SQL and wizard, are both based on SQL queries. The screenshot in the slide displays a classic SQL report.

# Creating a Classic (SQL) Report

To create a classic (SQL) report:

1. Access the Create Report Wizard.
2. Select Classic Report for the report type.
3. Specify the page name and breadcrumb, and choose whether you want tabs.
4. Enter the SQL query for the report, or use Query Builder to create the SQL.
5. Specify the report attributes (such as column heading sorting, CSV output, and enable search).
6. Confirm your selections and click Create.

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The slide shows the steps to create a classic report.

You can view the demonstration of creating a classic report by opening the `/home/oracle/labs/demos/les05_classic_report.html` file.

# Lesson Agenda

- Creating Classic Reports
- Creating Wizard Reports
  - Wizard Report
  - Creating a Wizard Report
- Creating List View for Mobile Applications

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# Wizard Reports

Wizard Report					
Employee Id	First Name	Last Name	Email	Phone Number	Hire Date
100	Steven	King	SKING	515.123.4567	17-JUN-1987
101	Neena	Kochhar	NKOCHHAR	515.123.4568	21-SEP-1989
102	Lex	De Haan	LDEHAAN	515.123.4569	13-JAN-1993
103	Alexander	Hunold	AHUNOLD	590.423.4567	03-JAN-1990
104	Bruce	Ernst	BERNST	590.423.4568	21-MAY-1991
105	David	Austin	DAUSTIN	590.423.4569	25-JUN-1997
106	Valli	Pataballa	VPATABAL	590.423.4560	05-FEB-1998
107	Diana	Lorentz	DLORENTZ	590.423.5567	07-FEB-1999
108	Nancy	Greenberg	NGREENBE	515.124.4569	17-AUG-1994
109	Daniel	Faviet	DFAVIET	515.124.4169	16-AUG-1994
110	John	Chen	JCHEN	515.124.4269	28-SEP-1997
111	Ismael	Sciarra	ISCIARRA	515.124.4369	30-SEP-1997
112	Jose Manuel	Urman	JMURMAN	515.124.4469	07-MAR-1998
113	Luis	Popp	LPOPP	515.124.4567	07-DEC-1999
114	Den	Raphaely	DRAPHEAL	515.127.4561	07-DEC-1994

row(s) 1 - 15 of 107 [Next >](#)

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A wizard report looks the same as a classic (SQL) report except that you cannot modify the query in the source area. Also, instead of specifying the SQL query, you can select the table name and the columns to display in the report. To create wizard reports, you don't have to know SQL, but it prompts you to create the report through a series of windows based on the table name and columns to be displayed in the report.

# Creating a Wizard Report

To create a wizard report:

1. Access the Create Report Wizard.
2. Select Wizard Report for the report type.
3. Specify the page and region names as well as the breadcrumbs. Choose whether you want tabs.
4. Select the table and columns that you want to display.
5. Specify the report attributes (such as template and number of rows).
6. Click Create.

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When you create a wizard report, you select the table and columns that you want to be displayed in the report rather than building a SQL query.

You can view the demonstration of creating a wizard report by opening the `/home/oracle/labs/demos/les05_wizard_report.html` file.

# Workshop 5-1 Overview: Creating Classic Reports

This workshop covers the following topics:

- Creating a classic report
- Creating a wizard report

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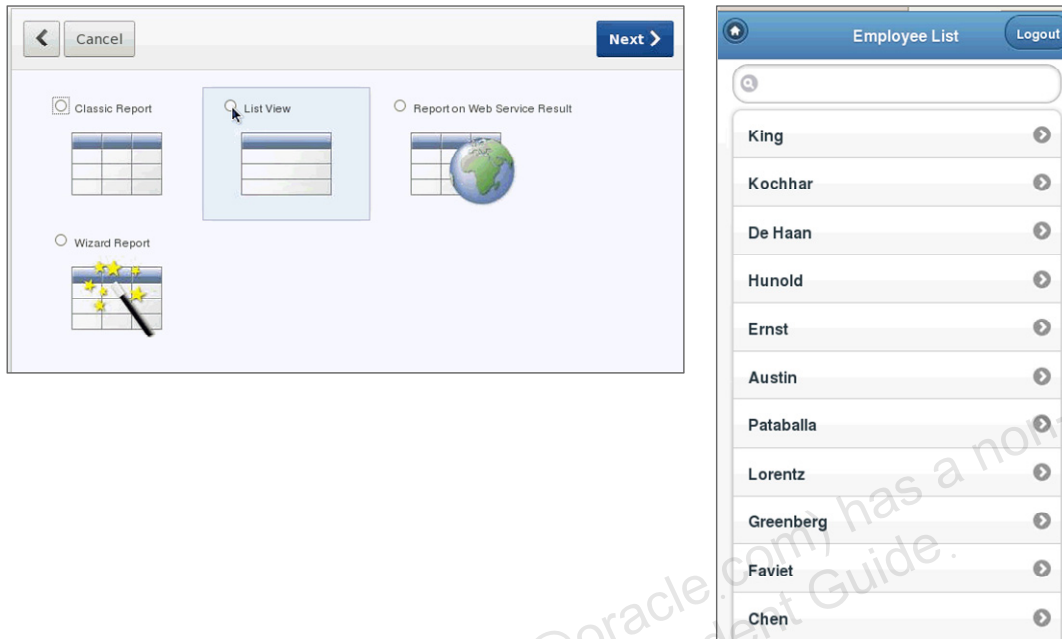
# Lesson Agenda

- Creating Classic Reports
- Creating Wizard Reports
- Creating List View for Mobile Applications
  - Creating a List View
  - Modifying a List View

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# Creating List View for Mobile Applications

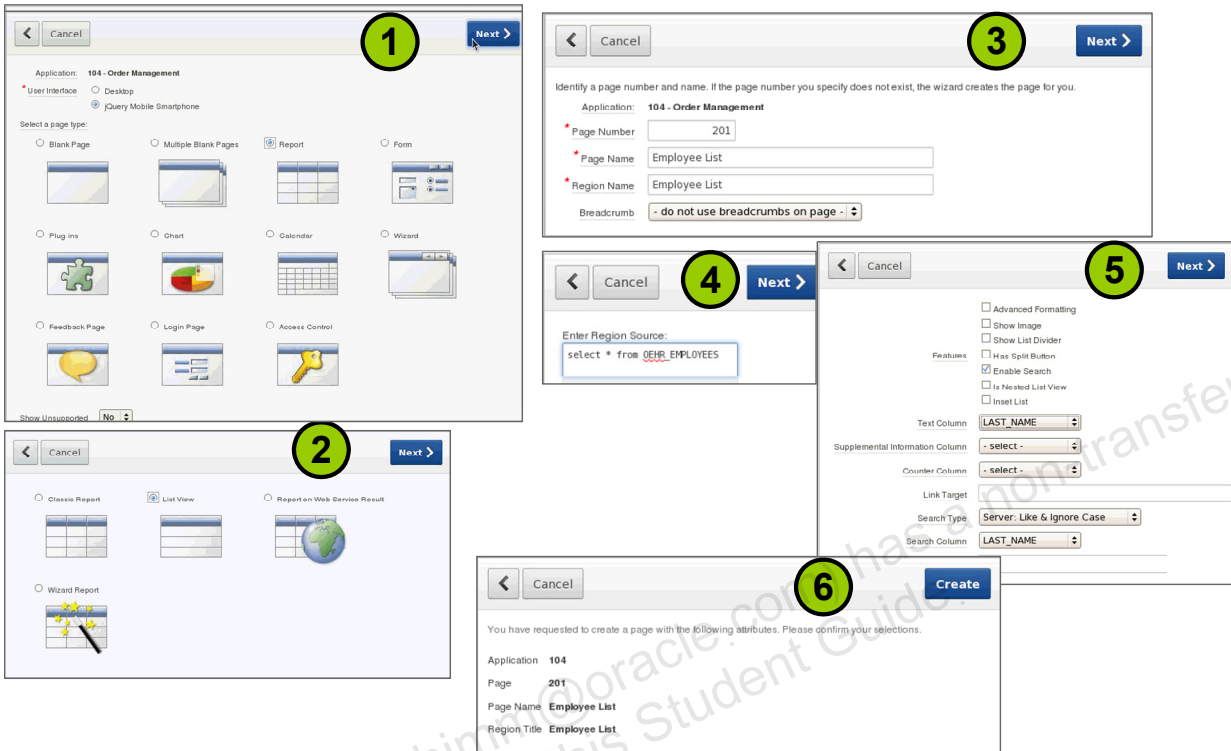


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When you create a report for a mobile application by using the Create Page Wizard, you can select different report types. These report types are similar to the report types available for desktop applications, except that the Interactive Report is replaced by List View.

# Creating a List View



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To create a List View, perform the following steps:

1. Access the Create Report wizard and select jQuery Mobile Smartphone for User Interface. Select Report as the page type.
2. Select List View for the report type.
3. Specify the Page Number, Page Name, and Region Name. Make sure to specify the Page Number to be distinct for mobile application pages. Select the Page Number in the 200 series.
4. Enter the Region Source.
5. Specify the Report Settings (such as, features to enable search and search column in the report).
6. Click Create.

You can view the demonstration of creating a List View by opening the `/home/oracle/labs/demos/les05_mobile_report.html` file.

# Modifying a List View

Cancel Next

Advanced Formatting  
Show Image  
Show List Divider  
Features  
Has Split Button  
 Enable Search (a)  
Is Nested List View  
Inset List

Text Column: LAST\_NAME  
Supplemental Information Column: FIRST\_NAME (b)  
Counter Column: - select -  
Link Target:  
Search Type: Server: Like & Ignore Case  
Search Column: LAST\_NAME  
Search Box Placeholder:

Employee List Logout

King	Steven
Kochhar	Neena
De Haan	Lex
Hunold	Alexander
Ernst	Bruce
Austin	David
Pataballa	Valli
Lorentz	Diana

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You can modify your List View by modifying the features and some attributes of the report. For example, selecting Enable Search allows you to enable search in your report based on the Search Column. Similarly, adding Supplemental Information Column enables you to add supplemental information for the list view entry. In the example shown in the slide, first name is the Supplemental Information Column.

## Workshop 5-2 Overview: Creating a List View

This practice covers adding and modifying a list view in a mobile application.

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# Summary

In this lesson, you should have learned how to:

- Create classic reports
- Create wizard reports
- Create a list view type of mobile report and modify the report

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In this lesson, you learned how to create classic (SQL), wizard, and list view reports.

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# 6

## Creating Forms

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# Objectives

After completing this lesson, you should be able to do the following:

- Identify the types of forms that you can include in an application
- Create:
  - A form on a table
  - A form with a report
  - A tabular form
  - A master detail form
- Edit forms
- Create forms in a mobile application

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In this lesson, you learn how to create forms in your application by using the various built-in wizards. You also learn how to edit and modify forms.

# Lesson Agenda

- Using Forms
  - Introducing Forms
  - Types of Forms
  - Accessing the Create Form Wizard
  - ROWID Versus Primary Key
- Creating Forms
- Modifying Forms
- Creating Forms in a Mobile Application

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# Introducing Forms

- What are forms in Oracle APEX?
  - Forms are application components that are used to manipulate database tables and objects.
- How are forms created in Oracle APEX?
  - Manually
  - Declaratively by using wizards
- Where are forms created?
  - On a new page in the application
  - On an existing page of the application

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Forms are application components that take input from a user and submit it to a server. A form usually consists of one or more page items (drop-down list, text box, check box, radio buttons, and so on), which enable users to enter information, and a button or link with a submit action.

In Oracle Application Express, you use forms when you must gather input from a user before performing a task on a database table. For example, you can create a form to insert data into a database table.

In Oracle Application Express, you can create forms easily by using wizards. For example, by using the “Form on a Table or View” wizard, you can create one item for each column in a table. The wizard automatically includes the necessary buttons and processes that are required to insert, update, and delete rows from the table.

You can create a form when you create a page in an application. You can also include a form on an existing page by creating a region.

# Types of Forms



**Form on a Table or View**



**Tabular Form**



**Form on a Table with Report**



**Master Detail Form**



**Form on a Procedure**



**Form on a SQL Query**



**Form on Web Service**



**Form and Report on Web Service**



**Summary Page**

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Oracle Application Express provides wizards to create the types of forms listed in the slide.

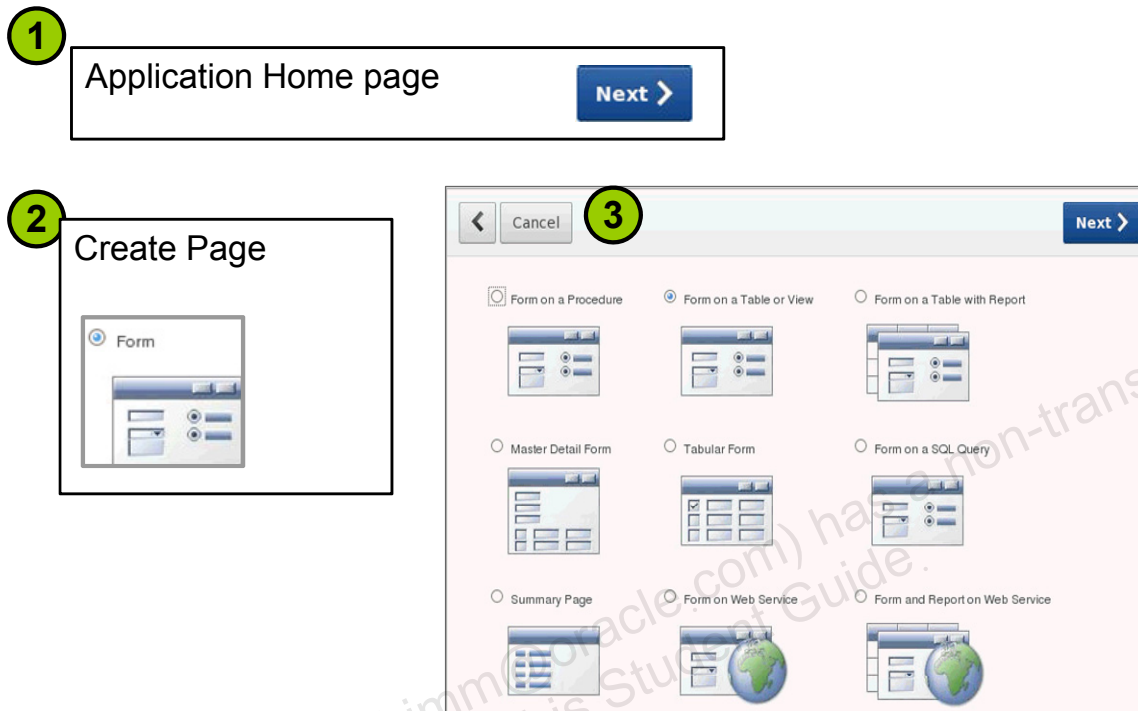
- **“Form on a Table or View” wizard:** Create a form to enable users to insert rows into a table.
- **Tabular Form Wizard:** Create a form to enable users to edit or delete multiple rows in a table simultaneously. Users will also be able to insert rows into the table.
- **“Form on a Table with Report” wizard:** Display a report and enable users to edit or delete rows one at a time. Users will also be able to insert rows into the table.
- **Master Detail Form Wizard:** Enable users to update data from two tables. You should have a foreign key relation between the two tables.

In this lesson, you learn how to create forms by using these four wizards.

The following are the other wizards:

- **“Form on a Procedure” wizard:** Create a form based on stored procedure arguments. Use this approach when you have implemented logic or data manipulation language (DML) in a stored procedure or package.
- **“Form on a SQL Query” wizard:** Create a form based on the columns returned by a SQL `SELECT` query.
- **“Form on Web Service” wizard:** Create a page with items based on a web service definition. This wizard creates a user input form, a process to call the web service, and a Submit button.
- **“Form and Report on Web Service” wizard:** Create a page with items based on a web service definition. This wizard creates a user input form, a process to call the web service, and a Submit button, and displays the results returned in a report.
- **Summary Page Wizard:** Create a read-only version of a form. A typical use case is to provide a confirmation page at the end of a wizard.

# Accessing the Create Form Wizards



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To access the Create Form wizards while creating a new page in your application, perform the following steps:

1. Click Create Page on the home page of the application where you want to create the form.
2. The Create Page Wizard opens. Select Form from the available options and click Next.
3. The form wizards are displayed. You can select a wizard based on the type of form that you want to create.

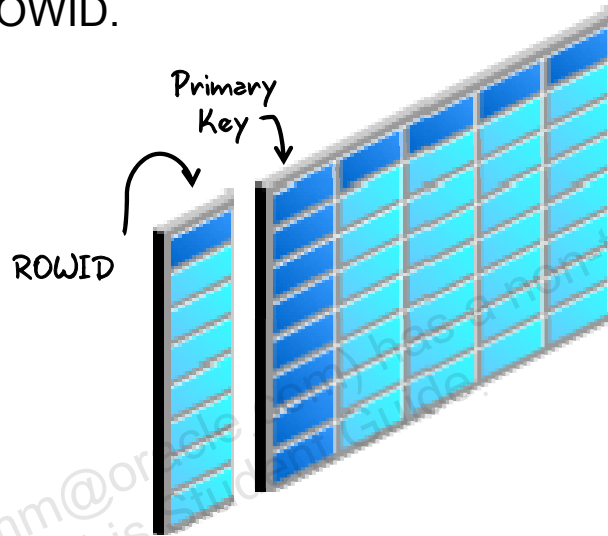
You can also access these wizards while creating a region on a page. You learn more about regions in the lesson titled “Working with Pages and Regions.”

The following wizards are also accessible when you create a database application from scratch:

- Form
- Report and Form
- Tabular Form
- Master Detail

## ROWID Versus Primary Key

- Oracle Application Express supports up to two primary key columns.
- For tables with no primary key or more than two primary key columns, use ROWID.



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Each row in a database table should be uniquely identifiable so that the DML operations in a form function properly. The most common practice is to specify a primary key for the table. A primary key can be a single column in a table or can be a combination of two or more columns.

In Oracle Application Express, the Create Form wizards allow you to specify up to a maximum of two columns for a primary key. If your table does not have a primary key or if it has three or more columns, Oracle Application Express recommends that you use the ROWID feature. ROWID is a pseudocolumn that uniquely identifies a row in a table.

# Lesson Agenda

- Using Forms
- Creating Forms
  - Creating a Form on a Table
  - Creating a Form with a Report
  - Creating a Tabular Form
  - Creating a Master Detail Form
- Modifying Forms
- Creating Forms in a Mobile Application

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## Example: Form on a Table

Each table column is displayed as a field.

Automatically Created Region Buttons

Oehr Employees

Cancel Create

First Name

Last Name \*

Email \*

Phone Number

Hire Date \*

Job Id \*

Salary

Commission Pct

Manager Id

Department Id

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The slide shows the form that is created by using the “Form on a Table or View” wizard. The wizard creates a form where users can enter values for the selected columns of an EMPLOYEES table. The wizard displays two buttons on the page: Cancel and Create. To create a new row in the table, enter the details and click the Create button. The data is inserted in the table and you are redirected to the page that you specified while creating the form. Click Cancel to branch to the page that you specified while creating the form.

# Creating a Form on a Table



Access the “Form on a Table or View” wizard, and then perform the following steps:

1. Select the schema and table.
2. Enter the page number and name, region name, and template (filled by default).
3. Select a tab option.
4. Select the primary key columns.
5. Select the source for primary key column.
6. Select the columns to include in the form.
7. Select and name the buttons.
8. Select the pages to branch to.
9. Confirm the details and create the form.

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The slide provides an overview of the steps to create a form on a table by using the “Form on a Table or View” wizard. You must access the wizard and follow the wizard instructions. You can change the label name of the buttons created on the form page. You can also specify the page that should be displayed after clicking these buttons.

## Example: Form on a Table with Report

The screenshot displays an Oracle APEX interface. At the top, there is a search bar with a magnifying glass icon, a 'Go' button, an 'Actions' dropdown menu, and a 'Create' button. Below this is a table with the following columns: Employee Id, First Name, Last Name, Email, Phone Number, Hire Date, and Salary. The table contains 10 rows of employee data. A form titled 'Oehr Employees' is overlaid on the table, showing the details for the first row (Employee Id: 100, First Name: Steven, Last Name: King, Email: SKING, Phone Number: 515.123.4567, Hire Date: 17-JUN-1987, Salary: 24000). The form has input fields for each field, with the 'First Name' field containing 'Steven'. There are 'Cancel', 'Delete', and 'Apply Changes' buttons at the top right of the form.

Employee Id	First Name	Last Name	Email	Phone Number	Hire Date	Salary
100	Steven	King	SKING	515.123.4567	17-JUN-1987	24000
101	Neena	Kochhar	NKOCHHAR	515.123.4568	21-SEP-1989	17000
102	Lex	De Haan	LDEHAAN	515.123.4569	13-JAN-1993	17000
103	Alexander	Hunold	AHUNOLD	590.423.4567	03-JAN-1990	9000
104	Bruce	Ernst	BERNST	590.423.4568	21-MAY-1991	6000
105	David	Austin	DAUSTIN	590.423.4569	25-JUN-1997	4800
106	Valli	Pataballa	VPATADAL	590.423.4560	05-FEB-1998	4800
107	Diana	Lorentz	DLORE			
108	Nancy	Greenberg	NGREE			
109	Daniel	Faviet	DFAVIE			

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The slide shows the pages that are created by using the “Form on a Table with Report” wizard. The first page is an interactive report that lists the details from an EMPLOYEES table. When you click the Create button, a form appears where you can insert new rows in the EMPLOYEES table. When you click the link column in the report, the form is populated with the row details. Then you edit the details and save your changes.

## Creating a Form on a Table with a Report



- Type of report
- Page number and name
- Region template and name
- Tabs
- Columns to display
- Image for edit link
- Page number and name
- Region template and name
- Primary key and trigger source
- Columns to edit
- Actions to enable (insert, update, and delete)

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The “Form on a Table with Report” wizard combines the steps to create a report and the steps to create a form—and creates two pages. The first page is a report with an edit link (link column) for each row. The report page also includes a Create button to enable users to insert rows into the table. The second page is a form to edit or delete the row selected from the first page (reports page). The slide shows the various wizard steps for creating the Report and Form pages.

You can view a demonstration of creating a form on a table with report by opening the `/home/oracle/labs/demos/les06_form_with_report.html` file.

# Workshop 6-1 Overview: Creating a Form on a Table

This practice covers the following topics:

- Creating a form based on a table
- Linking to the form from a report

## Example: Master Detail Form

Order Id	Edit	Order Date	Order Mode	Customer Id	Order Status	Order Total	Sales Rep Id	Promotion Id
2458		16-AUG-99 02.34.12.234359 PM	direct	101	0	78279.6	153	
2397		19-NOV-99 03.41.54.696211 PM	direct	102	1	42283.2	154	
2454		02-OCT-99 04.49.34.678340 PM	direct	103	1	6653.4	154	
2354		14-JUL-00 05.18.23.234567 PM	direct	104	0	46257	155	
2358		08-JAN-00 06.03.12.654278 PM	direct	105	2	7826	155	
2381		14-MAY-00 07.59.08.843679 PM	direct					
2440		31-AUG-99 08.53.06.008765 PM	direct					
2357		08-JAN-98 09.19.44.123456 PM	direct					
2394		10-FEB-00 10.22.35.564789 PM	direct					
2435		02-SEP-99 10.22.53.134567 PM	direct					
2455		20-SEP-99 10.34.11.456789 AM	direct					
2379		16-MAY-99 01.22.24.234567 AM	direct					

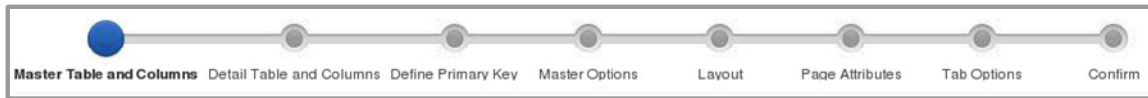
Line Item Id	Product Id	Unit Price	Quantity	Order Item Id
6	3163	32	142	1661
1	3117	38	140	1105
2	3123	79	112	1174
3	3127	488.4	114	1219

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The slide shows the form that is created by using the Master Detail Form Wizard. You can select whether you want the wizard to create a report page on the master table. You can also specify whether you want the master and details information on the same page or on different pages. In the slide example, the reports page is created and the master and details information is shown on the same page. On the reports page, you can insert rows into the master table or edit the information in the existing rows. When you click the Edit icon, the master table row and any associated rows in the details table are shown. You can modify the data, as well as add or delete rows in the details table.

# Creating a Master Detail Form



Access the Master Detail Form Wizard, and then perform the following steps:

1. Select the schema, table, and columns for the master and detail tables.
2. Select the primary key source for the master and detail tables.
3. Specify master row navigation and the master report (optional).
4. Specify layout, page attributes, and tab options.
5. Review the details and create the form.

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A master detail form reflects a one-to-many relationship between two tables in a database. Typically, a master detail form displays a master row and multiple detail rows within a single HTML form. With this form, users can insert, update, and delete values from two tables or views. When you create the master detail form, you have the option to customize the output. Your decisions result in the creation of one to three pages.

- You can include a master report. This displays the selected master columns and provides links to the master detail page, displaying the selected master record.
- You decide whether to edit the detail records on the same page (that is, you get a tabular form on your master detail page) or to edit the detail records on a separate page (that is, you get only a report in the detail section of your master detail page and the editing is done by using a form on another page).

You can view a demonstration of creating a master detail form by opening the following file:  
[/home/oracle/labs/demos/les06\\_master\\_table.html](/home/oracle/labs/demos/les06_master_table.html)

# Workshop 6-2 Overview: Creating a Master Detail Form

This practice covers creating a Master Detail form and make some modifications to it.

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## Example: Tabular Form

The screenshot shows a window titled "Tabular Form" with a table of employee data. The table has columns for Employee Id, First Name, Last Name, Email, Phone Number, Hire Date, and Salary. Each row has a checkbox on the left. The data is as follows:

<input type="checkbox"/>	Employee Id	First Name	Last Name	Email	Phone Number	Hire Date	Salary
<input type="checkbox"/>	100	Steven	King	SKING	515.123.4567	17-JUN-1987	24000
<input type="checkbox"/>	101	Neena	Kochhar	NKOCHHAR	515.123.4568	21-SEP-1989	17000
<input type="checkbox"/>	102	Lex	De Haan	LDEHAAN	515.123.4569	13-JAN-1993	17000
<input type="checkbox"/>	103	Alexander	Hunold	AHUNOLD	590.423.4567	03-JAN-1990	9000
<input type="checkbox"/>	104	Bruce	Ernst	BERNST	590.423.4568	21-MAY-1991	6000
<input type="checkbox"/>	105	David	Austin	DAUSTIN	590.423.4569	25-JUN-1997	4800
<input type="checkbox"/>	106	Valli	Pataballa	VPATABAL	590.423.4560	05-FEB-1998	4800
<input type="checkbox"/>	107	Diana	Lorentz	DLORENTZ	590.423.5567	07-FEB-1999	4200
<input type="checkbox"/>	108	Nancy	Greenberg	NGREENBE	515.124.4569	17-AUG-1994	12000
<input type="checkbox"/>	109	Daniel	Faviet	DFAVIET	515.124.4169	16-AUG-1994	9000

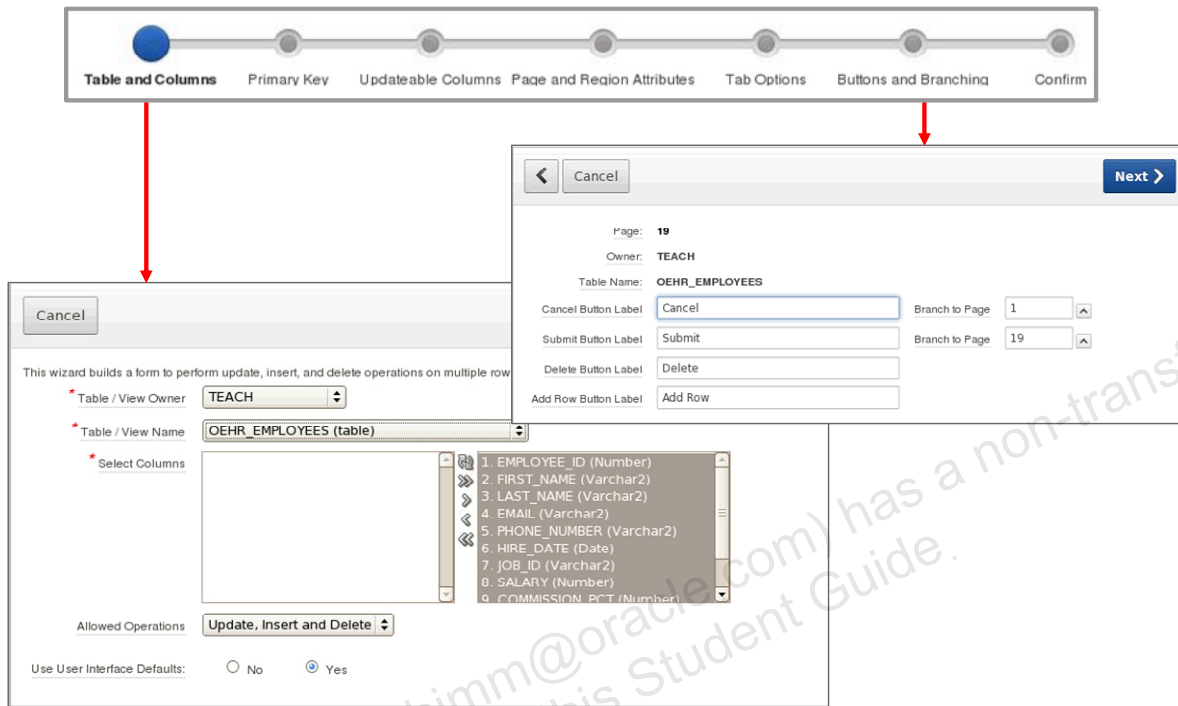
At the bottom right of the table, there is a dropdown menu showing "row(s) 1 - 10 of 107" and a "Next" button. Below the table is an "Add Row" button. In the top right corner of the window, there are "Cancel", "Delete", and "Submit" buttons.

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The slide shows the form that is created by using the Tabular Form Wizard. If you allowed all the operations in the wizard, the tabular form presents the user with four action buttons. By default, Cancel, Delete, and Submit are displayed on the upper-right corner and Add Row is displayed at the bottom. Additionally, a check box appears to the left of each row, enabling you to select the rows and delete them. You can also select all the rows simultaneously by selecting the check box to the left of the column headings. You can make changes to the data in any row, and then click the Submit button to save the changes in the database.

# Creating a Tabular Form



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The Tabular Form Wizard has steps that are similar to the “Form on a Table or View” wizard. While selecting the schema, the wizard prompts you to set the operations that you want to allow users to perform on the form. By default, the “Update, Insert and Delete” option is selected. The wizard enables you to select the columns to be displayed in the form and the columns that can be updatable. Depending on the operations that you allowed the users to perform, the buttons are included on the form page. You can change the label name for the buttons.

You can view a demonstration of creating a tabular form by opening the [/home/oracle/labs/demos/les06\\_form\\_tabular.html](/home/oracle/labs/demos/les06_form_tabular.html) file.

## Workshop 6-3 Overview: Creating a Tabular Form

This practice covers creating and manipulating a Tabular form.

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## Quiz

Which type of form would you create if you want to show a CUSTOMER and all the ORDERS that the customer has placed for a product?

- a. Form on a table
- b. Tabular form
- c. Master detail form
- d. Form on a table with report

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**Answer: c**

## Quiz

You have a report that displays a list of all employees. You want to create a page to enter details for a new employee. Which of the following wizards should you use?

- a. Form on a Table or View
- b. Tabular Form
- c. Master Detail Form
- d. Form on a Table with Report

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**Answer: a**

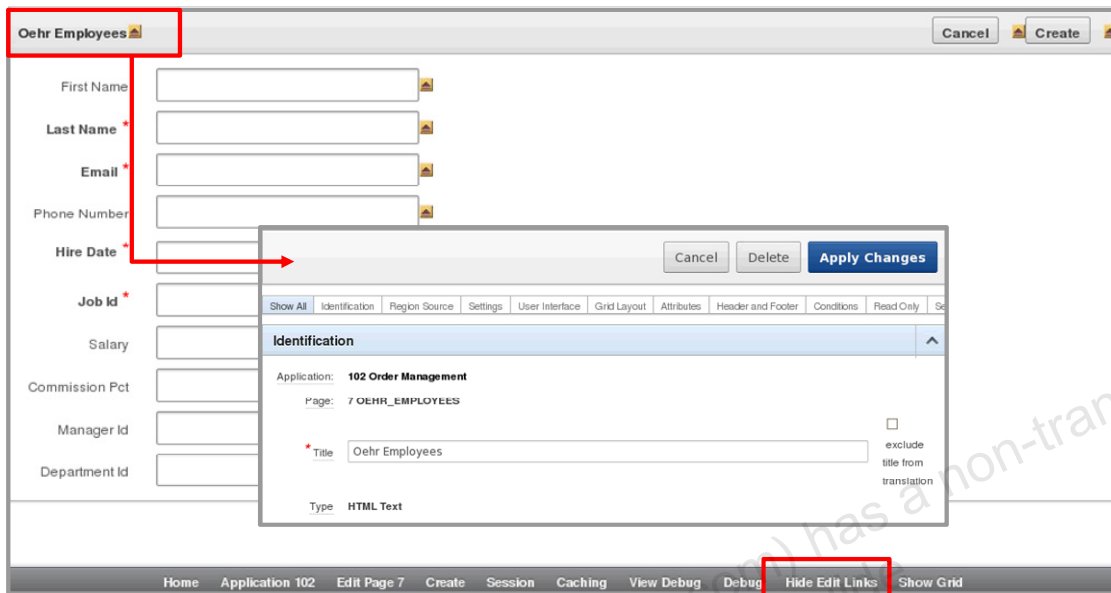
# Lesson Agenda

- Using Forms
- Creating Forms
- **Modifying Forms**
  - Using Show/Hide Edit Links
  - Linking a Report to a Form
  - Reordering Items in the Tree View
  - Editing Items by Using Edit All
  - Changing the Item Display Type
  - Customizing Forms
- Creating Forms in a Mobile Application

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# Using Show/Hide Edit Links



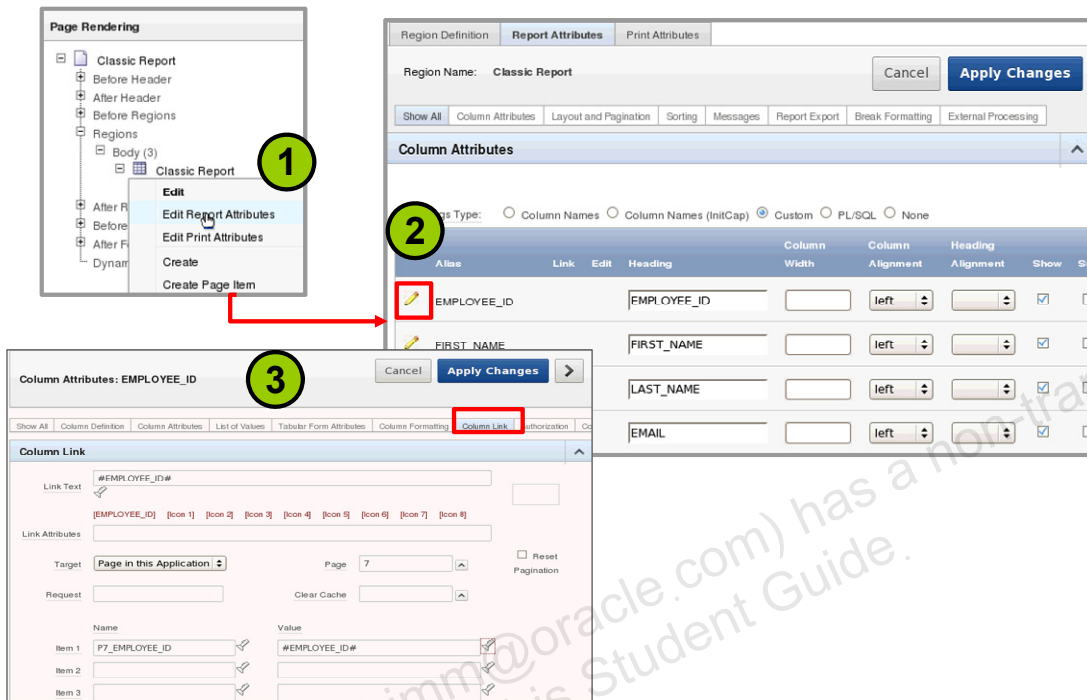
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When you run your form page, you can modify its objects by using the Show Edit Links button on the Developer toolbar. When you click Show Edit Links, an icon appears next to each item in the form. Click the icon to view the details about that item. This is useful, for example, when changing a label or the format of an item.

To disable the edit links, click Hide Edit Links on the Developer toolbar.

# Linking a Report to a Form



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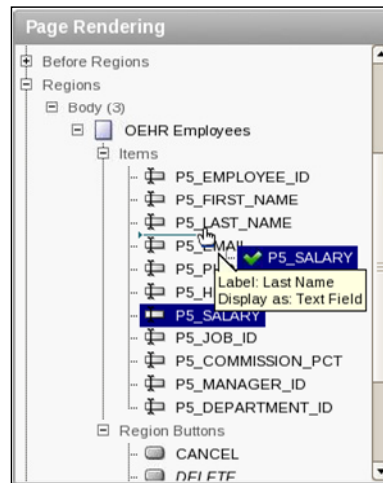
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When you create a “Form on a Table with Report,” the wizard automatically creates the required report and form and links between them. Stand-alone reports (interactive or classic) can also be linked to existing forms. This slide shows how you can link a classic report to a form.

1. From the page definition of the page where you have created the report, right-click the report node and select Edit Report Attributes.
2. Click the Edit icon next to the column that you want to link.
3. Click the Column Link tab and in the Link Text field, enter the HTML text to be shown as the link. Use an image tag to display images, or select one from the list of default images. From the Target drop-down list, select “Page in this Application.” In Page, specify the target page ID. To reset the pagination for this page, select Reset Pagination. Use the Name and Value fields to specify the session state for a specific item, and then click Apply Changes.

For example, a column link is created on `EMPLOYEE_ID` and page 5, which contain a form on the `EMPLOYEES` table.

# Reordering Items



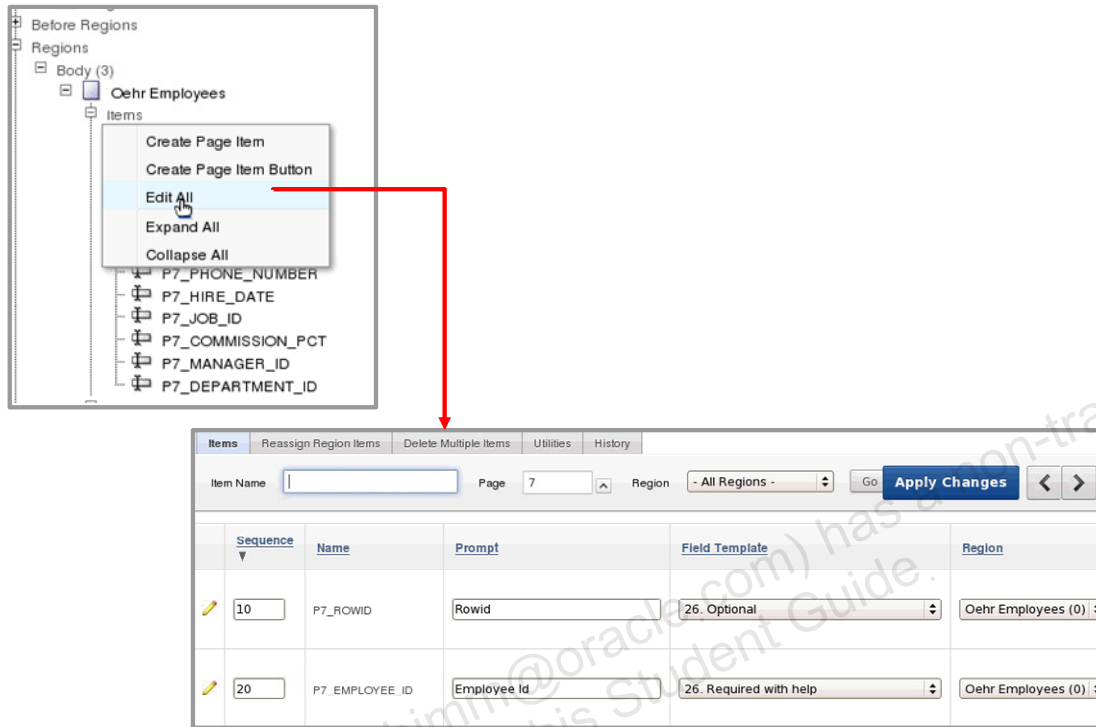
Drag to the Tree view.

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You can drag an item listed under the Items node to a different location among the items.

# Editing Form Items by Using “Edit All”



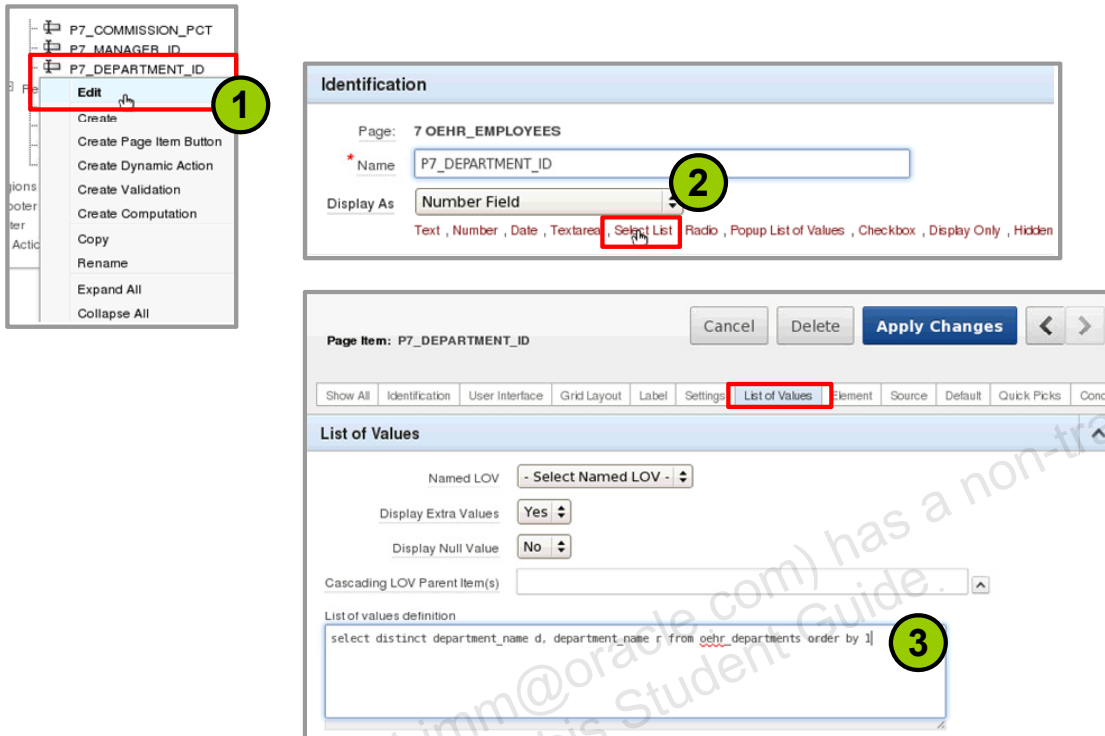
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To modify multiple items simultaneously, you can use the Edit All capability. Right-click the Items node and select Edit All. The Page Items page appears, where all the items on the page are listed on the Items tab. Click the Edit icon to edit the corresponding item. In addition, the following tabs are available:

- **Reassign Region Items:** Enables you to assign multiple items to different regions
- **Delete Multiple Items:** Enables you to delete multiple items at a time
- **Utilities:** Enables you to edit item labels or help text, and view reports across all pages in the selected application
- **History:** Enables you to get the history of all the items on this page

# Changing Item Display Type



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By default, your varchar/number type columns are displayed as text fields in a form. You can change this default type to other available types, such as drop-down lists, radio buttons, check boxes, and pop-up LOVs.

To change the display type for an item, perform the following steps:

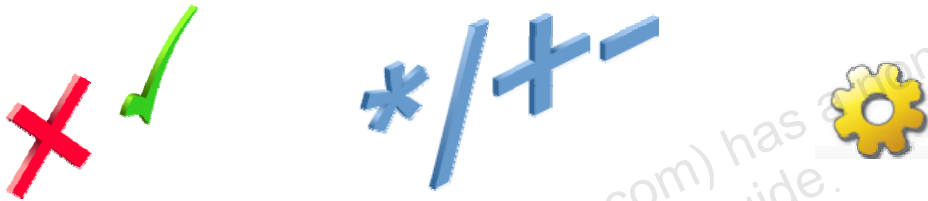
1. Right-click the item for which you want to change the display type and select Edit.
2. For the Display As field (on the Name tab), select the new type from the drop-down list.
3. Click the “List of Values” tab and enter the values for the list. You can view example syntax for writing the list of values by clicking the “List of Values Examples” node below the text area.

You can also create and save a list of values and use it to specify the list values here. You learn how to create a list of values as a shareable component in the lesson titled “Adding Items and Buttons.”

# Customizing Forms

You can include the following in your forms:

- Validations
- Computations
- Processes



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You can customize your forms by creating computations and processes. You can also include validations to verify user inputs. You learn about these topics in detail in the lesson titled “Adding Page Processing.”

## Quiz

Which edit facility should you use if you want to change all the item prompts and templates on a page simultaneously?

- a. Show Edit Links
- b. Edit All
- c. Reorder Region Items
- d. Drag and Drop

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**Answer: b**

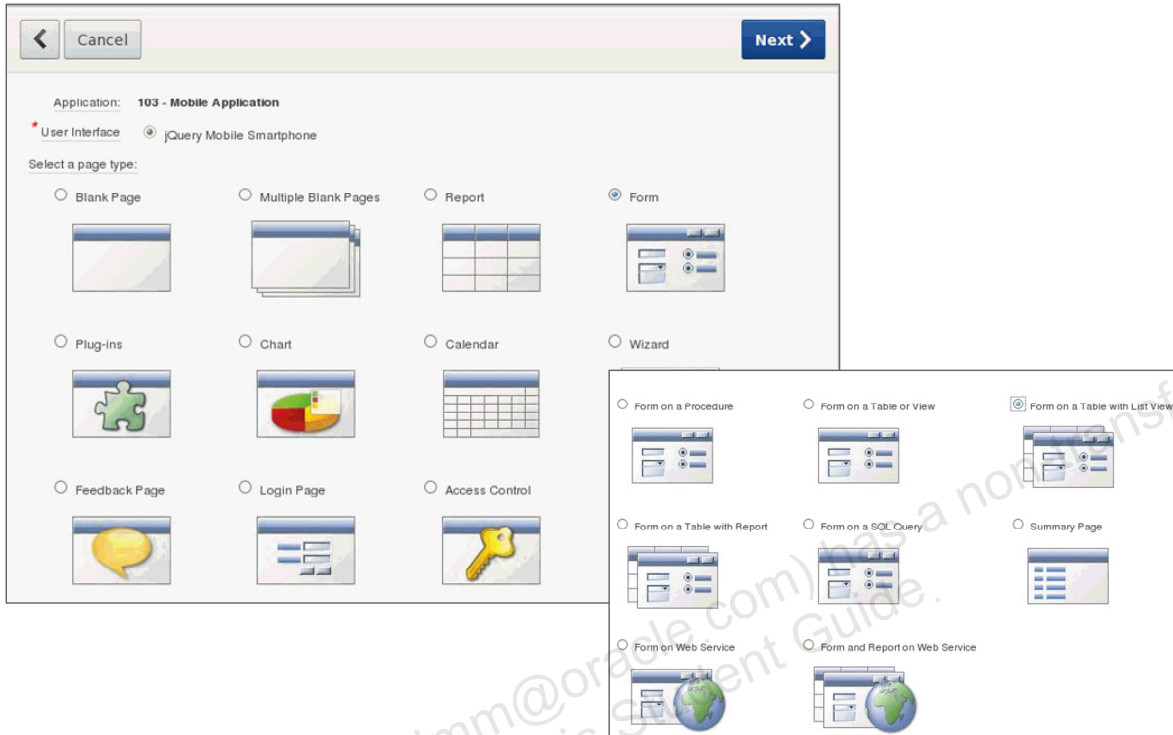
# Lesson Agenda

- Using Forms
- Creating Forms
- Modifying Forms
- Creating Forms in a Mobile Application
  - Creating a Form with List View
  - Creating a Form on a Table and link it from an existing List View
  - Modifying a Form

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# Form on a Table with List View



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When you create a form for a mobile application using the Create Page Wizard, you can choose different form types. “Form on a Table with List View” is the commonly used form in a mobile application. To select this option, you first select jQuery Mobile Smartphone User Interface and then select Form. You then select “Form on a Table with List View.”

## Creating a Form on a Table with List View

Access the “Form on a Table with List View” wizard for jQuery Mobile Smartphone User Interface, and then perform the following steps:

1. On the List View Page, specify the Page Number, Page Name, and Region Title.
2. This page builds two pages, which is a combination of a report and a form on a single table/view. Specify the Table/View Name.
3. Select the columns to include on the page.
4. Specify page and region information for the Form page.
5. Review the details and create the form and list view pages.

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The “Form on a Table with List View” wizard combines the steps to create a list view and the steps to create a form by creating two pages. The first page (List View Page) enables users to specify the row to be updated. It also includes a button to create a new row. The second page (Form Page) provides users with the ability to update the selected table or view. The slide lists the steps to define the List View and Form pages.

You can view a demonstration of creating a form on a table with list view by opening the `/home/oracle/labs/demos/les06_form_with_list_view.html` file.

## Creating a Form on a Table

The screenshot shows a mobile application window titled "EMPLOYEES DETAIL" with a "Logout" button in the top right corner. The form contains the following fields:

- Last Name (with a red asterisk indicating a required field)
- Email (with a red asterisk indicating a required field)
- Phone Number
- Hire Date (with a red asterisk indicating a required field)
- Job Id (with a red asterisk indicating a required field)
- Salary
- Commission Pct
- Manager Id
- Department Id

At the bottom of the form, there are two buttons: "Cancel" and "Create".

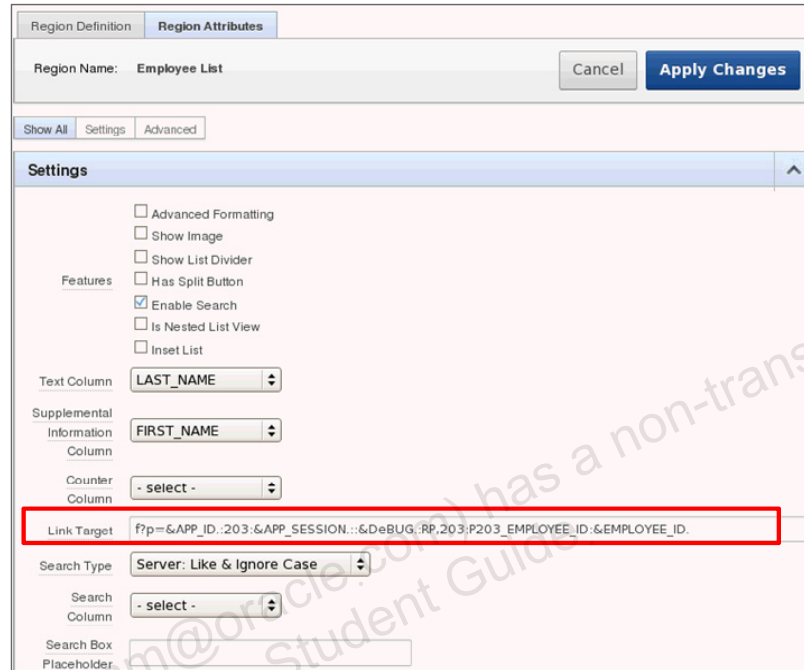
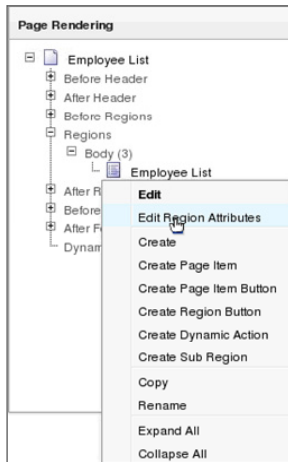
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In the Create Page Wizard for Form using jQuery Mobile Smartphone user interface, you can also select the “Form on a Table or View” form type. With this option, you create a form to update a single row in a database table or view. Access the “Form on a Table” wizard for jQuery Mobile Smartphone User Interface, and then perform the following steps:

1. Select the table or view name on which you want to build a form.
2. Specify page and region information by specifying the Page Number, Page Name, and Region Name.
3. Select the Primary Key type.
4. Select the columns to include in the form.
5. Identify the process options and button display text for the form.
6. Specify the branching details of the page and confirm your selections.

# Linking to a Form on a Table from an Existing List View



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You have seen how a List View report was created in the previous lesson. You can link to a Form on a Table from an existing List View. This can be done by editing the Settings in the Region Attributes of the List View page and by specifying a Link Target to the Form page.

## Workshop 6-4 Overview: Create a Form on a Table for Mobile Applications

This practice covers adding a form page to the mobile application and linking the form to a list view.

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# Summary

In this lesson, you should have learned how to:

- Identify the types of forms that you can include in an application
- Create:
  - A form on a table
  - A form with a report
  - A tabular form
  - A master detail form
- Edit forms
- Create forms in a mobile application

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This lesson showed you how to create forms, how to use the various built-in wizards that help you create forms, and how to edit the attributes of a form.

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# 7 Working with Pages and Regions

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# Objectives

After completing this lesson, you should be able to do the following:

- View page definitions
- Edit page attributes
- Create a new region
- View region attributes
- Create a subregion
- Create a global page
- Create common pages for different user interfaces

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This lesson shows you how to create pages and regions and how to edit their attributes.

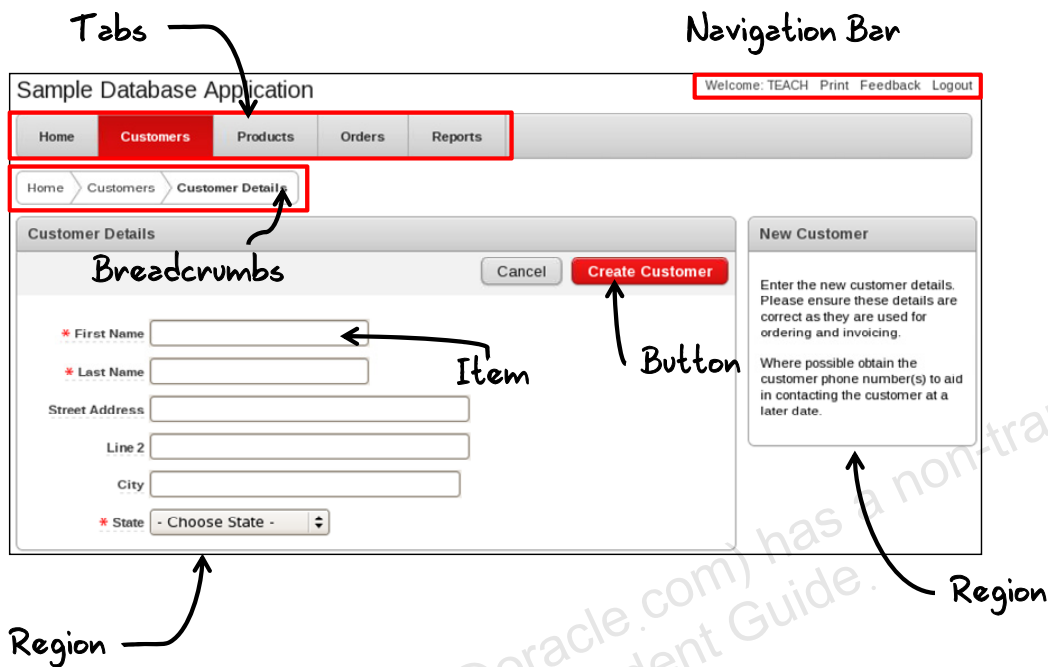
# Lesson Agenda

- Introducing Page Definition
  - What Is a Page? (Review)
  - Accessing a Page Definition
  - Page Definition Interface
  - Editing Page Attributes
- Working with Page Regions
- Working with Pages

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# What Is a Page? (Review)



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In the lesson titled “Creating a Database Application,” you learned that a page is the basic building block of any application. This slide presents a recap of the components of a page.

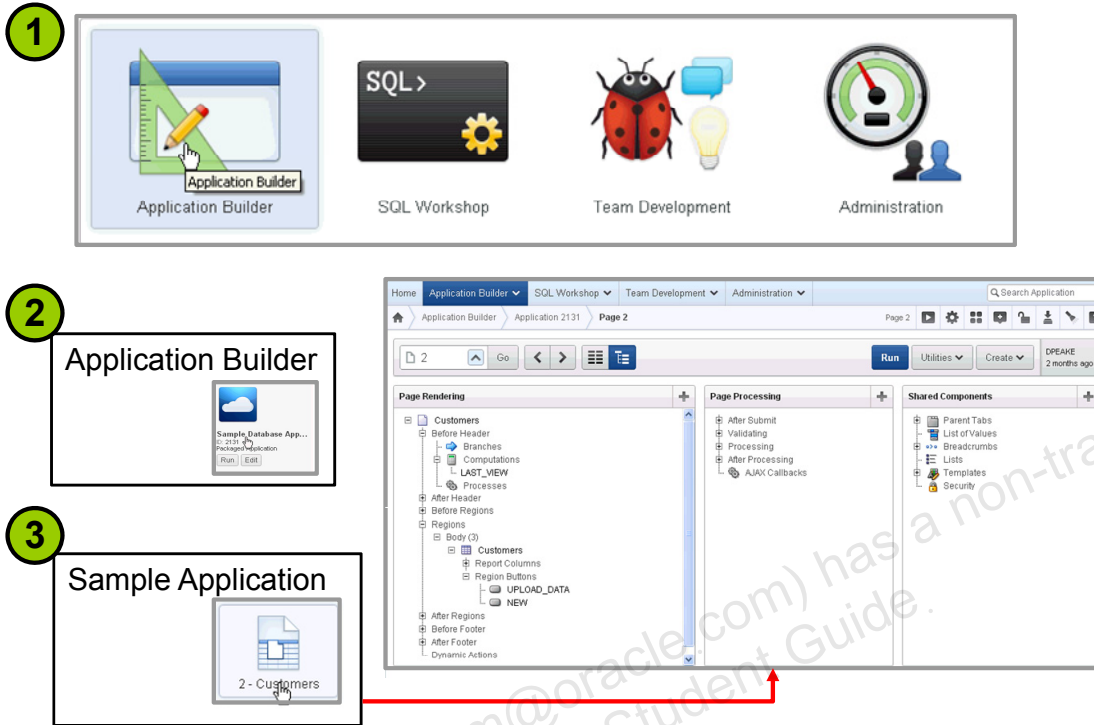
A page contains user interface elements and application logic. A page is divided into regions. A region is a section of a page that contains content. The content of a region is determined by the region source. For example, a region can contain a report based on a SQL query, or it can contain static HTML.

A region can also contain the following:

- Items, such as a text field, text area, select list, and check box
- Buttons to direct users to a specific page or URL, and also to post and process information
- Breadcrumbs, tabs, and a navigation bar to enable navigation

Each page in your application has a unique page ID and name. All information about a page and its components is displayed in a *page definition*.

# Accessing a Page Definition



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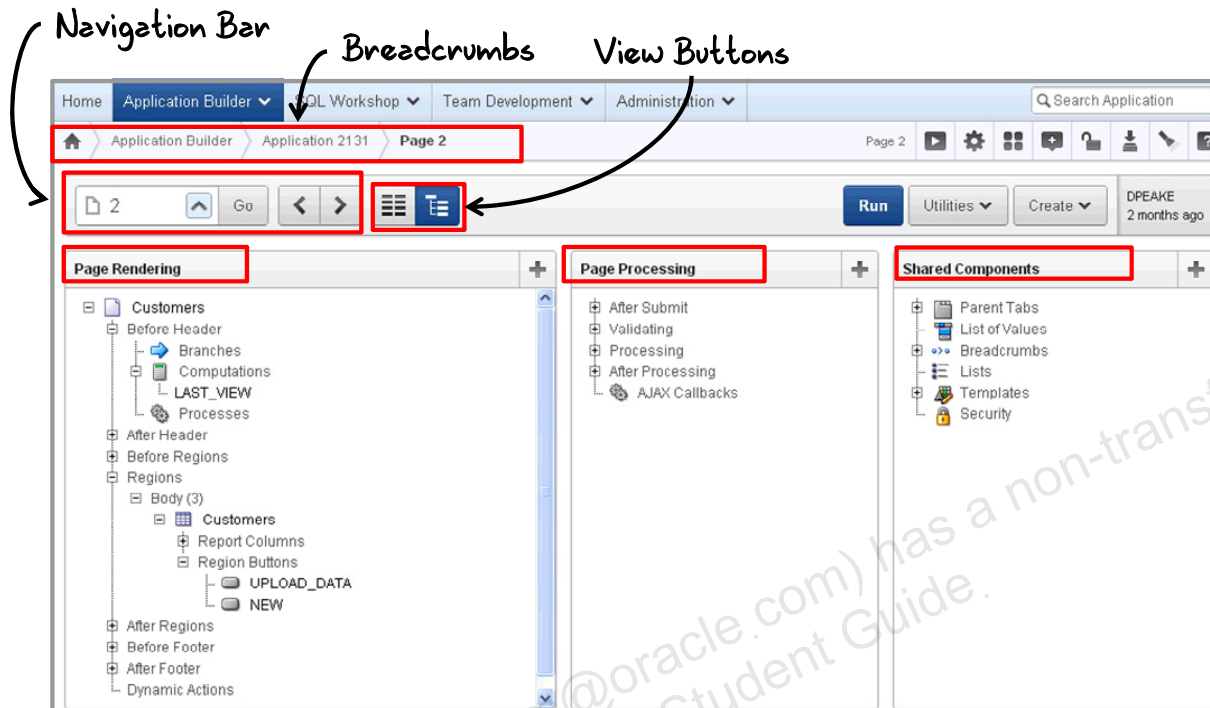
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You use the Page Definition to view, create, and edit the components of a page. To access the page definition for a page, perform the following steps:

1. On the Oracle Application Express home page, click the Application Builder icon.
2. On the Application Builder page, click the application that you want to access.
3. On the selected application page, click a page to view its definition.

The page definition is displayed.

# Page Definition Interface



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A page definition has three sections:

- **Page Rendering:** Lists user interface controls and logic that are executed when a page is rendered. Page Rendering is the process of generating a page from the database.
- **Page Processing:** Lists logic controls (such as computations and processes) that are evaluated and executed when the page is processed.
- **Shared Components:** Lists common components that can be used by one or more pages within an application.

In this lesson, you learn to work with the Page Rendering section. The Page Processing and Shared Components sections are discussed in the lessons titled “Adding Page Processing” and “Adding Shared Components That Aid Navigation,” respectively.

A breadcrumb menu is displayed at the top-left of the page. Each entry indicates your current location and functions as a navigation path. You can instantly navigate by clicking the respective breadcrumb.

You can use the navigation bar to navigate to another page by either entering the page number and clicking the Go button, or clicking the Back or Next buttons.

## Tree View

You can use the View buttons to switch between the Tree and Component views of a page definition. The Tree view (shown in the screenshot in the slide) is the default view. Click the Component View button to switch to the Component view. The Component view is discussed in the next slide.

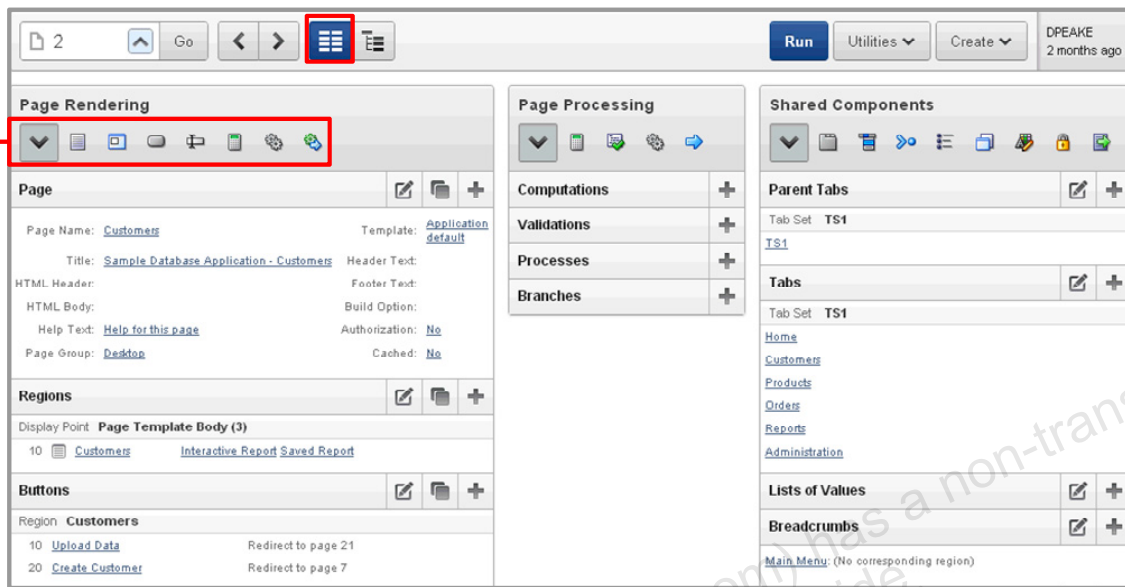
In the Tree view, page details are listed based on event sequence, that is, how Oracle Application Express processes them while rendering a page. Page components, such as regions, page items, and application logic, are represented as nodes in a tree. This organization provides a better understanding of when a component is processed.

### Key Features of the Tree View

- Each node in the tree has a custom context menu. You can access this menu by right-clicking the node.
- Each context menu includes options that link to default wizards. For example, selecting Create Validation for an item displays the Create Validation Wizard.
- You can quickly access the attributes page for a node by double-clicking the node. If available, an attributes page appears.
- You can reorder page items, report columns, processes, validations, branches, or computations by dragging them to another display, processing point, or region.
- Each tree node has a tool tip, which displays basic information about the component, such as item type, condition, and authorization.
- If a component has a condition, authorization, or build option, the tree node label is displayed in italic.
- Tree nodes with a Rename option in the context menu can be directly modified within the tree without having to go to the edit page. You can press F2 to enable inline edit. Use Show Names and Show Labels from the Utilities > Switch To menu to show component names or labels.

You can view the demonstration of understanding page definition by opening the `/home/oracle/labs/demos/les07_about_page_definition.html` file.

# Page Definition Interface: Component View



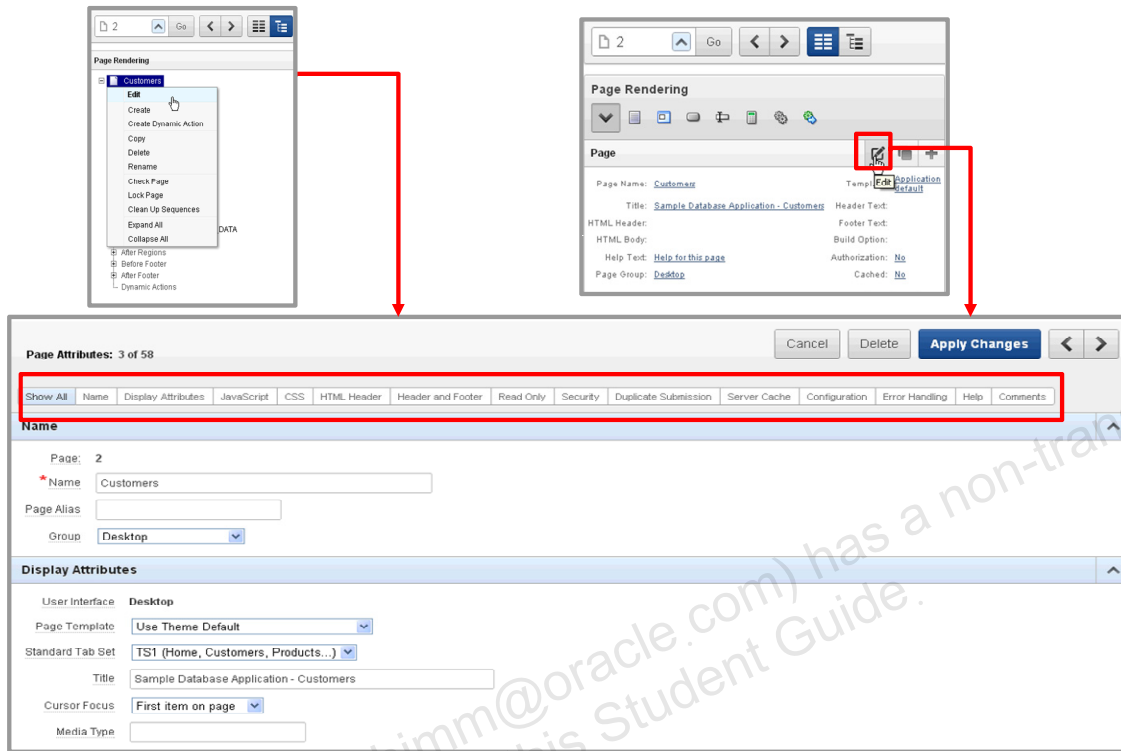
→ Show All, Page, Regions, Buttons, Items, Computations, Processes, Dynamic Actions

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In the Component view, the page components are listed by type. The buttons in each of the sections enable you to focus on one of the components in that section. For example, if you click the Items button, you see only the items in that section. You can move from component to component by clicking the corresponding button. To see all the components again, click the Show All button at the far left.

# Editing Page Attributes



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To edit a page's attributes, right-click the page node and select Edit. To edit a page in the Component view, click the Edit icon in the Page area. The Edit Page page is displayed. You can modify the following page attributes:

- **Name:** You can modify the page name, alias, and group to be displayed in the browser window.
- **Display Attributes:** You can define general display attributes for the current page such as the selected page template, standard tab set, title, and cursor focus. You can also set the cursor focus to be placed on the first item on the page. Select "Do not focus cursor" to bypass this behavior. You can select a page template to define the appearance of this page. This template takes precedence, for this page, over the application template.
- **JavaScript:** You can include JavaScript to be executed when the page loads.
- **CSS:** You can use these attributes to include Cascading Style Sheets (CSS) files on the current page.
- **HTML Header:** You can use this attribute to:
  - Specify page-specific inline cascading style classes
  - Add additional style sheets for a specific page

- **Header and Footer:** You can enter the text that you want to display in the page header or page footer. The page header displays text after the HTML header and before the body section. The footer section displays text after the page template body and before the page template footer.
- **Read Only:** Select a condition type from the list that must be met for the page to render page items as read-only.
- **Security:** Select the authorization scheme to be applied to the page from the Authorization Scheme drop-down list. Authorization schemes are defined at the application level and can be applied to many elements within the application. A given authorization scheme is set up to be evaluated once, either for each application session (at session creation) or for each page view. If the selected authorization scheme evaluates to true (subject to other defined conditions), the page is displayed. If it evaluates to false, the page is not displayed and an error message appears.  
From the Authentication drop-down list, specify whether this page is defined as public or whether it requires authentication. If a page is identified as public, the page can be viewed before authentication. This attribute applies only if the application uses authentication.
- **Duplicate Submission:** Use the “Allow duplicate page submissions” drop-down list to specify whether Oracle Application Express allows users to process a page multiple times. This can happen when you click the browser’s Back button, and then submit the page again, or, in some cases, when you click the browser’s Reload button. Setting this attribute to No prevents duplicate page submissions.
- **Server Cache:** You can enable caching for the current page. This improves performance for static pages.
- **Configuration:** Select a Build option for this component. Build options are predefined settings that determine whether or not the components within an application are enabled. Using Build options, you can enable or disable functionality. Most application attributes have a Build option attribute. Do not specify a Build option unless you plan to exclude that object from specific installations. Build options have two possible values: INCLUDE and EXCLUDE. An attribute that is excluded is treated as if it does not exist.
- **Error Handling:** Use this attribute to specify the error text displayed in the #NOTIFICATION\_MESSAGE# substitution string that is included in the page template.
- **Help:** Use this attribute to enter the help text for the current page.
- **Comments:** Use this attribute to record your comments about the current page.

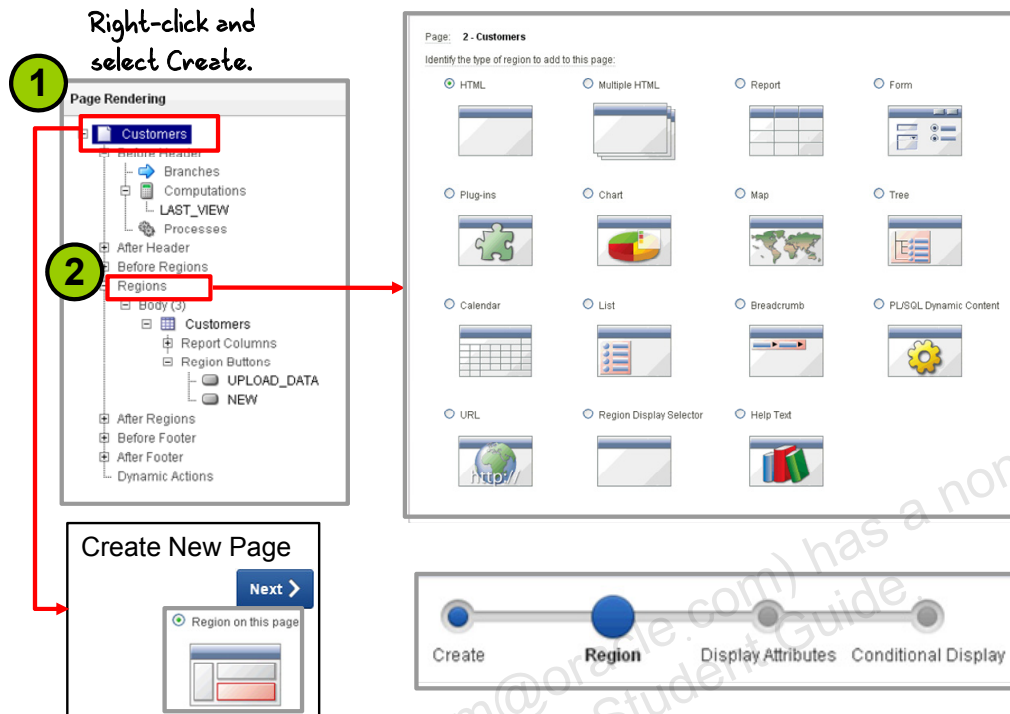
# Lesson Agenda

- Introducing Page Definition
- Working with Page Regions
  - Accessing the Create Region Wizard
  - About Region Types
  - Positioning a Region
  - Conditional Display of Regions
  - Viewing and Editing Region Attributes
  - Specifying Region Header or Footer
  - Creating a Region Display Selector
  - Copying Regions
  - Creating a Subregion
- Working with Pages

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# Accessing the Create Region Wizard



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To access the Create Region Wizard, navigate to the page definition of the page where you want to create a new region, and then perform one of the following steps:

- Right-click the parent page node and select Create. Select “Region on this page” and click Next.
- Right-click the Regions node and select Create.

You can also click the down arrow on the Create button and select “Region on this page.”

The various regions that you can create are displayed. Select an option depending on the type of region that you want to create, and click Next to proceed. The List option is displayed only if you have created a list in the application. The Region Display Selector enables you to create a show/hide control for each region on the page for which region display selection is enabled.

**Note:** To access the Create Region Wizard in the Component view, click the Create icon in the Regions section.

# About Region Types



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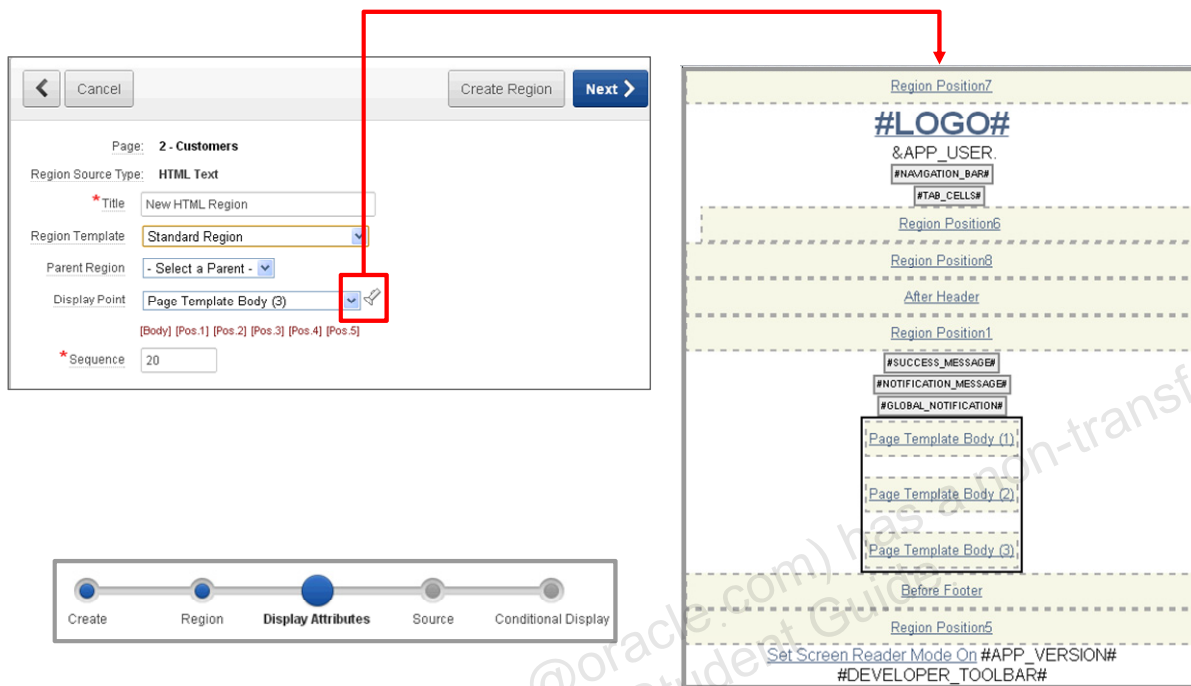
When you create a region, you select a region type. The Application Express engine interprets a region differently based on the type you select. The available region types are:

- **HTML:** This functions as containers for items and contains the HTML you provide.
- **Multiple HTML:** You use this to create multiple HTML regions at once.
- **Report:** You can define this region by a SQL query you write, or by using a wizard to guide you through the steps needed to write a query.
- **Form:** Form regions are used to contain a form.
- **Plug-ins:** Plug-ins allow developers to declaratively extend the built-in types available with Application Express.
- **Chart:** Chart regions contain line, bar, or pie charts based on SQL queries.
- **Map:** Map regions contain declaratively defined Flash maps.
- **Tree:** Trees are a hierarchical navigational control based on a SQL query executed at run time.
- **Calendar:** Calendar regions are used to contain a calendar.
- **List:** List regions contain a shared collection of links called list.

- **Breadcrumb:** The Breadcrumb region contains a hierarchical list of links called breadcrumb.
- **PL/SQL Dynamic Content:** Regions based on PL/SQL allow you to render any HTML or text using the PL/SQL Web Toolkit.
- **URL:** URL-based regions obtain their content by calling a web server using a predefined URL.
- **Region Display Selector:** This region enables the display of show hide controls for each region on a page for which region display selection has been enabled.
- **Help Text:** This region enables you to provide page-level help.

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# Positioning the Region



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When you create a region, you must specify its position (Display Point) on the page. You can select either a default position (such as Page Template Body) or a user-defined position in the template (such as Page Template Region Position 4).

You can also specify the sequence of the region to position the region in relation to other regions on the page.

Additionally, you can specify the column in which the region will be placed. Oracle Application Express automatically renders the necessary HTML to produce a multiple-column layout.

You can click the flashlight icon to see a picture of all the templates and where they appear on the page.

**Note:** The Parent Region field is used to create a subregion. You learn to create a subregion later in the lesson.

# Conditional Display of Regions



Page: 2 - Customers

Region Title: **New HTML Region**

Condition Type  
Exists (SQL query returns at least one row)

[PL/SQL] [item / column=value] [item / column not null] [item / column null] [request=e1] [page in] [page not in] [exists] [never] [none]

Expression 1

```
SELECT cust_first_name
FROM DEMO_CUSTOMERS
WHERE credit_limit > 1000
```

Do not validate code (parse code at runtime only).

Authorization Scheme  
- No Security Check Required -

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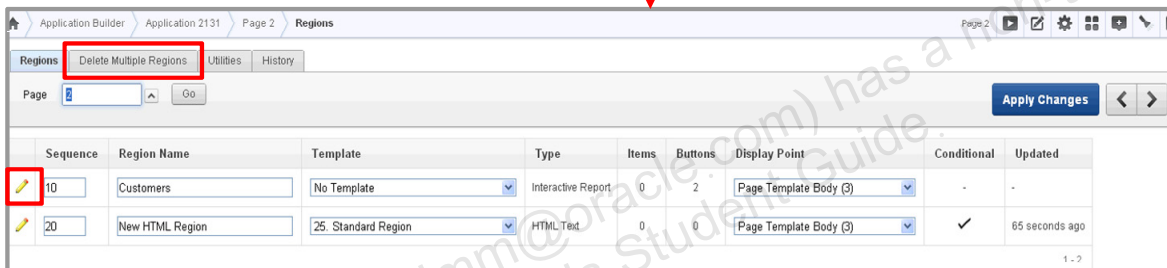
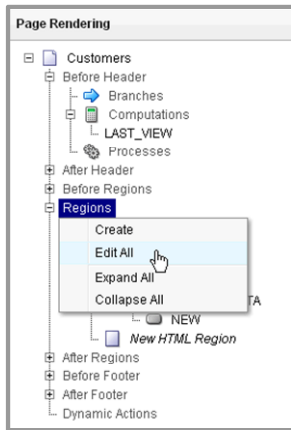
You can display regions conditionally. A condition is a small unit of logic that enables you to control the display of regions, items, buttons, tabs, and other components. When you apply the condition to a component (for example, a region), the condition is evaluated at run time. The component is displayed only if the condition evaluates to true.

You can set the condition by selecting a condition type when you create the component or by editing the component's conditional display attribute. For example, if you want a particular region to be displayed only when the administrator logs in, you can set an appropriate condition for that region. The condition evaluates to true or false based on the values you enter in the expression fields.

You can click a link below the Condition Type field to select a condition type. The following are some of the predefined condition types:

- Exists
- Not exists
- SQL Expression
- PL/SQL Expression

# Viewing the Regions Page

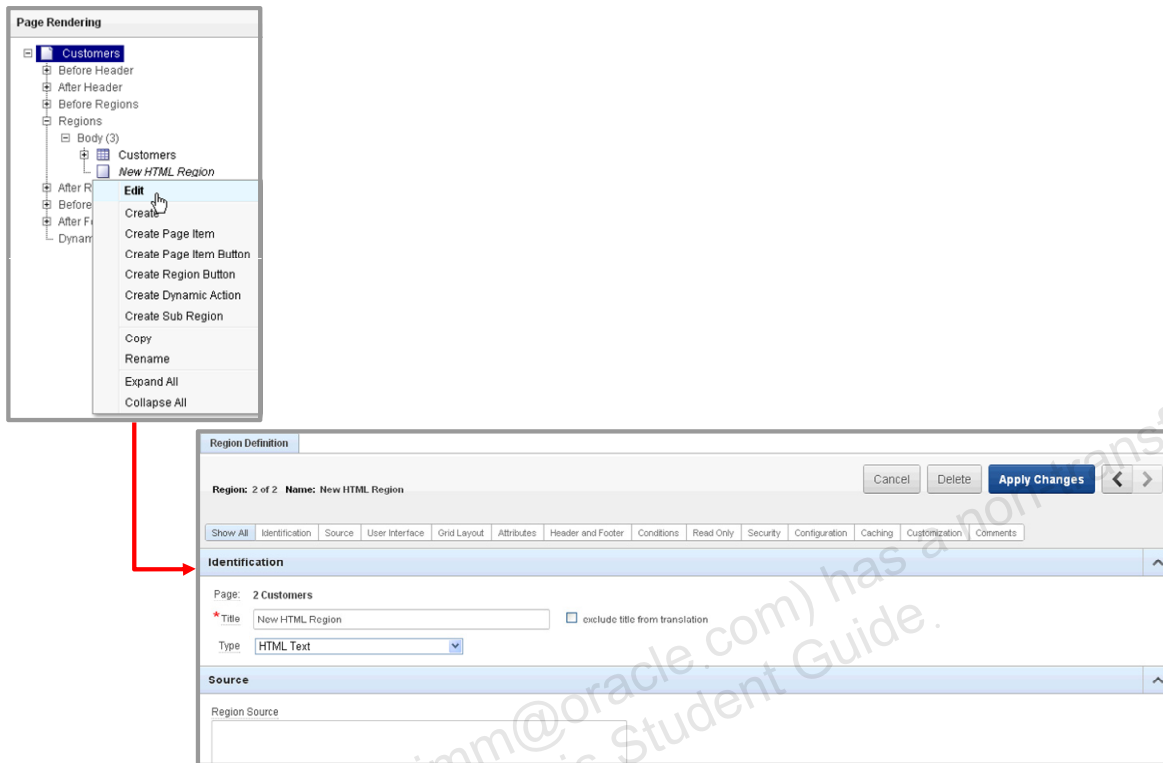


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To view the Regions page, right-click the Regions node and select Edit All. All the regions on the page are listed. You can click the Edit icon to edit the corresponding region. Use the Edit Page Region page to edit the region attributes. Click the Delete Multiple Regions tab to delete multiple regions simultaneously.

# Editing a Region



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To edit a region, right-click the region's node and select Edit. Use the Edit Region page to change any region definition, and click Apply Changes to save the changes.

# Specifying a Region Header and Footer

Region: 1 of 2 Name: Customers

Header and Footer

Region Header

Region Footer

Fetches #ROWS\_FETCHED# Rows in #TIMING# seconds.

You can use substitution strings in region headers and footers.

Address	City	State	ZIP Code	Tags
Windsor Locks	Windsor Locks	CT	06096	REPEAT CUSTOMER
Dulles, John	45020 Aviation Drive	Sterling	VA	20166
Hartsfield, William	6000 North Terminal Parkway	Atlanta	GA	30320
LaGuardia, Fiorello	Hangar Center, Third Floor	Flushing	NY	11371
Lambert, Albert	10701 Lambert International Blvd.	St. Louis	MO	63145
Logan, Edward	1 Harborside Drive	East Boston	MA	02128
O'Hare, Frank	10000 West O'Hare	Chicago	IL	60666

Fetches 7 Rows in 0.12 seconds.

This displays the time taken to render the region.

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You can specify additional HTML to be placed above and below a region, or in its header and footer. Substitution strings can be used in region headers and footers.

In the example shown in the slide, the #ROWS\_FETCHED# and #TIMING# substitution strings are used in the region footer. These substitution strings calculate the number of rows fetched in the elapsed time in seconds when rendering a region.

# Enabling Region Display Selection

Region: 1 of 2 Name: Customers

Attributes

Region Display Selector: Yes

Click to view all regions.

Click to view the region.

FIRST_NAME
Alexis
Alberto
Alexander
Alyssa
Alexander
Allan
Aiana

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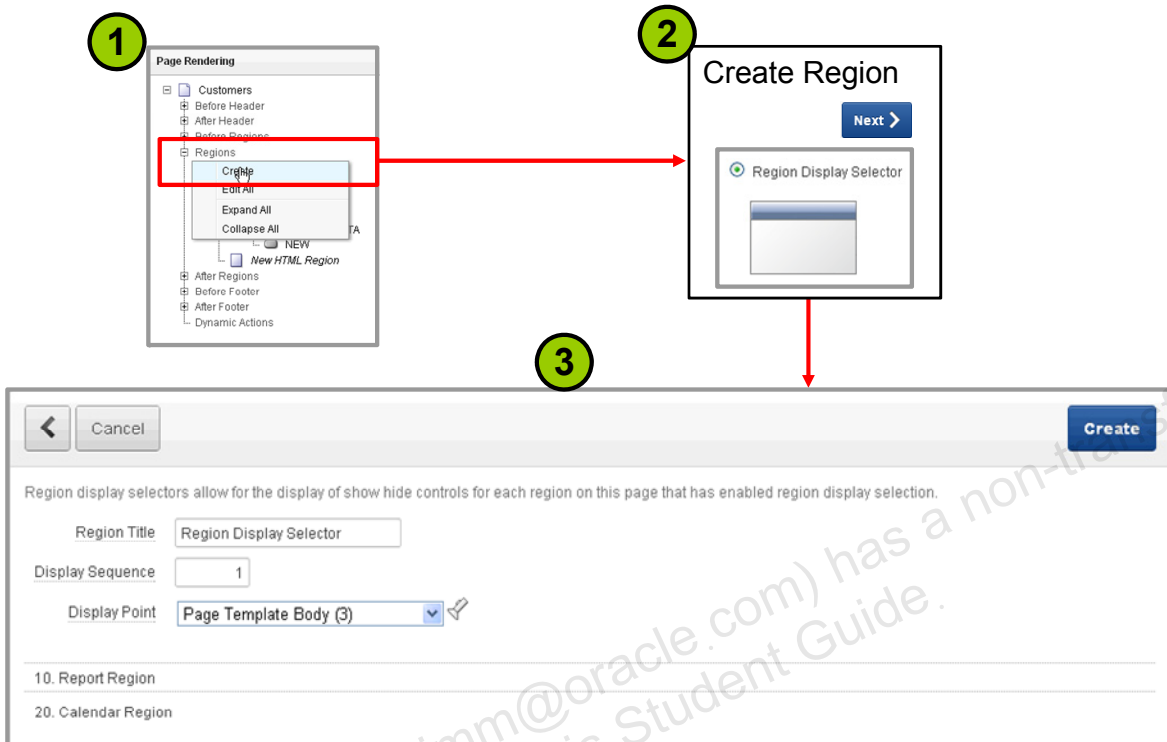
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To enable region display selection, select Yes for Region Display Selector on the Attributes tab. This attribute is used along with the Region Display Selector region.

The Region Display Selector region enables you to hide or show regions on a page. For example, if you have multiple regions on your page, a Region Display Selector allows you to view all the regions at once or only one region at a time.

You learn to create a Region Display Selector in the next slide.

# Creating a Region Display Selector



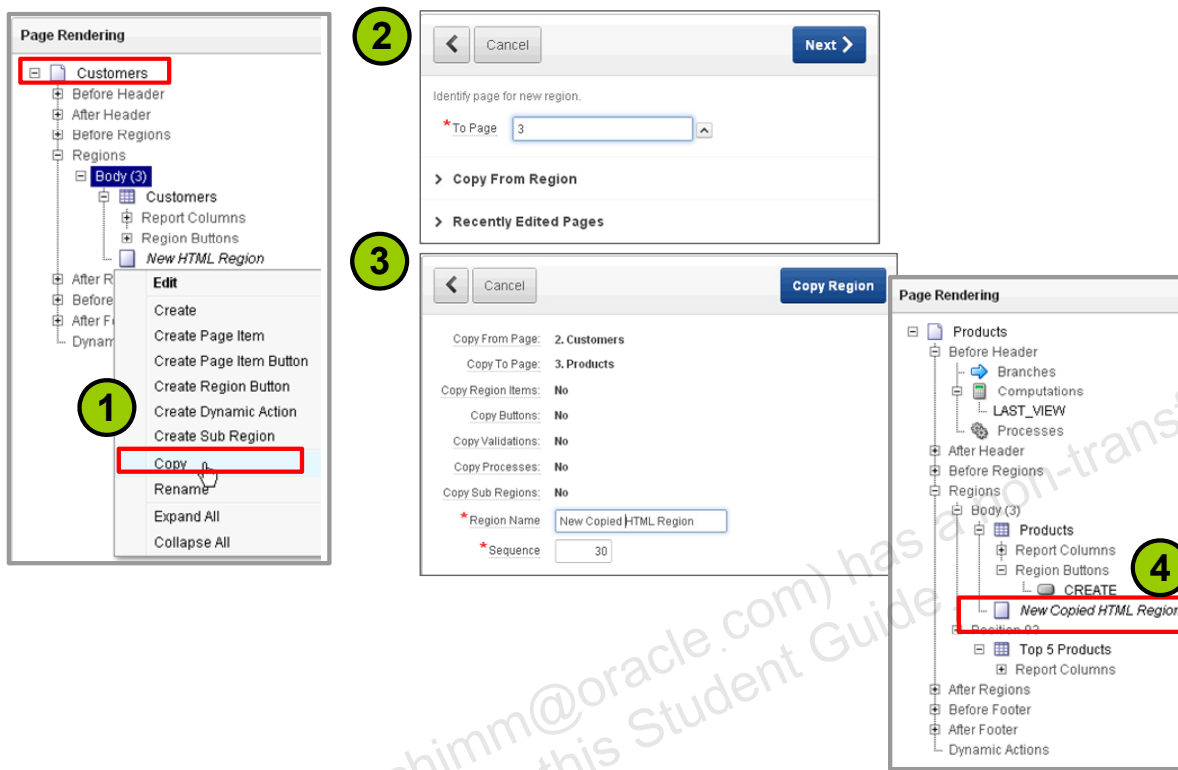
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To create a Region Display Selector on a page, navigate to the page's definition and perform the following steps:

1. Right-click the Regions node and select Create.
2. In the Create Region Wizard, select the Region Display Selector option and click Next.
3. The list of selectable regions is displayed. You see only the regions for which you have enabled region display selection. (See the previous slide.) Click Create to create the region.

# Copying Regions



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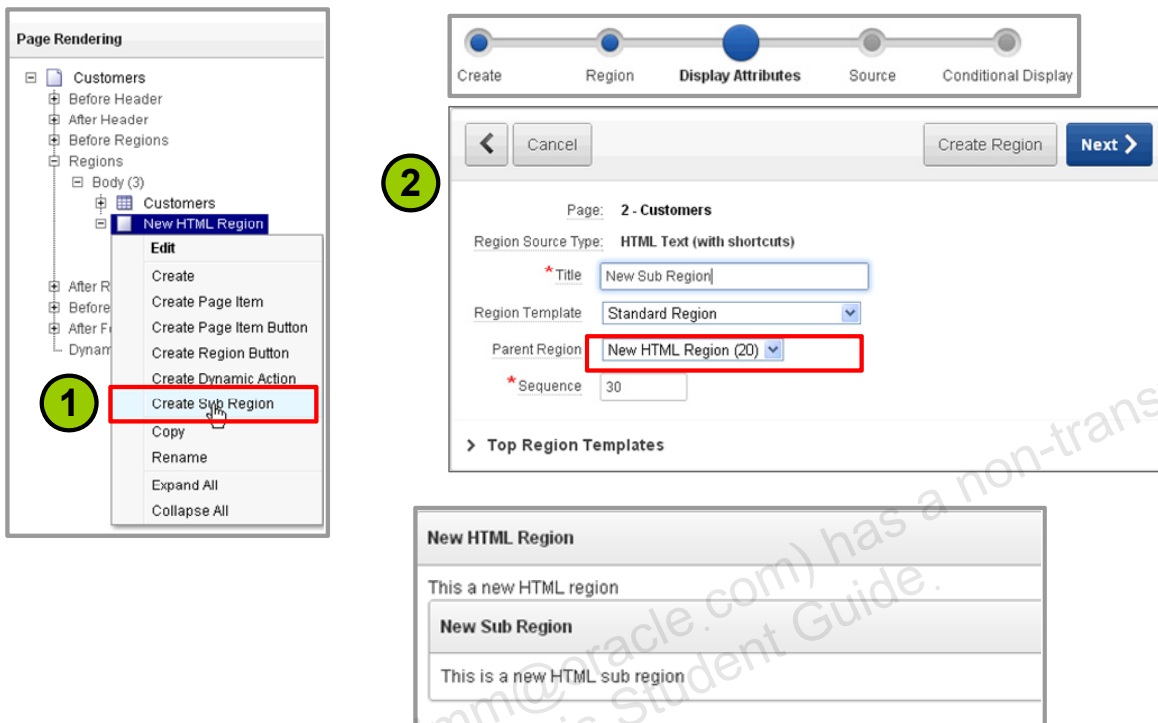
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You can copy regions from one page to another within an application. When copying, you can include the region items and buttons as well. To copy a region, perform the following steps:

1. Right-click the region node and select Copy.
2. Specify the page where you want to copy the region. You also have an option to copy the subregions. Click Next.
3. Enter the new region name and click Copy Region.
4. The region is copied to the specified page.

**Note:** Certain restrictions in Application Express prevent you from copying a region to another page. For example, a page can contain only one interactive report region. You will not be able to copy an interactive report region to a page that already contains an interactive report.

# Creating a Subregion



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A subregion is a region within another region. To create a subregion, you need to specify a parent region while creating the region. Detailed steps are as follows:

1. Right-click the node for the region where you want a subregion and select Create Sub Region.
2. The Create Region Wizard opens. Select the type of region that you want to create.
3. Specify the region attributes. Note that the Parent Region field is automatically set to the region node that you selected in the previous step.
4. Follow the wizard instructions to create the region.

# Workspace 7-1 Overview: Creating and Modifying Pages and Regions

This practice covers the following topics:

- Creating a SQL report region
- Creating a sidebar region
- Editing region attributes, including:
  - Adding a region footer
  - Changing the template

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# Lesson Agenda

- Introducing Page Definition
- Working with Page Regions
- Working with Pages
  - What Is a Global Page?
  - Creating a Global Page
  - Common Pages for Different User Interfaces
  - Auto-detection of Application Pages
  - Creating and Using Page Groups
  - Copying a Page

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# Global Page

Any item, button, or region on this page is displayed on all the pages in the application.

The image shows two overlapping Oracle APEX pages. The top page is titled 'Classic Report' and contains a table with employee data. The bottom page is titled 'OEHR Employees' and contains a form for creating an employee record. Both pages have a 'Learn More' region in the top right corner, which is highlighted with a red box. A handwritten note with arrows pointing to these regions says 'Region created on global page'. The 'Learn More' region contains two links: 'Oracle Learning Library' and 'Oracle Technology Network'.

EMPLOYEE_ID	FIRST_NAME	EMAIL	MANAGER_ID	DEPARTMENT_ID
198	Donald	DOCONNEL	124	50
199	Douglas	DGRANT	124	50
200	Jennifer	JWHALEN	101	10
201	Michael	MHARTSTE	100	20
202	Pat	PFAY	201	20
203	Susan	SMAVRIS	101	40
204	Hermann	HBAER	101	70
205	Shelley	SHIGGINS	101	110
206	William	WGIETZ	205	110

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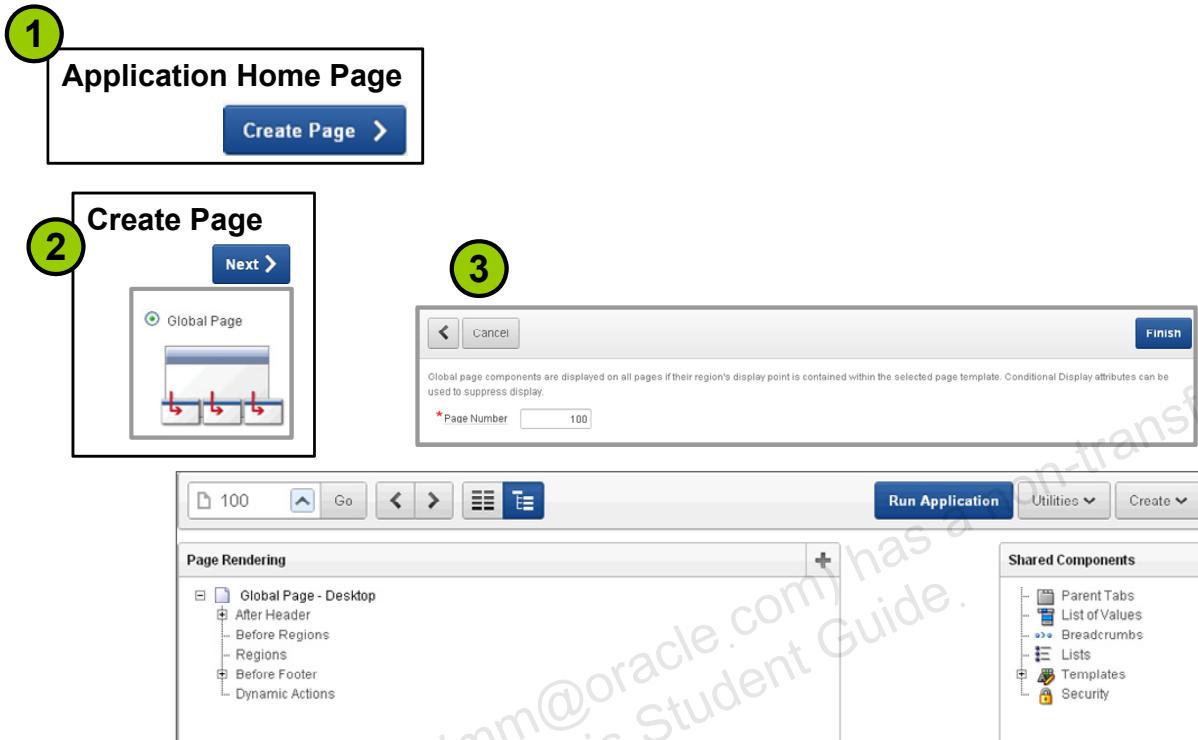
The global page of your application functions as a master page. You can add a separate global page for each user interface. The Application Express engine renders all components you add to a global page on every page within your application. You can further control whether the Application Express engine renders a component or runs a computation, validation, or process by defining conditions.

When you create a mobile application, apart from the Home page and the Login page, a Global page is automatically created.

The example in the slide first creates the “Learn More” HTML region type on the global page. By defining the region on the global page, the region is displayed on all pages in the application. You can also restrict the region to appear only on certain pages.

You cannot create processes, computations, or branches on the global page.

# Creating a Global Page



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To create a global page, perform the following steps:

1. Navigate to the application home page and click Create Page.
2. On Create Page, select a user interface for the page. If it is a Desktop interface, then select Global Page as the page type. Note that the Global Page option does not appear for a mobile application because it is already created at the time of creating the application. Also, note that the Global Page option appears only if the application does not have a global page already.
3. For Page Number, enter an integer value that identifies a page within the application. For Mobile applications, the Global Page has a default value of 0.
4. Click Finish.

The page definition for a global page looks different from other pages. You cannot run a global page directly.

You can view the demonstration of creating a global page by opening the `/home/oracle/labs/demos/les07_global_page.html` file.

## Workshop 7-2 Overview: Creating a Global Page and Adding a Region

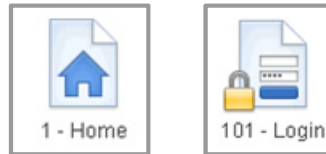
This practice covers creating a Global desktop page and adding a static HTML region to it.

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# Common Pages for Different User Interfaces



## Desktop Application



## Mobile Application

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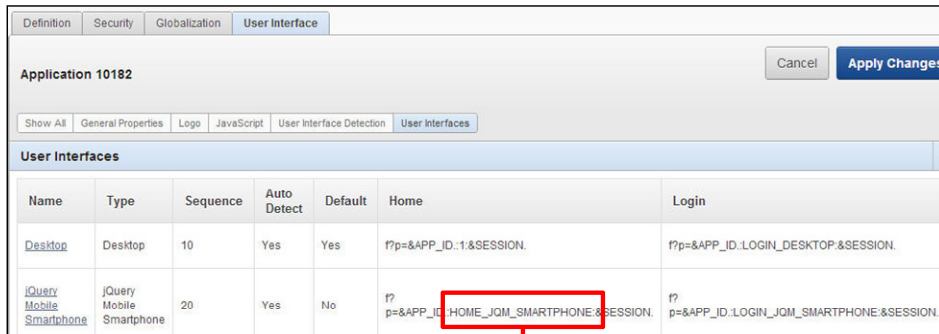
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At the time of creating an application, Oracle Application Express will create a set of default pages based on the type of user interface you select for the application.

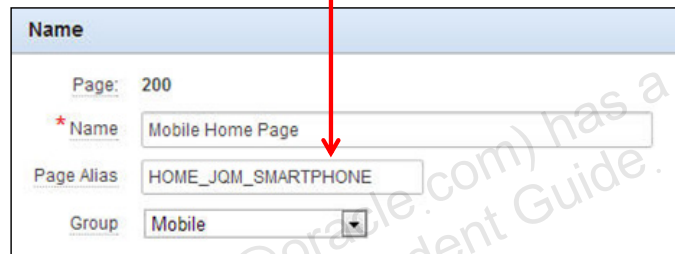
- **Desktop applications:** Home page and Login page
- **Mobile applications:** Global Page, Home page, and Login page

If you add the mobile user interface to an existing desktop application, then new Global, Home, and Login pages for the mobile user interface will be added to the application.

# Auto-detection of Application Pages



Name	Type	Sequence	Auto Detect	Default	Home	Login
Desktop	Desktop	10	Yes	Yes	f?p=&APP_ID.:1:&SESSION.	f?p=&APP_ID.:LOGIN_DESKTOP:&SESSION.
jQuery Mobile Smartphone	jQuery Mobile Smartphone	20	Yes	No	f?p=&APP_ID.:HOME_JQM_SMARTPHONE:&SESSION.	f?p=&APP_ID.:LOGIN_JQM_SMARTPHONE:&SESSION.



Name

Page: 200

\* Name: Mobile Home Page

Page Alias: HOME\_JQM\_SMARTPHONE

Group: Mobile

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Application Express can automatically detect application pages on multiple devices. Auto-detection is enabled based on the user interface. In the screenshot in the slide, you have two user interfaces: Desktop and jQuery Mobile Smartphone. Both user interfaces are set to Auto Detect. In addition, the Default is for the Desktop user interface to be displayed. When a user accesses the application, from a desktop or tablet, the Desktop user interface will be displayed. If on a mobile device, the jQuery Mobile Smartphone user interface is displayed. The value of HOME\_JQM\_SMARTPHONE is the page alias of the page that is displayed on a mobile device. Note that you can change this alias to a specific page number in the user interface definition or move the page alias to the desired page.

# Viewing jQuery Mobile Smartphone Pages

A screenshot of the Oracle APEX page list table. The table has columns: Page, Name, Updated, Updated By, Page Type, User Interface, and Group. The "User Interface" column is highlighted with a red box. The table contains six rows of data, all with "jQuery Mobile Smartphone" in the "User Interface" column.

Page	Name	Updated	Updated By	Page Type	User Interface	Group
199	<a href="#">Global Page - jQuery Mobile Smartphone</a>	4 months ago	dpeake	Global Page	jQuery Mobile Smartphone	Mobile
200	<a href="#">Mobile Home Page</a>	4 months ago	dpeake	Navigation Page	jQuery Mobile Smartphone	Mobile
201	<a href="#">Customers</a>	4 months ago	dpeake	Navigation Form	jQuery Mobile Smartphone	Mobile
202	<a href="#">Maintain Customer</a>	4 months ago	dpeake	DML Form	jQuery Mobile Smartphone	Unassigned
203	<a href="#">Products</a>	4 months ago	dpeake	Navigation Form	jQuery Mobile Smartphone	Mobile
204	<a href="#">Maintain Product</a>	4 months ago	dpeake	DML Form	jQuery Mobile Smartphone	Unassigned

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To view all the jQuery Mobile Smartphone pages in your application, select the User Interface header and select jQuery Mobile Smartphone. If you have both Desktop and jQuery Mobile Smartphone user interfaces in the same application, it is a best practice to have the sequence numbers for all your jQuery Mobile Smartphone pages together. In the example in the slide, all of the mobile pages are in the 200 sequence series.

# Workshop 7-3 Overview: Modify the Mobile Home page

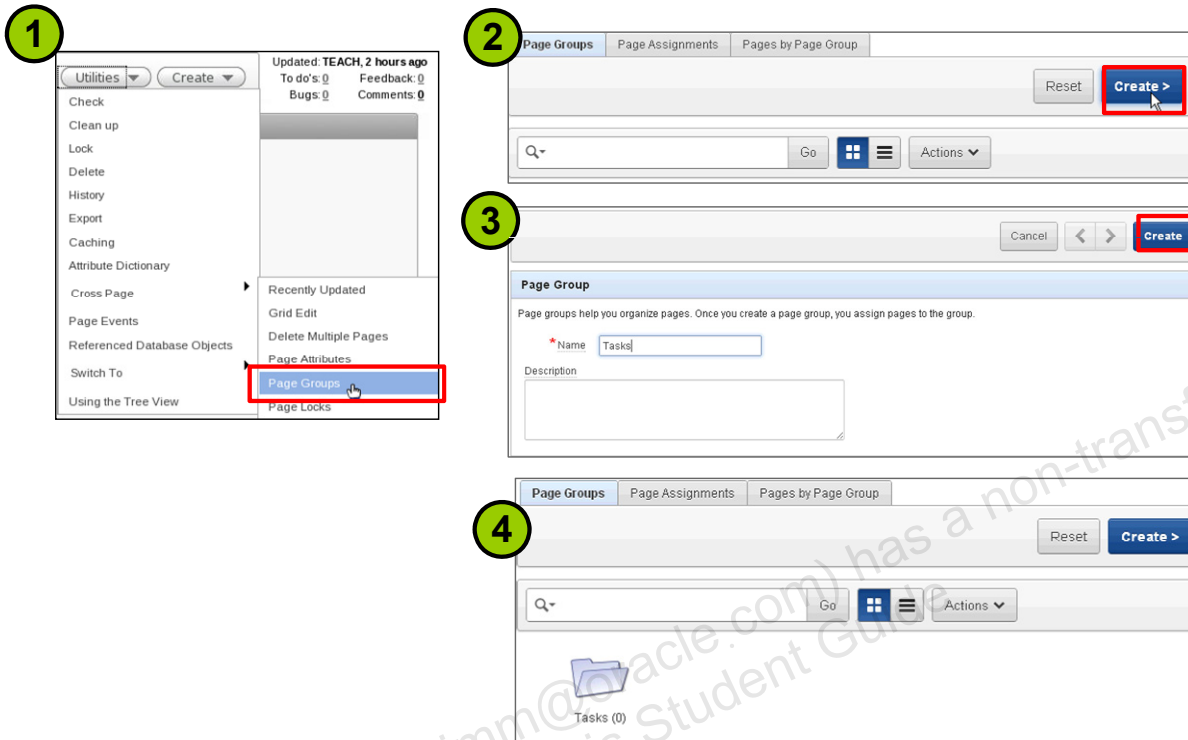
This practice covers modifying the Home region on the Mobile Home page.

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# Creating a Page Group



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Page groups help you to organize pages. To use page groups, you must create a group, and then assign pages to this group.

To create a group, perform the following steps:

1. From the page definition of any page, click the down arrow on the Utilities button and select Page Groups from the Cross Page submenu.
2. Click the Create button.
3. Enter the name of the page group and click Create.

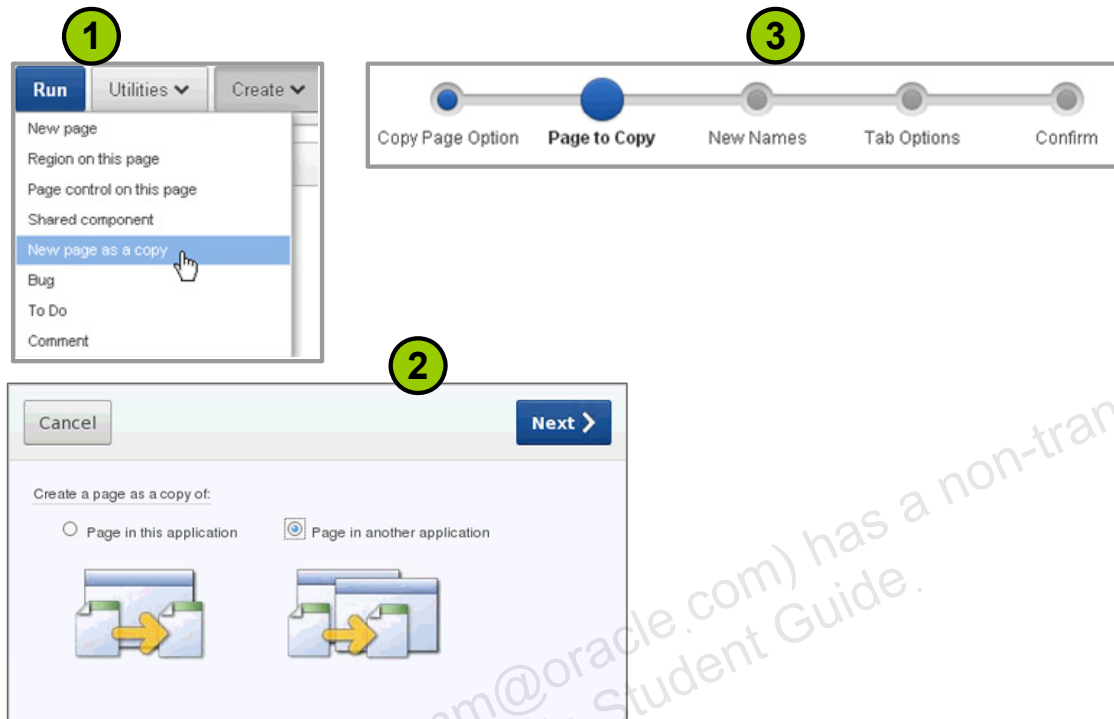
The Page Group is created.

To assign pages to a group, click the Page Assignments tab and select the group from the New Group list. Select the check box next to the pages that you want to assign to the group and click the Assign Checked button.

After you have created page groups and assigned pages to them, you can view the page group by clicking “Pages by Page Group.”

You can prevent conflicts during application development by locking the pages in your application. By locking a page, you prevent other developers from editing it.

# Copying a Page



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You can copy pages within an application or from another application. If you are copying a page from another application, that application must reside in the current workspace.

To copy a page from another application, perform the following steps:

1. Click the down arrow on the Create button from the Page Definition of any page. Select “New page as a copy.”
2. Select “Page in another application” and click Next.

Follow the wizard instructions. You will be prompted to select the application to copy from, the page to copy, and so on, and whether you want to copy the tabs, templates, and so on from the other page.

## Quiz

A global page is used for:

- a. Performing page processing
- b. Identifying a different template
- c. Displaying a set of items or buttons on all the pages in your application
- d. Calculating session values

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**Answer: c**

## Quiz

Which of the following statements are true?  
(Choose all that apply.)

- a. Each page can have any number of regions.
- b. You cannot copy a page from another application.
- c. You can add developer comments to an application, a page, or a group of pages.
- d. You can choose to display regions conditionally.

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**Answer: a, c, d**

# Summary

In this lesson, you should have learned how to:

- View page definitions
- Edit page attributes
- Create a new region
- View region attributes
- Create a subregion
- Create a global page

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In this lesson, you learned about pages and regions. You learned how to create pages and regions, and how to edit their attributes.

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# 8

## Adding Items and Buttons

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# Objectives

After completing this lesson, you should be able to do the following:

- Identify the different types of items
- Create items and edit item attributes
- Create and use lists of values
- Create buttons and edit button attributes

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In this lesson, you learn how to include items and buttons on application pages. You also learn how to create a list of values (which is a shared component) and associate it with the supported item types.

# Lesson Agenda

- Introducing Items
  - Examples
  - What Are Application Items?
  - Accessing the Create Item Wizard
  - Types of Page Items
- Using Items
- Creating List of Value (LOV) Type Items
- Using Buttons

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# Items

Items are HTML form elements. There are two categories of items:

- Page-level items
- Application-level items

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Items are HTML form elements such as text fields, select lists, and check boxes with an associated session item. Item attributes affect the display and behavior of items on a page. For example, these attributes can impact where a label displays, how large an item is, and whether the item displays next to or below the previous item.

There are two categories of items: page items and application items. Page-level items are placed on a page and have associated user interface properties. Application-level items are not associated with a page and therefore have no user interface properties. An application item can be used as a global variable.

# Page Items: Examples

Product Details

Product Name

Product Description

\* Category

\* Product Available

\* List Price

Product Image

Tags

Cancel Add Product

Text Field

Text Area

Select List

File Browse

Radio Group

Pop-up LOV

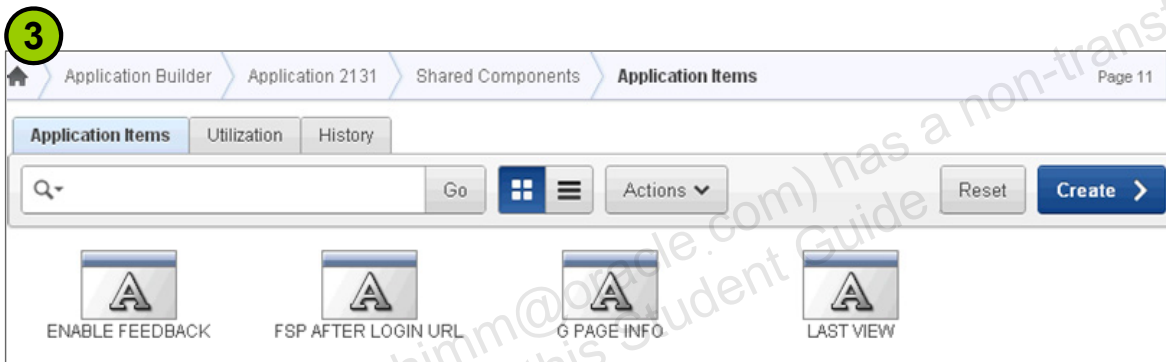
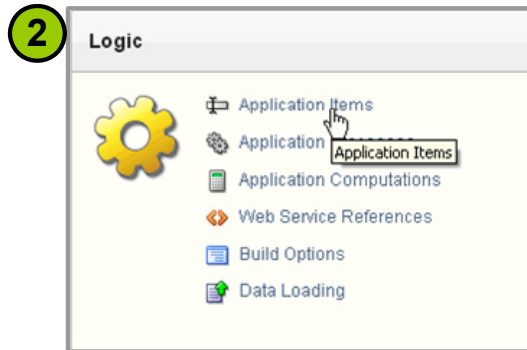
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The slide displays some page item examples. An item is part of an HTML form and can be used to store a value in session state so that it can be retrieved at a later time. The examples shown in the slide are page items. Page items are placed on a page and have associated user interface properties, such as Display As, Label, and Label Templates. Another type of item, application items, is discussed in the next slide.

When you create a form by using a wizard, an item is created for each column of the table. The default item type is a text field, text area, number field, date picker, or File Browse depending on whether the database table column type is varchar, varchar2 (with size greater than 255 characters), numeric, date, or BLOB, respectively. You can edit the item properties to change the display type. For example, you can change a text field to a text area or select list.

# What Are Application Items?



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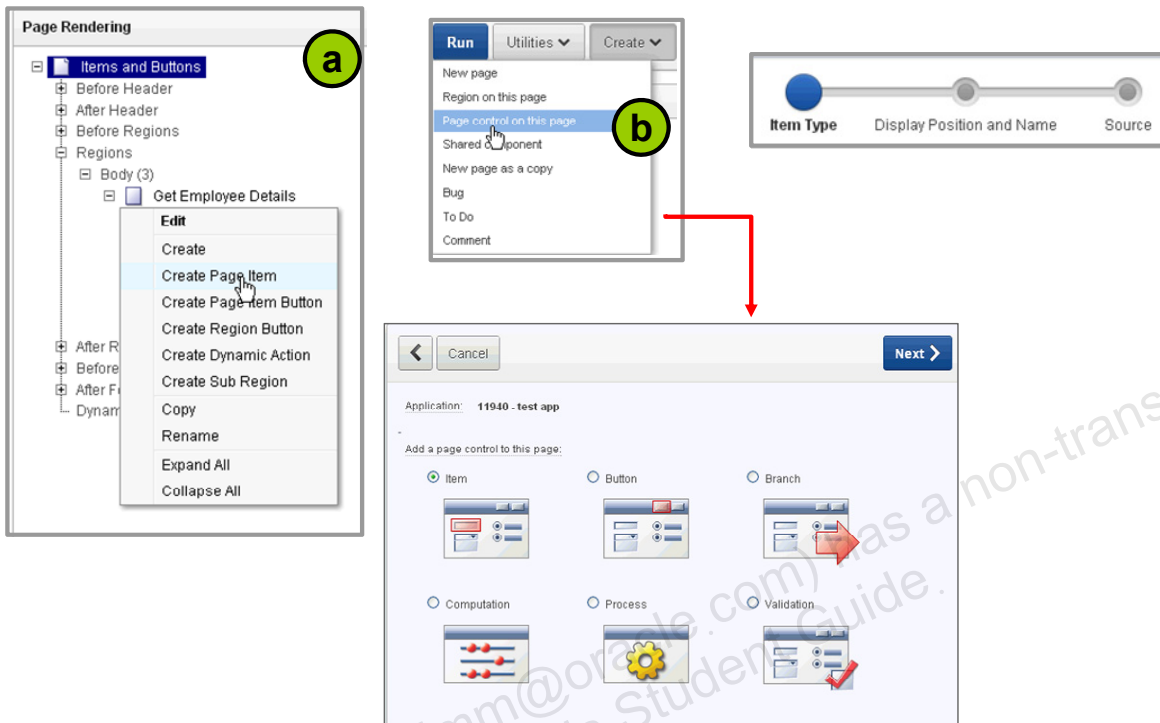
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Application items are not associated with a page and, therefore, have no user interface properties. An application item can be thought of as a global variable. You create an application item from the Application Items page. To access the Application Items page, perform the following steps:

1. Click the Shared Components icon on the application home page.
2. In the Logic pane, click Application Items.  
The Application Items page is displayed.

Application items are typically configured by using processes or computations, or by passing values in a URL. For example, the `FSP_AFTER_LOGIN_URL` application item is used internally by Oracle Application Express to remember the page that users attempted to visit before they were shown the login page. You can click the item icon to view or edit details.

# Accessing the Create Page Item Wizard



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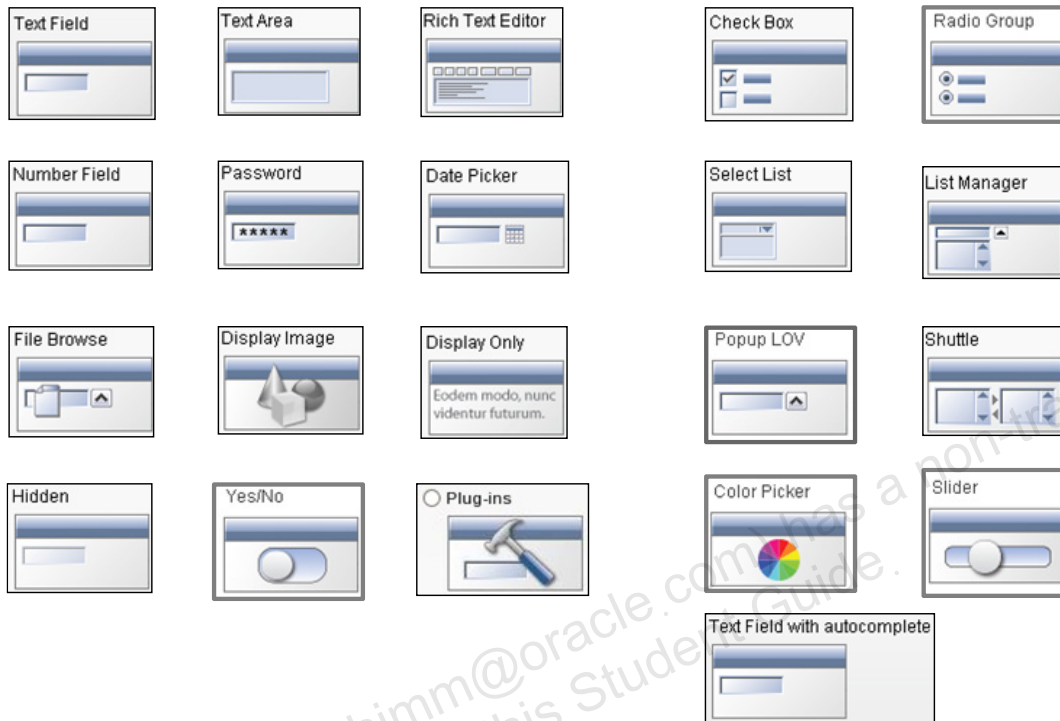
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You can access the Create Page Item wizard in either of the following ways:

- Right-click the region node where you want to create the item and select Create Page Item.
- Click the down arrow on the Create button and select Create Page Control. Then select Items and click Next.

**Note:** The wizard steps differ depending on the item that you want to create.

# Types of Page Items



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- **Text Field, Text Area, Rich Text Editor:** Allow users to enter textual data. The Text Area field is resizable. Rich Text Editor provides various formatting options. You can specify up to 32,767 bytes for a Text Area or Rich Text Editor item.
- **Number Field:** Validates the user input and accepts only numerical data
- **Password:** Creates a text field that displays an asterisk for each character entered
- **Date Picker:** Displays a text field with a calendar icon next to the text field. You can specify a format mask, maximum and minimum date, year range, and so on while creating the item.
- **File Browse:** Displays a text field with a Browse button. This enables you to locate a file in a local file system and upload it. The files that you upload are stored in a table called `wwv_flow_file_objects$`. Every workspace has access to this table through a view called `APEX_APPLICATION_FILES`.
- **Display Image, Display Only:** The Display Only item displays a read-only version of a display value. The Display Image item displays a specified image.
- **Hidden:** Creates an HTML hidden form element. You can use this item to store session state values.

- **Yes/No:** Displays Flip Toggle Switch in jQuery Mobile user interfaces and as a select list in nonmobile environments.
- **Check Box:** Is based on a list of values. The value corresponding to a check box is returned in a string delimited by a single colon (:).
- **Radio Group:** Displays an HTML radio group form element based on a list of values
- **Select List:** Displays a list of values. The values in the select list are determined by using a shared list of values or a list of values defined at the item level.
- **List Manager:** It is based on a list of values. It enables you to manage a list of items by selecting from and adding to a list.
- **Popup LOV:** Renders a text field with an icon next to it. A user can click it and select a value from the pop-up window. The list in the pop-up window is driven by a list of values.
- **Shuttle:** It is used to move one or more list elements from left to right.
- **Plug-ins:** Plug-ins enable developers to declaratively extend, share, and reuse the built-in types available with Oracle Application Express.
- **Color Picker:** Renders as a text field with an icon. When the user clicks the icon, a pop-up window appears. When the user makes a selection from the palette, the HTML value for the color selected (for example, #000000 for black) is returned.
- **Slider:** Renders slider item type for jQuery Mobile applications. This item type enables users to use slide handler to set a value.
- **Text Field with autocomplete:** Shows data from a table as you enter text in the field

**Note:** You can create a maximum of 100 items on a page.

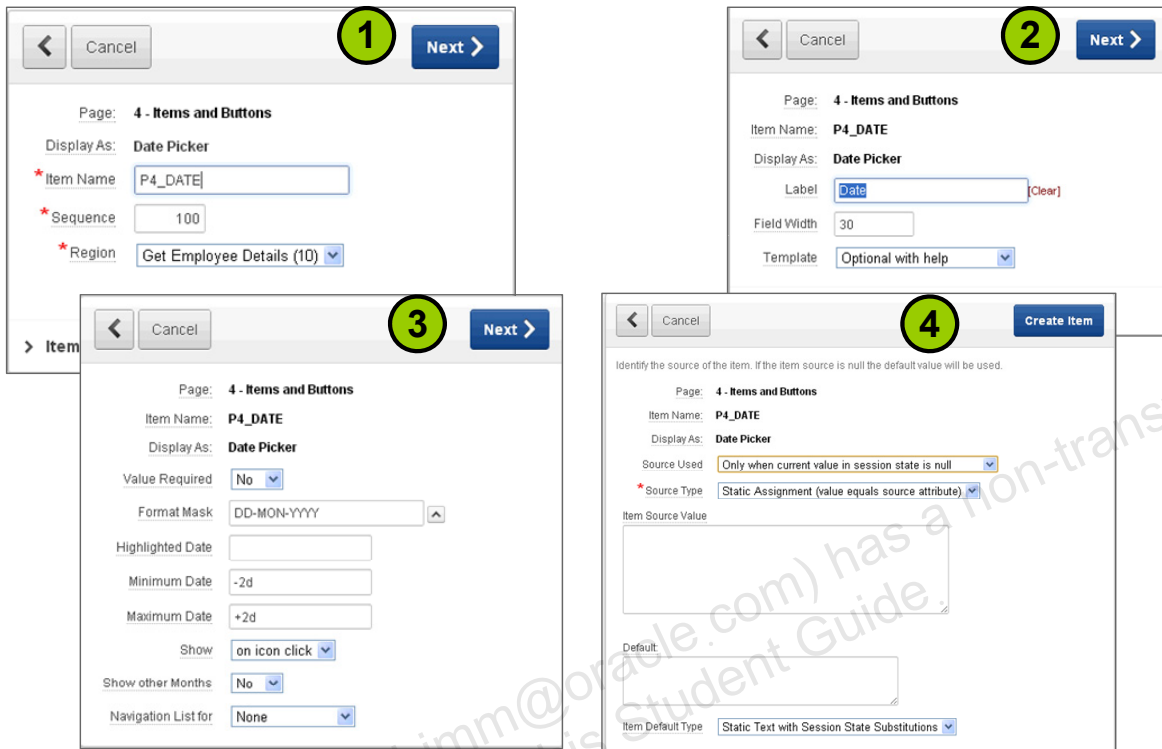
# Lesson Agenda

- Introducing Items
- Using Items
  - Creating a Date Picker Item
  - Creating Multiple Items by Using the Tabular Form
  - Editing an Item
  - Creating Quick Picks
  - Finding Items by Using the Item Finder
  - Adding Subtypes on Mobile Item Types
- Creating List of Value (LOV) Type Items
- Using Buttons

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## Creating a Date Picker Item



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To create a date picker item, select Date Picker in the Create Page Item Wizard. Click Next and perform the following steps:

1. Enter a name for the item. As a best practice, use the default format P<n>\_<item\_name> to name the items. Click Next.
2. Accept the defaults or change the item label and display properties. Select the appropriate label template. If you select an option with “with help,” a help window opens when the item label is clicked. If you select a “required” option, a red asterisk is displayed before the label. Click Next.
3. You can specify whether a value is required for the item. If you select Yes, the item is validated to ensure that it is not null when the page is submitted. The options in this step may differ for each item type. For the date picker item, you can specify a format mask, the date to be highlighted, and so on. Click Next.
4. Specify the source for the item. You can also specify a default value for the item. Click Create Item.

You can run the page to check whether the item was created successfully.

# Creating Multiple Items by Using the Tabular Form

**Tasks**

- [Create multiple items using tabular form](#)

Sequence	Name	Label	Type	Cache	LOV
10	P4_NAME	Name	Text Field	Yes	
20	P4_GENDER	Gender	Radio Group	Yes	STATIC:M,F
30	P4_BIRTHDATE	Birthdate	Text Field	Yes	
40	P4_CONTACT_NUMBER	Contact Number	Text Field	Yes	
50	P4_		Text Field	Yes	
60	P4_		Text Field	Yes	
70	P4_		Text Field	Yes	
80	P4_		Text Field	Yes	
90	P4_		Text Field	Yes	
100	P4_		Text Field	Yes	
110	P4_		Text Field	Yes	
120	P4_		Text Field	Yes	

Cancel Create Multiple Items

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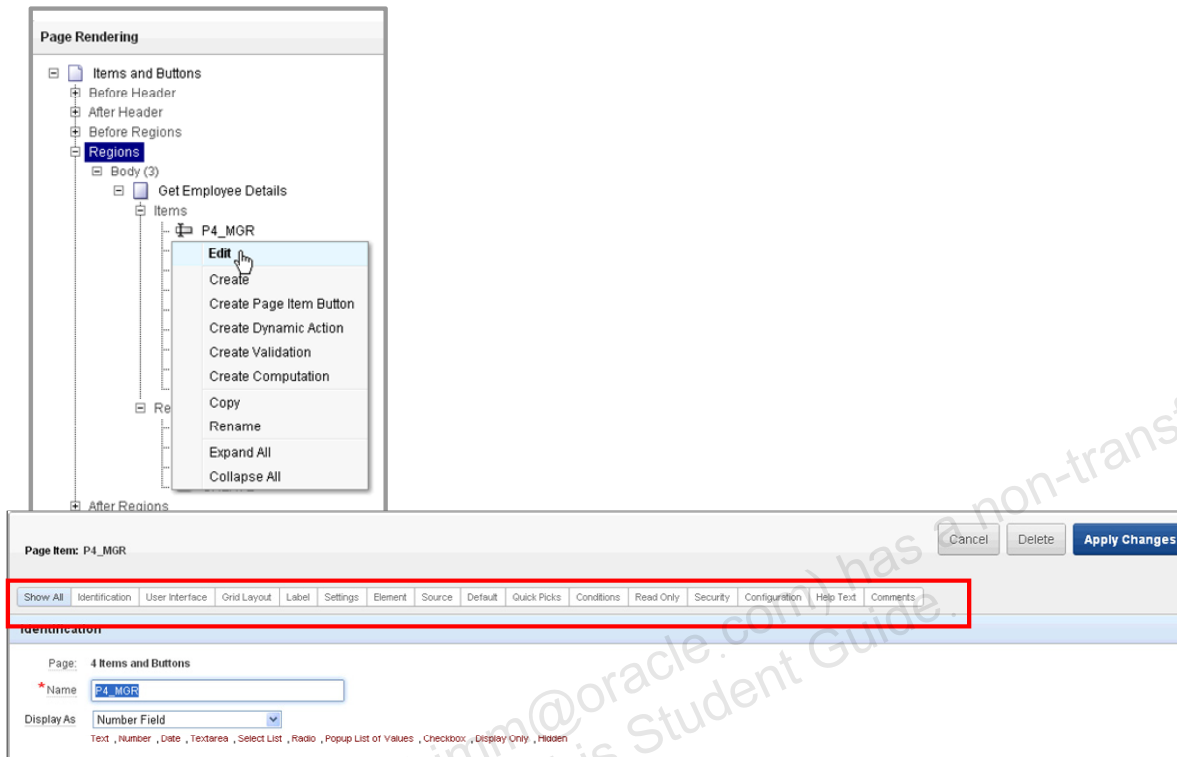
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You can create multiple text field, text area, radio, check box, and hidden field items by using a tabular form. Perform the following steps:

1. Navigate to the page where you want to create the items and access the Create Page Item Wizard.
2. Click the “Create multiple items using tabular form” link at the bottom of the page.
3. On the Create Multiple Items page, select the region to contain the items and select a template for the item labels.
4. For each item that you want to create, enter the name, label, and type.
5. Click Create Multiple Items.

Run the page to confirm that the items were created successfully.

# Editing an Item



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To edit an item, navigate to the Page Definition. Right-click the item node and select Edit. Depending on the type of the item, you can edit the following attributes:

- Name
- Display details
- Label
- Element
- Source
- Default
- List of values
- Security
- Conditions
- Read-only display settings
- Help text
- Configuration
- Comments

# Creating Quick Picks

Get Employee Details

Manager

Quick Picks

Page Item: P4\_MGR

Cancel Delete Apply Changes < >

Show All Identification User Interface Grid Layout Label Settings Element Source Default Quick Picks Conditions Read Only Se

Quick Picks

Show Quick Picks Yes Link Attributes

Label	Value
1 Neena	101
2 Lex	102
3 Nancy	100
4	
5	
6	
7	
8	
9	
10	

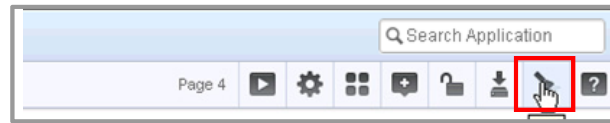
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Quick picks are links that you display below an item. You can click the quick pick links to enter a value in the item field. You can create up to 10 selections for items that support quick picks, such as text field, number field, select list, and pop-up LOV.

To create quick picks, right-click the item node and select Edit. Click the Quick Picks tab. Select Yes for Show Quick Picks and enter the label name and value for each quick pick that you want to create. Click Apply Changes and run the page to view the created quick picks. In the example in the slide, three quick picks are created for the Manager text field item.

# Finding Items by Using the Item Finder



Name	Label	Type	Page
P4_COMM	Comm	Page Item	<a href="#">4</a>
P4_DEPTNO	Deptno	Page Item	<a href="#">4</a>
P4_EMPNO	Empno	Page Item	<a href="#">4</a>
P4_ENAME	Ename	Page Item	<a href="#">4</a>
P4_HIREDATE	Hiredate	Page Item	<a href="#">4</a>
P4_JOB	Job	Page Item	<a href="#">4</a>
P4_MGR	Mgr	Page Item	<a href="#">4</a>
P4_ROWID	Rowid	Page Item	<a href="#">4</a>
P4_SAL	Sal	Page Item	<a href="#">4</a>

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To quickly find items on a specific page, perform the following steps:

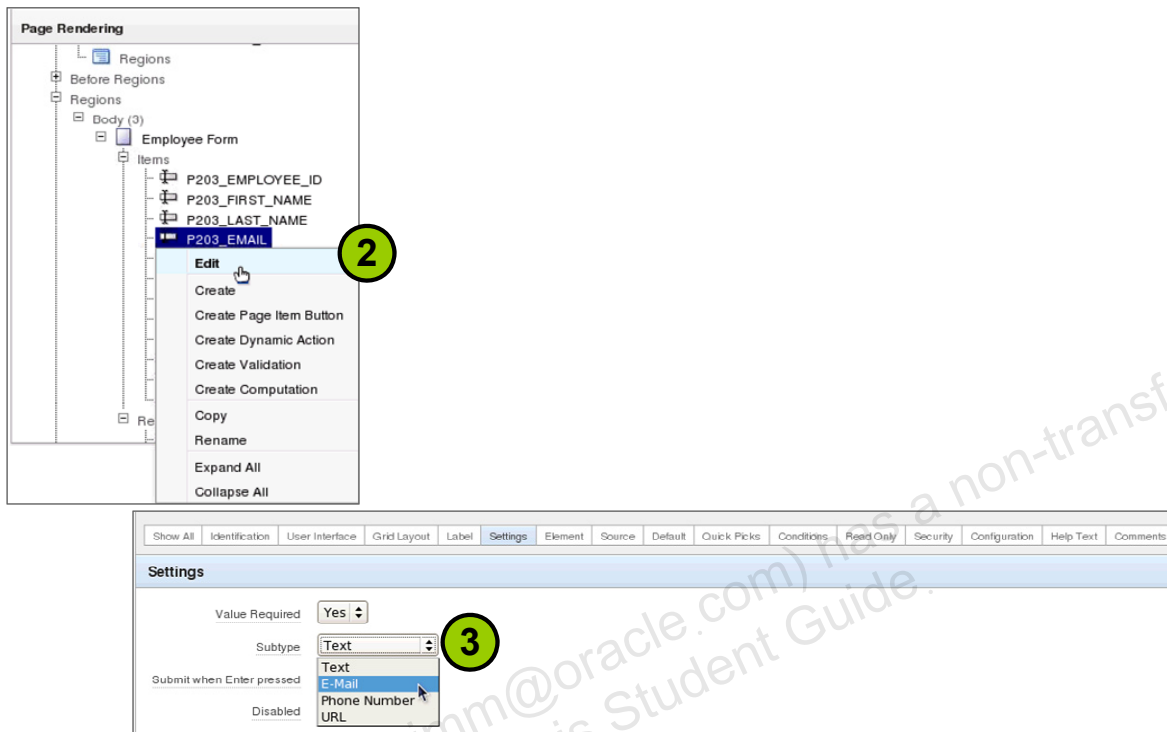
1. Navigate to the Page Definition page.
2. Click the Find icon at the top-right corner.
3. The items on the selected page are displayed. To find items on another page, enter the page number and click Go. You can also search for a particular string, such as find all items beginning with P3\_CUST.
4. Click the page link. The Item Edit page is displayed.

Using the other tabs in the Find window, you can also find the following:

- **Pages:** Displays all the pages in the application
- **Queries:** Displays all the queries in the application, along with the respective page numbers
- **Tables:** Displays all the available tables in your schema
- **PL/SQL:** Displays all PL/SQL expressions, along with the respective page numbers

- **Images:** Displays all the images in the application
- **Debug:** Displays debugging messages
- **Session:** Displays various information about session state (page and application items, collections, and so on)
- **Errors:** Displays any errors found when running your application

# Adding Subtypes on Mobile Item Types



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Subtype specifies what kind of text field the page item is. This will allow devices with on-screen keyboards to show an optimized keyboard layout specific to the subtype, for easier data input. The subtype selection will also be used to render an appropriate link with the value of the page item, if it's rendered read only. This HTML5 feature works in modern browsers only.

To access subtype, perform the following steps:

1. Select the form of the mobile application where you can find item types.
2. Right-click the item type and select Edit.
3. Under the Settings tab, select the Subtype drop-down list and select the subtype for that item.

## Quiz

Which of the following is *not* a page item type?

- a. Date Picker
- b. File Browse
- c. HTML
- d. List Manager

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**Answer: c**

# Workshop 8-1 Overview: Adding Items and Buttons

This practice covers the following topics:

- Creating a blank page
- Creating and adding items to pages
  - Date picker
  - Text area
  - Text
  - Select list

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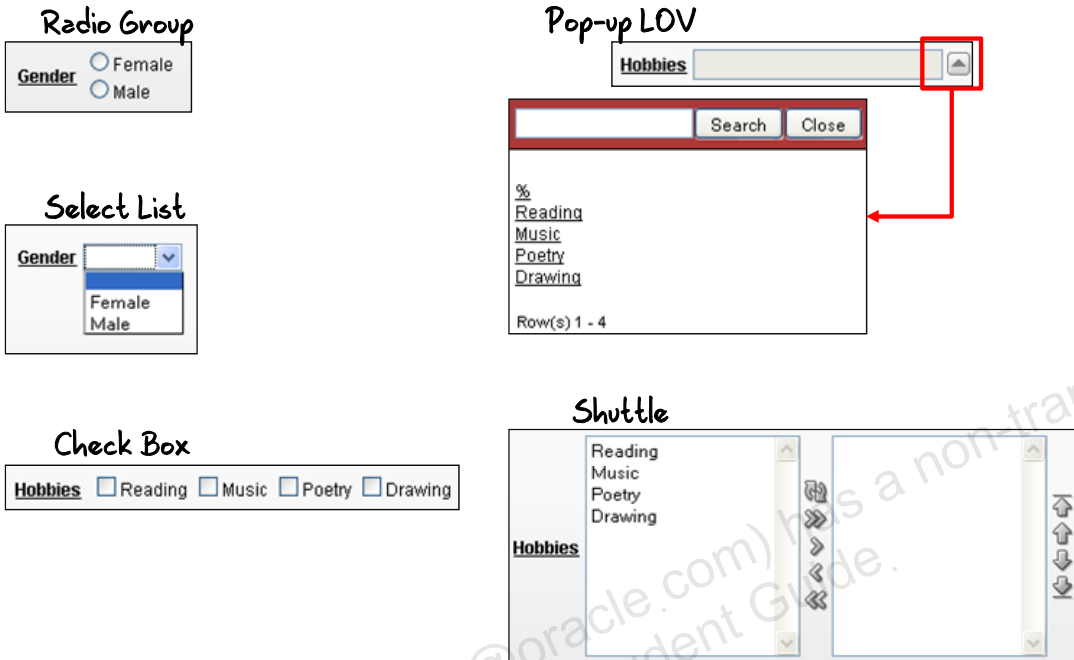
# Lesson Agenda

- Introducing Items
- Using Items
- Creating List of Value (LOV) Type Items
  - What Is an LOV?
  - Accessing the Lists of Values Page
  - Creating a Static LOV
  - Creating a Dynamic LOV
  - Associating an LOV with an Item
  - Creating a Select List Item
  - Converting an LOV
  - Creating a Cascading LOV
- Using Buttons

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# What Is an LOV?



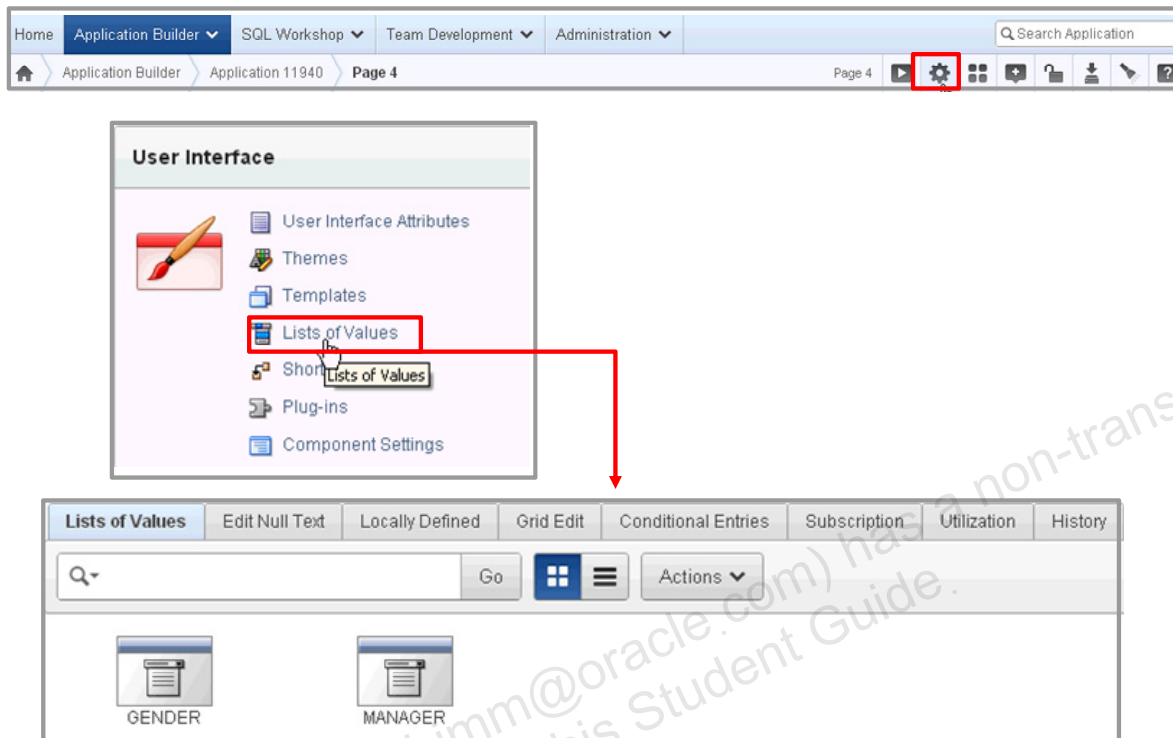
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A list of values (LOV) is used to display values for some specific type of page item, such as a radio group, check box, or select list. You can create an LOV while creating the item or create an LOV as a shared component, and then reference it in one or more items. An LOV can be either of the following:

- **Static:** Based on a set of predefined display and return values
- **Dynamic:** Based on a SQL query that selects values from tables

# Accessing the “Lists of Values” Page



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The LOVs that are created as shared components are listed on the “Lists of Values” page. To access the “Lists of Values” page, navigate to the Shared Components page for the application. Under User Interface, click “Lists of Values.” The LOVs that are created for the application are displayed. You can create new LOVs or create a copy of an existing LOV.

**Note:** Shared component LOVs are also called “named” LOVs.

# Creating a Static LOV

**1**

Cancel Next >

A List of Values is a static or dynamic definition used to display a specific type of page item, such as popup lists of values, a select list, a check box, a radio group, or multiple select lists.

Create List of Values:

From Scratch

As a Copy of an Existing List of Values

**2**

< Cancel Next >

Static lists are based on predefined pairs of display and return values. Dynamic lists are based on a SQL query you write that selects values from a table.

\*Name:

Type:  Static

Dynamic

**3**

< Cancel Create List of Values

Enter static display and return values. Values will display in the order entered. **Return Value** does not display, but is the value that is returned to the Application Express engine. If you do not specify a **Return Value** then it is equal to the **Display Value**. You can display additional attributes including build option controls and item level conditional display by editing the List of Values.

List of Values Name:

Sequence	Display Value	Return Value
1	<input type="text" value="Female"/>	<input type="text" value="F"/>
2	<input type="text" value="Male"/>	<input type="text" value="M"/>
3	<input type="text"/>	<input type="text"/>
4	<input type="text"/>	<input type="text"/>

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A static LOV is based on a predefined list of display and return values. To create a static LOV, click the Create button on the "Lists of Values" page and perform the following steps:

1. Select From Scratch and click Next. You can select the second option to create a copy of an LOV from another application in the same workspace.
2. Enter a name for the LOV. Select Static and click Next.
3. Enter the static display and return values. Values are displayed in the order in which they are entered here. The return value is not displayed, and is the value returned to the Oracle Application Express engine. In a case where you do not enter a return value, the display value is also the return value. Click "Create List of Values."

After you add a static LOV to the repository, you can create a check box, radio group, select list, or pop-up list item and reference the LOV there.

# Creating a Dynamic LOV

**1**

A List of Values is a static or dynamic definition used to display a specific type of page item, such as popup lists of values, a select list, a check box, a radio group, or multiple select lists.

Create List of Values:

From Scratch

As a Copy of an Existing List of Values

**2**

Static lists are based on predefined pairs of display and return values. Dynamic lists are based on a SQL query you write that selects values from a table.

\*Name:

Type:  Static

Dynamic

**3**

Enter a SQL query that returns two columns. The first column is the display value. The display value is the value you see in a list of values. This column should be aliased and a different name than the return column. The second column is the return value. The return value is the value returned when the display value is selected. The return column should be aliased if it includes any operations. Use bind variable syntax within your SQL query to reference the session state of the application or page items.

List of Values Name: **MANAGERS**

\*Query (SELECT DISPLAY\_VALUE, RETURN\_VALUE FROM.):

```
select m.name d, e.empno r
from emp e, emp m
where m.empno=e.mgr
order by 2
```

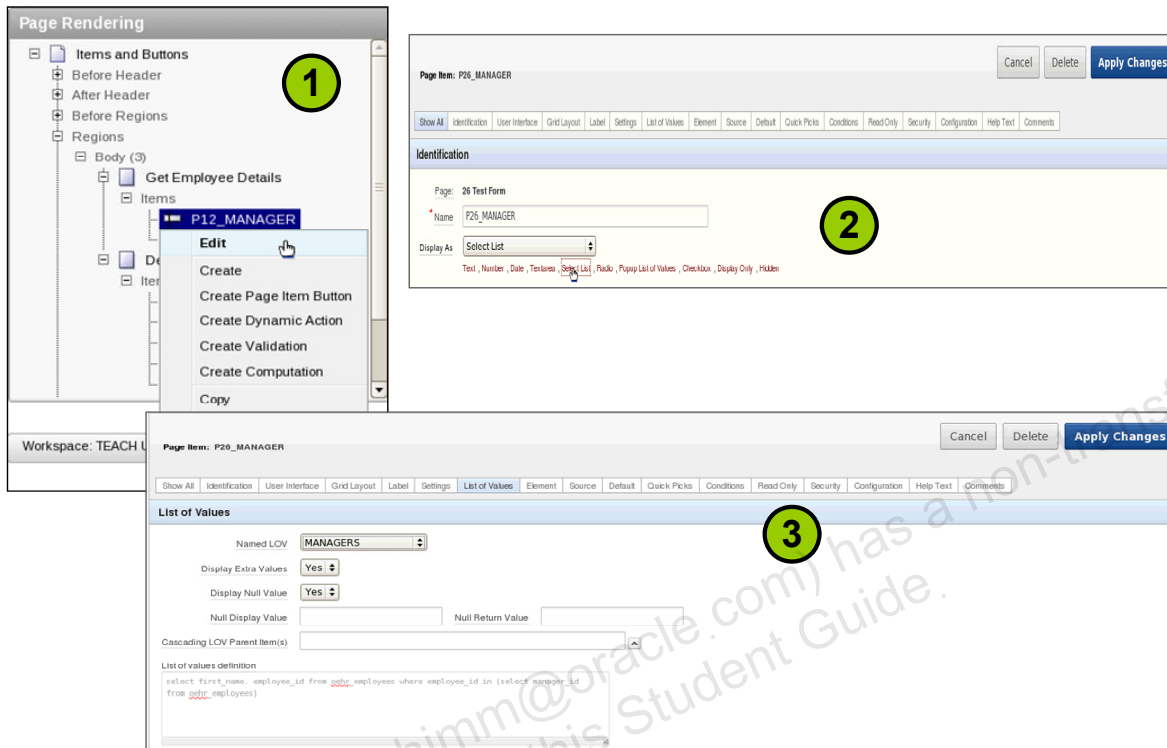
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Dynamic LOVs are based on SQL queries that are executed at run time and select values from tables or views. To create a dynamic LOV, click the Create button on the "Lists of Values" page and perform the following steps:

1. Select From Scratch and click Next.
2. Enter a name for the LOV. Select Dynamic and click Next.
3. Enter a SQL query that returns two columns. The first column returns the values to be displayed in the items list. The second column gives the value that is returned to the Oracle Application Express engine when the display value is selected. You can click the Examples link at the bottom of the page to see sample SQL queries. If the display and return columns are the same, or if a column includes a function or operator, you must use column aliases in the query. Click "Create List of Values."

# Associating an LOV with an Item



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You can associate a named LOV with an item that can accept a list of values. To associate an LOV to an item, perform the following steps:

1. Right-click the item node and select Edit.
2. Ensure that the display type is an LOV type item by clicking the Name tab. You can change the display type, if required. In this example, the Manager text field item is changed to a select list item.
3. Click the "List of Values" tab. For Named LOV, select the LOV that you already created. In this example, the Managers LOV is selected. Click Apply Changes.

Run the page to check whether the item displays the list of values.

# Creating a Select List Item

Use this page to define the list of values. Either construct a SQL statement with the number of columns required by the item type, or use the STATIC syntax. See the List Of Values Examples section for examples.

Application/Page: 11940/4  
Item Name: P4\_SELECTLIST  
Display As: Select List  
Named LOV:   
Display Null Value: Yes  
Null Display Value:   
Null Return Value:   
Cascading LOV Parent Item(s):

\* List of Values Query

```
SELECT ename d, empno r  
FROM emp  
ORDER BY 1
```

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The steps to create a Select List item are similar to creating a date picker item that was discussed earlier in this lesson. In addition, you specify the list of values for the item. You can do this in two ways:

- Create a list of values as a shared component and reference it here.
- Enter the list of values in the text area. You can view syntax examples by clicking the “List of Values Examples” node at the bottom of the page.

In the example in the slide, the SQL query is entered in the text area. You can click the links below the text area to create a static or dynamic list of values.

# Converting an LOV

The image shows two screenshots from the Oracle APEX interface. The top screenshot displays the configuration for a 'List of Values' (LOV) for the page item 'P25\_EMPLOYEE\_ID'. The 'List of Values' tab is selected, showing a SQL query: `SELECT first_name d, employee_id r FROM oehr_employees ORDER by 1`. A red circle with the number '1' highlights the 'Tasks' section on the right, where the 'Convert LOV' option is visible. The bottom screenshot shows the 'Create Shared LOV' dialog box. It prompts the user to enter a name for the shared LOV (e.g., 'EMPLOYEES') and a SQL query. A red circle with the number '2' highlights the 'Create' button.

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The LOVs that are defined while creating an item (as discussed in the previous slide) can be used only for that item. You have an option to convert this LOV to a named LOV so that you can reuse it for other items. Right-click the item that has the LOV defined and select Edit. Perform the following steps:

1. Click the “List of Values” tab and review the SQL query.
2. Under Tasks, click Convert LOV.
3. Enter a name for the LOV and click Create.

The LOV is converted to a shared component LOV and is listed in the Shared Components region of Page Definition. Shared Components are discussed in detail in the lesson titled “Adding Shared Components That Aid Navigation.”

# Creating a Cascading LOV

Get Employee Details

Manager: Neena  
Neena, Lex, Nancy

Employee: Hermann, Jennifer, Nancy, Shelley, Susan

The values displayed in the Employee select list depend on the Manager that is selected.

Page Item: P25\_EMPLOYEE\_ID

Named LOV: - Select Named LOV -

Display Extra Values: No

Display Null Value: No

Cascading LOV Parent Item(s): P25\_MANAGER\_ID

Page Items to Submit:

Optimize Refresh: Yes

List of values definition

```
SELECT first_name d, employee_id r  
FROM oehr_employees  
WHERE manager_id=:P25_MANAGER_ID  
ORDER BY 1
```

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A cascading LOV is a dynamic LOV that references another page item for its list of values. For example (shown in the slide), you can populate an Employees item with the names of employees who work for the manager entered in the Manager item. You can define a cascading LOV while creating the item or by editing the item. Before creating a cascading LOV, you must first create the item that is referred to. To define a cascading LOV for an existing item, perform the following steps:

1. Navigate to the appropriate page definition. Right-click the item node and select Edit.
2. Click the "List of Values" tab.
3. Click the up arrow for the Cascading LOV Parent Item(s) field and select the item that you want to refer in the SQL query.
4. Select the page items to submit.
5. Modify the SQL query to include the referred item in the WHERE clause. If you have selected a named LOV for the item, you must edit the named LOV from the List of Values page. Click Apply Changes.

Run the page to confirm that the items are populated as required.

You can view the demonstration of modifying an item type by opening the `/home/oracle/labs/demos/les08_modify_item_form.html` file.

**Note:** You can define a cascading LOV only for LOV-type items, such as select list, check box, and pop-up LOV.

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# Lesson Agenda

- Introducing Items
- Using Items
- Creating List of Value (LOV) Type Items
- Using Buttons
  - What Is a Button?
  - Creating a Button
  - Creating a Region Button
  - Accessing the Create Multiple Buttons Option
  - Creating Multiple Buttons
  - Editing Button Attributes
  - Modifying a Button to Redirect to a URL

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# What Is a Button?

The image shows a screenshot of a web form titled "Customer". The form contains several input fields with the following values: First Name: Eugene; Last Name: Bradley; Street Address: Schoephoester Road; City: Windsor Locks; State: Connecticut; Postal Code: 06096; Phone Number: (860) 555-1835; Credit Limit: 1000; Tags: REPEAT CUSTOMER. At the bottom of the form, three buttons are visible: "Cancel", "Delete", and "Apply Changes". A red rectangular box highlights these three buttons. An arrow points from the text "Region Buttons" to the "Apply Changes" button.

Region Buttons

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A button is an interface element that is used to either submit a page or navigate to another page or URL. You can create a button that is placed next to other page items. You can also create region buttons that are placed in predefined region templates.

When you use wizards to create page components such as reports and forms, some buttons (such as Cancel, Save, Create, and Delete) are automatically created.

In this lesson, you learn how to create a region button named CANCEL, which, when clicked, clears the cache for the items on a page and redirects to another page. You also create a button named GO next to an item, which, when clicked, submits the page items and displays a report region.

# Creating an Item Button

The image shows a sequence of four screenshots illustrating the process of creating a button in Oracle APEX:

- Step 1:** The 'Page Rendering' tree view is shown. The 'Get Employee Details' region is selected, and the context menu is open with 'Create Page Item Button' highlighted.
- Step 2:** The 'Create Button Wizard' is shown. The 'Button Name' is 'P4\_GO', the 'Label' is 'Go', and the 'Button Style' is 'Template Based Button'.
- Step 3:** The 'Create Button Wizard' is shown. The 'Button Name' is 'P4\_GO', the 'Action' is 'Submit Page', and 'Execute Validations' is set to 'Yes'.
- Step 4:** The 'Create Button Wizard' is shown. The 'Button Name' is 'P4\_GO', and the 'Condition Type' is '- Button NOT Conditional -'.

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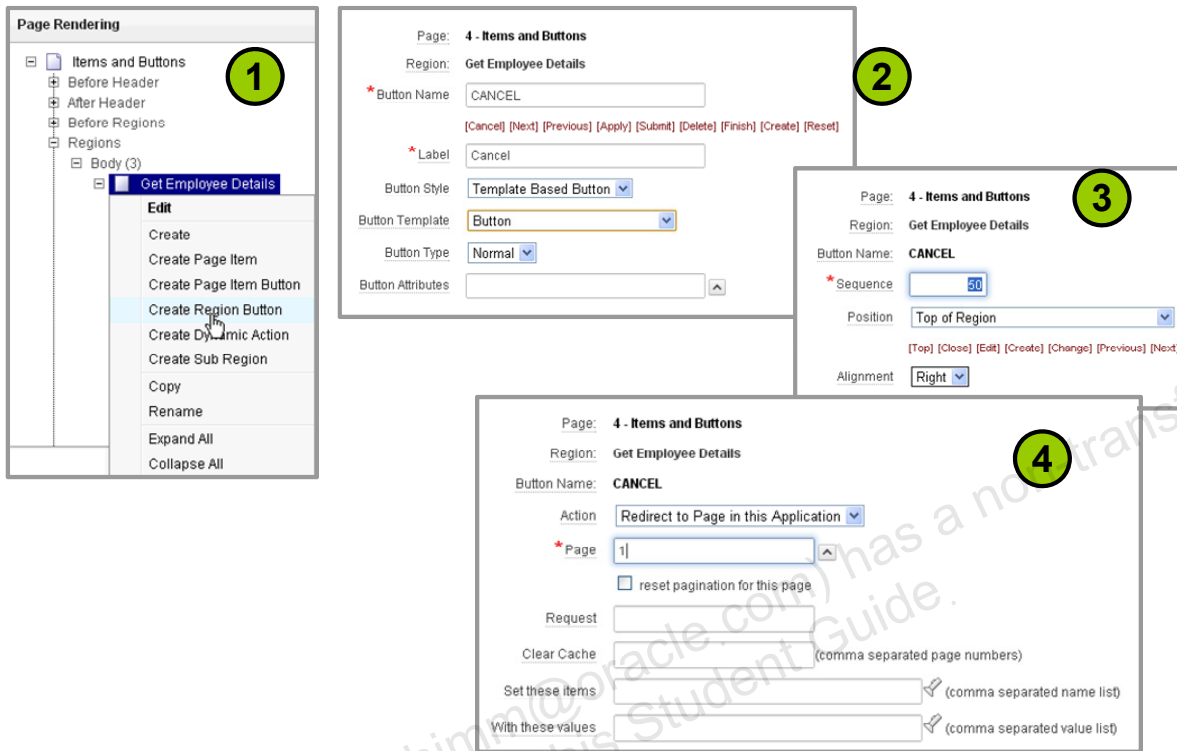
To create a new button, navigate to the Page Definition and perform the following steps:

1. Identify the region to contain the button. Right-click the region node and select Create Button.
2. Fill details in the Create Button Wizard and click Create Button.
  - Enter a name for the button.
  - Specify whether the button should display in a separate line or next to the previous item.
  - Enter a label name.
  - Select a style for the button.

The button is created.

If you run the page and click the button, you notice that the page gets submitted. You can now define the actions that are required when the page is submitted.

# Creating a Region Button



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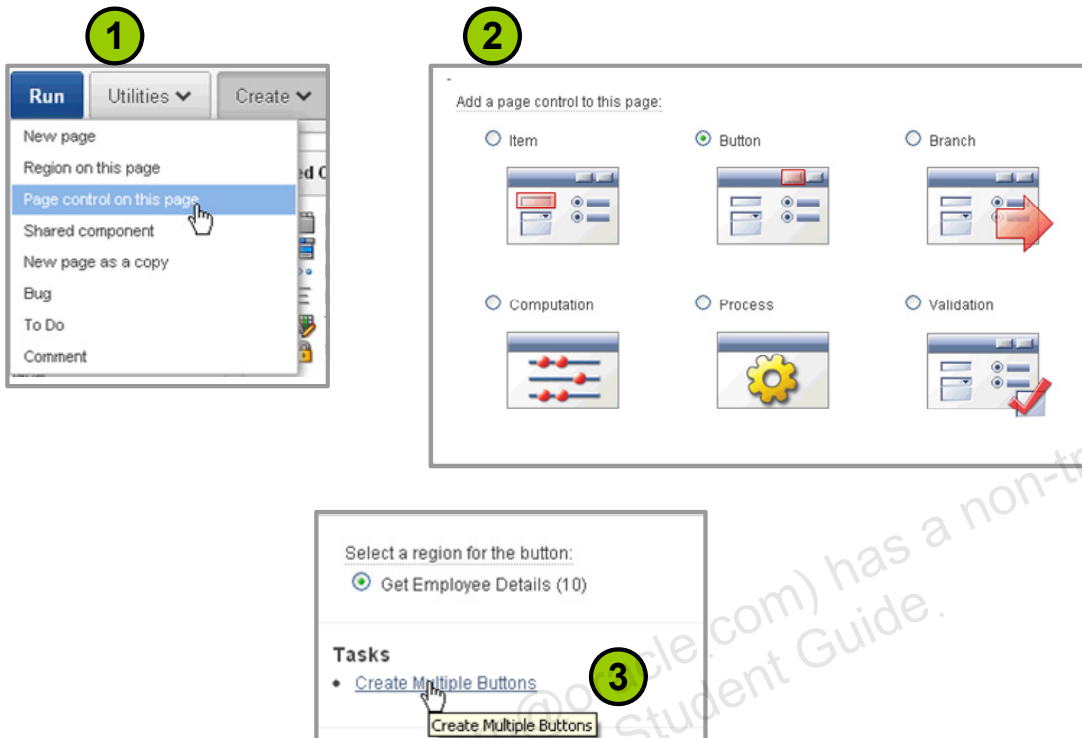
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To create a region button, navigate to the Page Definition and perform the following steps:

1. Right-click the region where the button should be created and select Create Region Button.
2. Enter a name for the button (you can use the quick pick links that are available) and the label. (When you enter a name in the Button Name field, the Label field populates automatically.) Specify the button style.
3. Specify where and how the button should be displayed.
4. Select the action that is required when the button is clicked. In this example, you redirect to another page in the application. Click Create Button.

You can click Next if you want to specify a condition for the button to be displayed. You can run the page to verify that the button was created successfully.

# Accessing the Create Multiple Buttons Option



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You can create multiple buttons within the same region simultaneously by using the Create Multiple Buttons Wizard. To access the wizard, perform the following steps:

1. In the page definition, click the down arrow on the Create button and select "Page control on this page."
2. Select Button and click Next.
3. Under Tasks, click Create Multiple Buttons.

# Creating Multiple Buttons

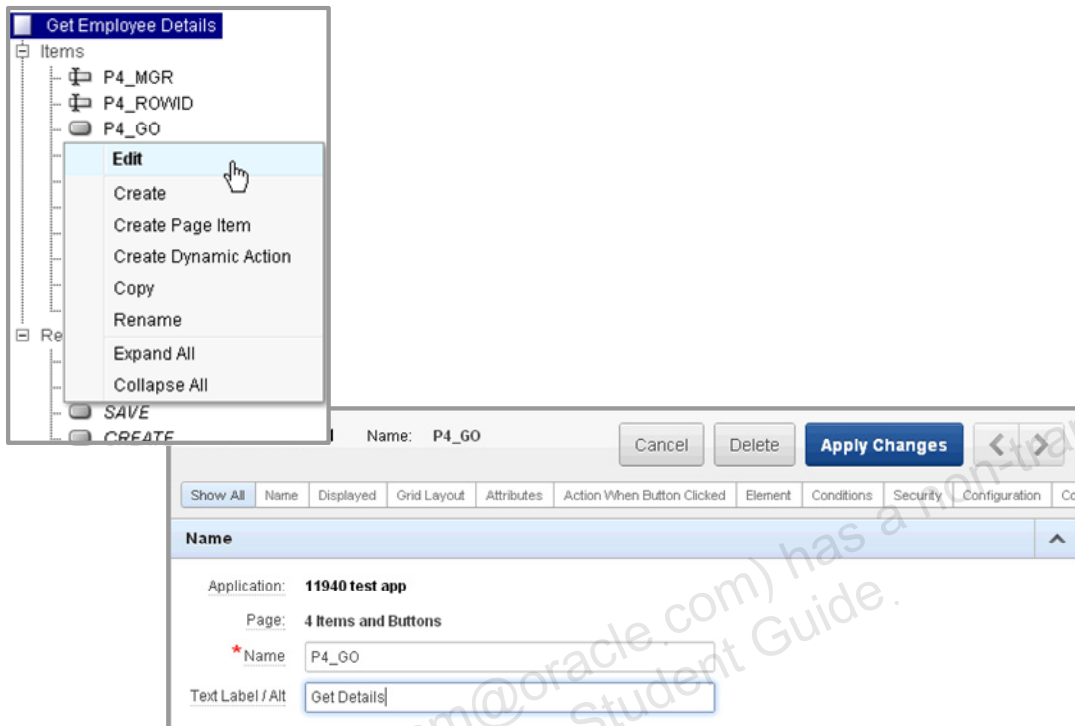
Sequence	Name	Label	Position	Attribu
<input type="text" value="10"/>	<input type="text" value="CANCEL"/>	<input type="text" value="Cancel"/>	<input type="text" value="Region Template Position #CLOSE#"/>	<input type="text"/>
<input type="text" value="20"/>	<input type="text" value="PREVIOUS"/>	<input previous"="" type="text" value("&lt;=""/>	<input type="text" value="Region Template Position #PREVIOUS#"/>	<input type="text"/>
<input type="text" value="30"/>	<input type="text" value="NEXT"/>	<input type="text" value="Next &gt;"/>	<input type="text" value="Region Template Position #NEXT#"/>	<input type="text"/>
<input type="text" value="40"/>	<input type="text" value="SUBMIT"/>	<input type="text" value="Submit"/>	<input type="text" value="Region Template Position #CREATE#"/>	<input type="text"/>
<input type="text" value="50"/>	<input type="text"/>	<input type="text"/>	<input type="text" value="Bottom of Region"/>	<input type="text"/>

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On the Create Multiple Buttons page, specify the region to contain the buttons and a style for the buttons. For each button that you want to create, enter a name, label, and position. You can use the links under Quick Buttons to create some commonly used buttons.

# Editing Button Attributes

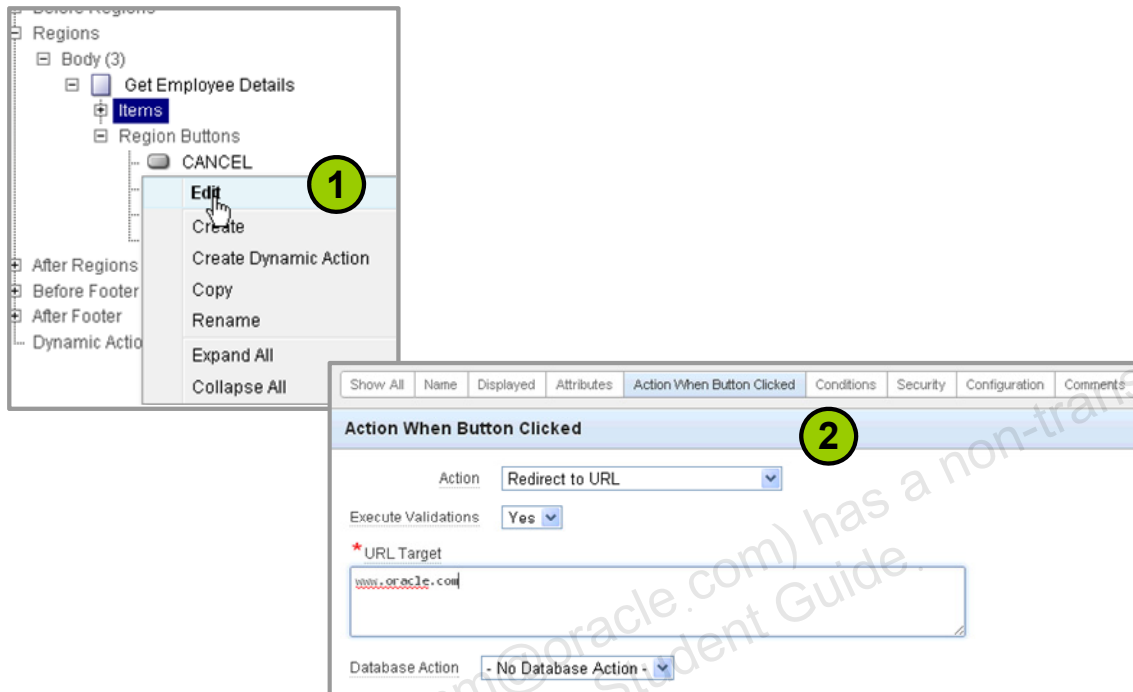


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After you create a button, you can edit its attributes on the Edit Button page. To access the Edit Button page, right-click the button node in the page definition and select Edit. You can modify the button properties and click Apply Changes to save your changes.

# Modifying a Region Button to Redirect to a URL



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To edit a region button, navigate to the Page Definition and perform the following steps:

1. Right-click the button name and select Edit. (The button is listed under the Region Buttons node for the region.)
2. Click the Action When Button Clicked tab. Select “Redirect to URL” for Action and enter the URL in the text area. In the slide example, the URL that is entered is <http://www.oracle.com>.

## Quiz

Which of the following statements are true about buttons?  
(Choose all that apply.)

- a. You can place a button in any position defined in the region template.
- b. A button cannot branch to a URL without submitting the page.
- c. You can edit the button attributes on the Edit Button page.
- d. You can create multiple buttons at a time.

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**Answer: a, c, d**

## Workshop 8-2 Overview: Manipulating Items on Your Desktop Pages

This practice covers the following topics:

- Creating and adding Submit and Cancel buttons to the page
- Editing item and button attributes
- Modifying the mobile form page to include some HTML5 item types

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# Summary

In this lesson, you should have learned how to:

- Identify the different types of items
- Create items and edit item attributes
- Create and use lists of values
- Create buttons and edit button attributes

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In this lesson, you learned about items and buttons. You learned how to create items and buttons, as well as how to edit their attributes.

# 9

## Understanding Session State

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# Objectives

After completing this lesson, you should be able to do the following:

- Define a *session state*
- Explain how Oracle Application Express implements session state
- View session state values
- Reference a session state value
- Clear the session state

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This lesson shows you how Oracle Application Express manages the session state of an application.

# Lesson Agenda

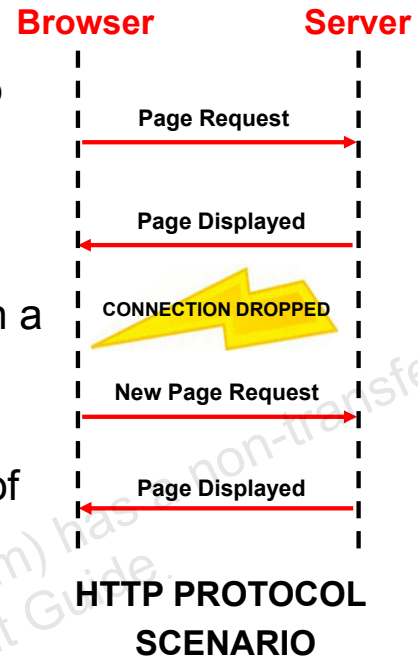
- Understanding Session State in Oracle Application Express
  - What Is a Session State?
  - What Is a Session ID?
  - What Is Session Timeout?
  - How Does Oracle Application Express Implement Session State?
  - Identifying the Parts of an Oracle Application Express URL
- Using Session State in Oracle Application Express

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# What Is a Session State?

- HTTP protocol is:
  - Used to transfer data across the web
  - Stateless
- A *session* is a series of browser requests and server responses within a specified time.
- A *session state* is the state or value of an item in a session.



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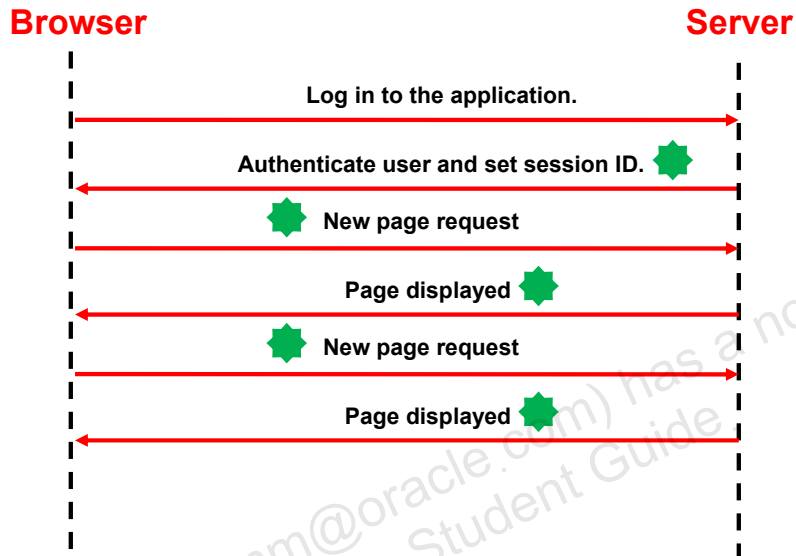
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To understand what a session state is, you must first understand what HTTP is and how it works. HTTP is the protocol that is used to transfer data across the web. HTTP is a stateless protocol. It means that each page request from a browser is treated as an independent request by the server. There is no memory or saved state between the requests.

In a web application scenario, such as an online shopping application, it is essential to maintain application state information. For example, a user fills out a web form for ordering products, then adds the items to be purchased, and finally submits the form. In this scenario, it is necessary to store the list of items in the shopping cart, and then present this list when required, such as when confirming the order. In addition, the user information must also be retrievable when necessary. To access the values that are entered on one page from a different page, some sort of management is required. A series of requests that originate from the same user by using the same web browser to a web server is called a *session*. The value of the page item during the session length is called the *session state* of the item.

# Session ID

A session ID is a unique identifier that is assigned to each new session in an application.



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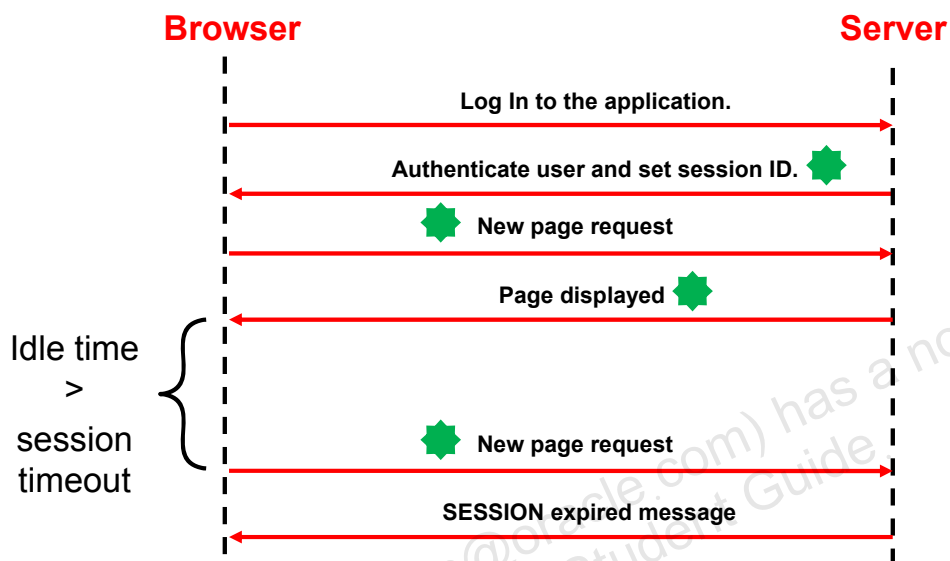
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To manage sessions and to store session state information, each session should be uniquely identifiable by the server and the browser. This is done by using session IDs. A session ID is a unique identifier for each session created in an application. For each new session that is initiated by the browser, the server assigns a session ID. This session ID is associated with subsequent page requests, establishing a session.

In the graphic in the slide, a user logs in to an application. The server authenticates the user and starts a new session. A session ID (depicted by a green symbol) is assigned to the session. Each time the browser makes a request to the server, the session ID is also sent to the server. The server uses this session ID to identify the user and maintain the session state for the user.

# Session Timeout

Session timeout is the time period a session can be idle before the server terminates the session.



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Session timeout is the time period set for an application session. If the user does not request a new page or refresh the current page within the time period, the server automatically terminates the session. By configuring Session Timeout attributes, you can reduce your application's exposure. By setting the session and idle timeout, users are automatically logged out of their application after the specified timeout.

Session Timeout attributes include:

- **Maximum Session Length in Seconds** – Enter a positive integer to control how many seconds a session exists and is used by this application.
- **Session Timeout URL** - Enter an optional URL to redirect to when the maximum session lifetime has been exceeded.
- **Maximum Session Idle Time in Seconds** – Enter a positive integer to control the seconds of inactivity or idle time for sessions used by this application. The idle time is the time between one page request and the next one.
- **Idle Timeout URL** – Enter an optional URL to be redirected to when the maximum session idle time has been exceeded.

# Setting Session Timeout

By configuring Session Timeout attributes, you can reduce your application's exposure.

The screenshot shows the Oracle Application Express configuration interface for Application 104. The 'Security' tab is selected, and the 'Session Timeout' sub-tab is active. The configuration includes the following attributes:

Attribute	Value
Maximum Session Length in Seconds	60
On session timeout direct to this URL	f?p=&APP_ID.:10:0:SESSION
Maximum Session Idle Time in Seconds	10
On session idle time timeout direct to this URL	f?p=&APP_ID.:10:0:IDLE

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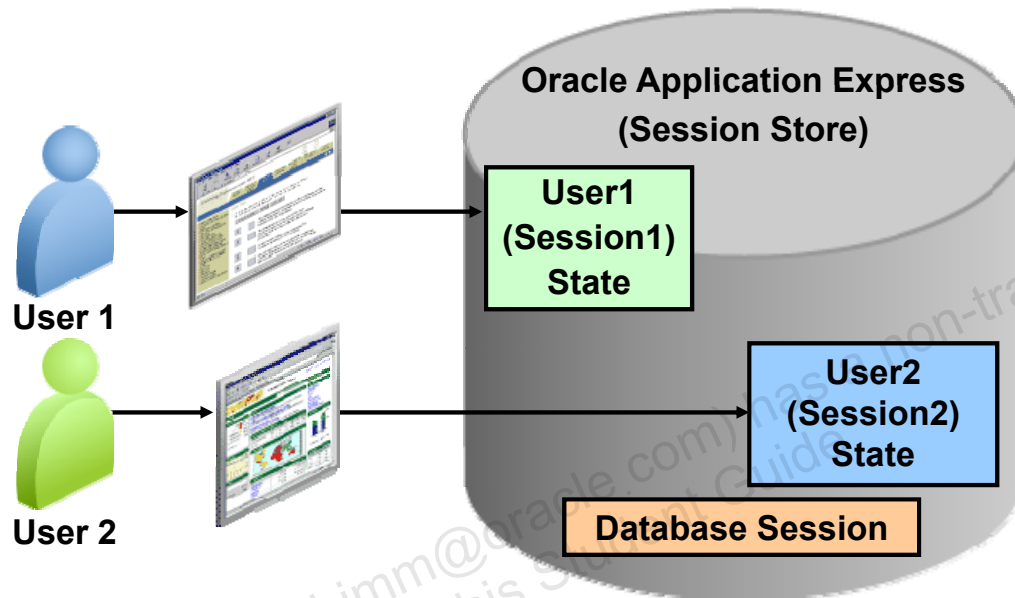
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In Oracle Application Express, you can declaratively specify session timeouts for maximum idle time and maximum session duration. To set the session timeout for an application, click the Edit Application Properties button on the application home page. Click the Security tab and then the Session Timeout tab. Set the following attributes:

- Maximum Session Length in Seconds
- On session timeout direct to this URL
- Maximum Session Idle Time in Seconds
- On session idle time timeout direct to this URL

# How Does Oracle Application Express Implement Session State?

Oracle Application Express maintains session state implicitly.



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In Oracle Application Express, you do not need to write code to manage and maintain sessions or session state. Session state is maintained transparently and you can easily access session state values and manipulate them, if required.

Each time users log in to an application, Oracle Application Express assigns a unique session identifier, which is associated with users until they log out of the application. This session ID is used by the Oracle Application Express engine to store and retrieve the application's working set of data before and after each page view. This is done by comparing the session ID with the session cookie and the session record in the database. The session cookie and the session record safeguard the integrity of the session ID and the authentication status of the user.

You can view the session ID in the URL for a page request. The other visible location is on the page's HTML `POST` structure or in a session cookie sent by the Oracle Application Express engine during authentication and maintained for the life of the application or the browser session.

Multiple sessions can exist in the database at the same time, because Oracle Application Express treats each session independently. The session information persists in the database until it is purged. Therefore, as long as the client's session has not expired, a user can continue running the application long after having first launched it.

Oracle Application Express uses cookies to store session state. If you turn off cookies in your browser, Application Express applications will not work properly.

The cookies hold information about the application, page, and so on. If developers run multiple instances that use the same browser on one PC when they build applications, then the different browser instances interfere with each other. When switching between the two different browser screens, the tool will exhibit strange behavior, including unexpected errors. This can be avoided by developing applications by using different browsers (such as Internet Explorer and Mozilla Firefox) because each browser tool uses its own cookies.

Oracle Application Express sessions are different from the Oracle database sessions that are used to service page requests. An end user runs an application in a single Oracle Application Express session from login to logout. For each page that is requested during that session, Oracle Application Express engine creates or reuses an Oracle database session to access the database resources. The Oracle Application Express engine uses the session ID to fetch the session state from the database.

# Identifying the Parts of an Oracle Application Express URL

Oracle Application Express URL syntax:

1	<code>http://&lt;servername&gt;:&lt;port&gt;/pls/apex/</code>
2	<code>f?p=</code>
3	<code>App:Page:Session:</code>
4	<code>Request:Debug:ClearCache:</code>
5	<code>itemNames:itemValues:</code>
6	<code>PrinterFriendly</code>

Example:

`http://localhost:8080/apex/f?p=130:2:1340248669461899::NO::P2_CUSTOMER_ID:4`

Diagram illustrating the parts of the URL:

- Page #**: 2
- Session ID**: 1340248669461899
- Item Name**: P2\_CUSTOMER\_ID
- Application ID**: 130
- Debug**: NO
- Item Value**: 4

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The slide shows the syntax of a complete URL for an application developed by using Oracle Application Express.

1. The URL starts with the address of the Oracle Application Express instance. `pls` in the URL indicates that you are using Oracle HTTP Server with `mod_plsql`. If you are using Application Express Listener or Embedded PL/SQL Gateway, `pls` is omitted.
2. `f` is the procedure that is called and `p` is the rest of the URL that is passed as parameters to the procedure.
3. `App` is the application ID or alias of the application that you want to access. `Page` is the page number or alias of the page that you want to access. `Session` is the identifier for the session assigned by Oracle Application Express when you log in to an application.

4. `Request` is set to the request attribute value of a button when it is clicked. For example, if you click a button called `CREATE`, `CREATE` is passed as `request` in the URL.

`Debug` can be set to `YES` (uppercase) to switch on the debug mode for your application. Every other value turns the debugger off.

`ClearCache` is used to set the session state values to null. To clear a page, specify the page number. To clear multiple pages, specify a comma-separated list of page numbers. You can also set the following values:

- `RP` – To reset pagination
  - `APP` – To clear cache for all the pages and application-level items in the current application
  - `SESSION` – To clear cache for the current user session
5. `itemNames` is a comma-separated list of item names and `itemValues` is a comma-separated list of item values. Item values cannot include colons, but can contain commas if enclosed with backslashes. To pass a comma in an item value, enclose the characters with backslashes (for example, `\123,45\`).
  6. `PrinterFriendly` can be set to `YES` to render the page by using the printer-friendly page template.

## Quiz

What does the number **29** indicate in the following URL?  
`http://localhost:9001/apex/f?p=100:29:13402486694618  
99::NO::P29_ORDER_ID:4`

- a. Application name
- b. Session ID
- c. Page number
- d. Item value

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**Answer: c**

# Lesson Agenda

- Understanding Session State in Oracle Application Express
- Using Session State in Oracle Application Express
  - Viewing Session State
  - Referencing Session State
    - Referencing Session State by Using Bind Variables: Example
    - Referencing Session State in Static Text: Example
  - Clearing the Cache

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# Viewing Session State

Get Employee Details

Manager: Steven

Employee: Neena

Go

Home Application 104 Edit Page 16 Create **Session** Caching View Debug Debug Show Edit Links Show Grid

Application	Page	Item Name	Display	Item Value	Status	Encrypted
104	16	P16_EMPLOYEE_ID	Hidden		RESET_TO_NULL	No
104	16	P16_FIRST_NAME	Select List		RESET_TO_NULL	No

Application	Page	Item Name	Display	Item Value	Status	Encrypted
104	16	P16_EMPLOYEE_ID	Hidden	101	Updated	No
104	16	P16_FIRST_NAME	Select List	109	Inserted	No

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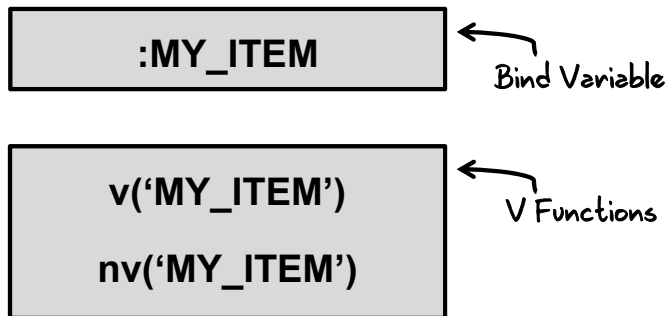
Each time you request or submit a page, Oracle Application Express automatically saves session state values. To view the session state for a page, click the Session button on the Developer toolbar. The Session State page opens in a new window and provides information about a page, such as:

- Session ID, current user, workspace ID, and the browser language
- The attributes of the page, such as the item name, how the item is displayed, the state or session ID, and the status. The status column indicates the status of the session state. The values include I (Inserted), U (Updated), and R (Reset).
- The application items that do not reside on a page. The application items are session state variables without the associated user interface properties. Application items are not used for display, but used as global variables to the application.

When you view a page for the first time, before making any changes and submitting the page, the state column on the session page displays null. After you click a button and submit the page, when you view the session page, the state column displays the item values and the status column shows that an insert operation has been performed.

# Referencing Session State

Referencing session state values in SQL and PL/SQL:



Referencing session state values in static text:



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In many a situation, you may want to reference session state values of items in regions, computations, processes, validations, and branches. You can reference the session state values by using the following:

- **SQL and PL/SQL**
  - Use the standard bind variable syntax for item names that are not longer than 30 characters. You can use this syntax for references within a SQL or PL/SQL query (for example, `:MY_ITEM`).
  - Use the `v` function to reference the item value [for example, `v('MY_ITEM')`] if the item name is longer than 30 characters, or when you are coding a stored procedure.
  - Use the `nv` function to reference numeric items [for example, `nv('MY_NUMERIC_ITEM')`].
- **Static text**
  - Use `&item name` followed by a period "." (for example, `&MY_ITEM.`).

## Referencing Session State by Using Bind Variables: Example

```
select * from oehr_employees  
where employee_id = :P10_EMPLOYEE
```

A SQL query used to  
create a report

A SQL query used  
to create an LOV

```
select first_name d, employee_id r  
from oehr_employees  
where manager_id = :P10_MANAGER  
order by 1
```

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There are many scenarios where you can use bind variables to reference the session state value. For example, if you want to display a report and restrict the result based on some item values entered or selected by the user, you can use bind variables to reference the item's session state value in the `WHERE` clause of the SQL query. Similarly, if you want to display a list of values depending on user input, you can use a bind variable in the SQL query.

In Oracle Application Express, you can use bind variables to reference the session state in any place where you use SQL or PL/SQL. Other examples of where you can use bind variables are in computations and processes.

# Referencing Session State in Static Text: Example

Region Definition | Report Attributes | Print Attributes

Region: 1 of 1 Name: Details for Employee &P26\_EMPLOYEE. [Cancel] [Delete] [Apply Changes] [Left Arrow] [Right Arrow]

Show All | Identification | Source | User Interface | Grid Layout | Attributes | Header and Footer | Conditions | Read Only | Security | Configuration | Caching

**Identification** [Up Arrow]

Page: 27 Test Report

\* Title:   exclude title from translation

Type:  [Down Arrow]

**Details for Employee 206**

EMPLOYEE_ID	FIRST_NAME	LAST_NAME	EMAIL	PHONE NUMBER	HIRE DATE	JOB ID	SALARY	COMMISSION PCT	MANAGER ID	DEPARTMENT ID
206	William	Gietz	WGIETZ	515.123.8181	07-JUN-1994	AC_ACCOUNT	8300		205	110

[Download](#) 1 - 1

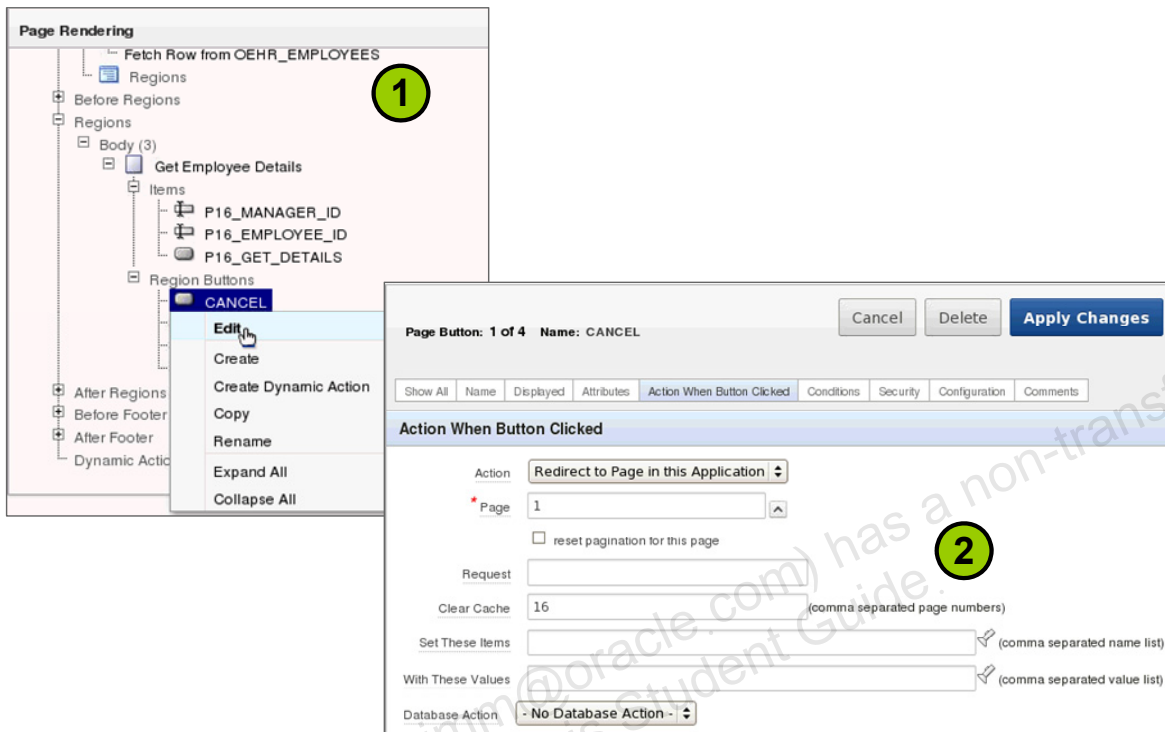
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In this example, you want to display the id of the employee whose details have been retrieved in the region title.

You can view the demonstration of viewing session state by opening the `/home/oracle/labs/demos/les09_using_session_state.html` file.

# Clearing the Cache



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You can clear the session state information by using a built-in Oracle Application Express process. For example, you want to clear cache for a page when the Cancel button in a form is clicked. To clear cache, perform the following steps:

1. Right-click the button node and select Edit.
2. Click the Action When Button Clicked tab. In the Clear Cache field, enter the page number of the page for which you want to clear the cache. Click Apply Changes.

**Note:** To clear the cache on multiple pages, you can enter multiple page numbers in the Clear Cache field. For example, if you enter 11 , 17 , 18 , the cache of pages 11, 17, and 18 are cleared.

## Quiz

What does the number **100** indicate in the following URL?  
`http://localhost:9001/apex/f?p=100:29:1340248669461899::NO  
::P29_ORDER_ID:4`

- a. Application ID
- b. Session ID
- c. Page number
- d. Item value

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**Answer: a**

# Summary

In this lesson, you should have learned how to:

- Explain what a session state is
- Explain how Oracle Application Express implements session state
- View session state values
- Reference a session state value
- Clear the session state

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In this lesson, you learned how Oracle Application Express manages the session state of an application. You also learned how to debug an application.

# Workshop 9 Overview: Understanding Session State

This practice covers how session state variables work and clearing the cache in a page.

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# 10

## Adding Page Processing

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# Objectives

After completing this lesson, you should be able to do the following:

- Explain the difference between page rendering and page processing
- Create computations on application pages
- Create page processes
- Create validations to verify user input
- Create branches within an application

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This lesson explains how the Oracle Application Express engine renders and processes a page. You create computations, validations, and processes that are executed when the page is processed. You create page branches to enable navigation between pages after processing.

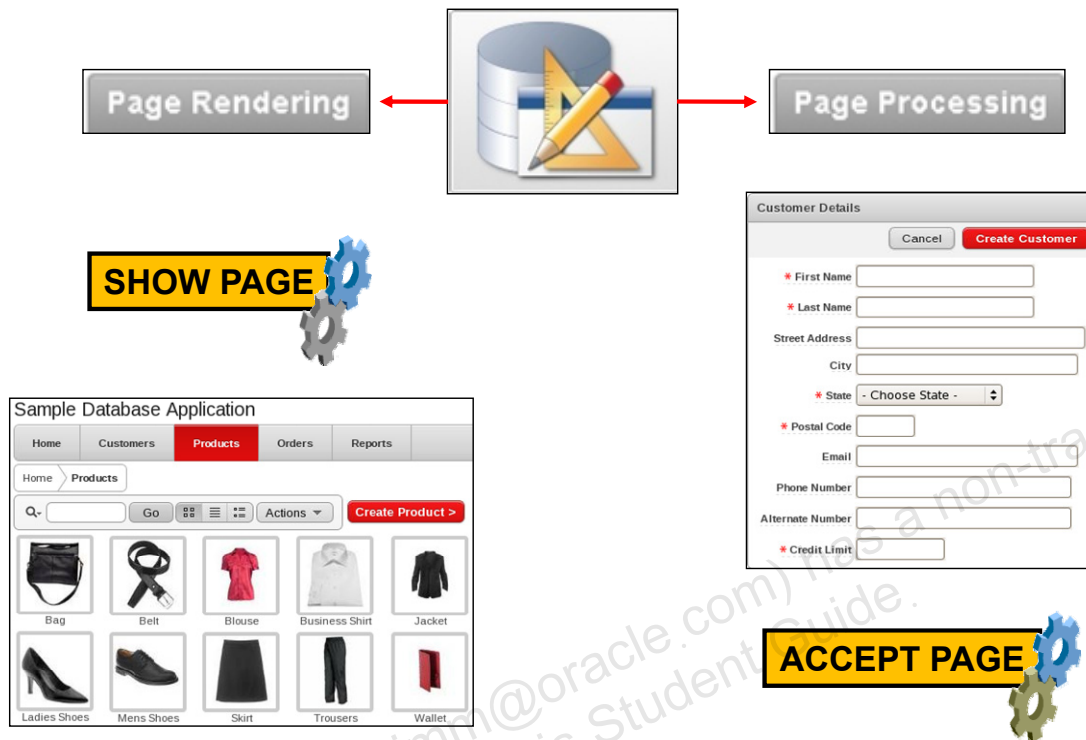
# Lesson Agenda

- Introducing Page Processing
  - Page Rendering Versus Page Processing
  - Types of Logic
  - Scenarios
- Including Computations
- Including Processes
- Including Validations
- Including Branches

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# Page Rendering Versus Page Processing



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Oracle Application Express performs page rendering and page processing.

Page rendering occurs when the APEX engine assembles a page from the database by using a Show Page process. For example, when you request a page by using a URL, the APEX engine runs Show Page. You use the Page Rendering section of a page definition to modify the controls that impact the rendering of a page, including page attributes, regions, buttons, items, computations, and processes.

Page processing occurs when the APEX engine executes a process by using the data submitted from a page. For page processing, the APEX engine runs an Accept Page process. Typically, a page is submitted when a user clicks a button. You use the Page Processing section of page definition to specify application logic such as computations, validations, processes, and branches.

## Types of Logic

	Page Rendering	Page Processing
Computations	✓	✓
Processes	✓	✓
Validations		✓
Branching		✓

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There are four types of logic that you can perform on a page: computations, processes, validations, and branching. The point at which the logic is performed can be specified when the logic is created. If you have more than one process or computation defined at the same point, you can specify a sequence order.

Page rendering computations and processes are performed when the HTML page is assembled and displayed, whereas page-processing computations and processes are performed when the page is submitted to the APEX engine.

# Scenario 1: Page Rendering

Click Create Customer to view an empty form page.

Customer Name	Address	City	State	ZIP Code
Bradley, Eugene	Schoephoester Road	Windsor Locks	CT	06096
Dulles, John	45020 Aviation Drive	Sterling	VA	20166
Hartsfield, William	6000 North Terminal Parkway	Atlanta	GA	30320
LaGuardia, Fiorello	Hangar Center, Third Floor	Flushing		
Lambert, Albert	10701 Lambert International Blvd.	St. Louis		
Logan, Edward	1 Harborside Drive	East Boston		
O'Hare, Edward "Butch"	10000 West O'Hare	Chicago		

Customer Details

Cancel Create Customer

\* First Name

\* Last Name

Street Address

Line 2

City

\* State - Choose State -

\* Postal Code

Email

Phone Number

Alternate Number

\* Credit Limit

On Cancel, another page is rendered.

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In the example in the slide, one page redirects to another page. When you click the Create Customer button, the page is submitted and a branch to a form page is invoked.

When you click the Cancel button on the form page, you are redirected to the previous page. Nothing is submitted, so there is no page processing.

## Scenario 2: Page Processes

Search  Display 15

Report 1

EMPLOYEE_ID	FIRST_NAME	LAST_NAME	EMAIL	PHONE_NUMBER	HIRE_DATE	JOB_ID
100	Steven	King	SKING	515.123.4567	17-JUN-1987	AD_PRES
101	Neena	Kochhar	NKOCHHAR	515.123.4568	21-SEP-1989	AD_VP
102	Lex	De Haan	LDEHAAN	515.123.4569	13-JAN-1993	AD_VP
103	Alexander	Hunold	AHUNOLD	590.423.4567	03-JAN-1990	IT_PROG
104	Bruce	Ernst	BERNST	590.423.4568	21-MAY-1991	IT_PROG
105	David	Austin	DAUSTIN	590.423.4569	25-JUN-1997	IT_PROG
106	Valli	Pataballa	VPATABAL	590.423.4560	05-FEB-1998	SA_REP
107	Diana	Lorentz	DLORENTZ	590.423.5567	07-FEB-1999	IT_PROG
108	Nancy	Greenberg	NGREENBE	515.124.4569	17-AUG-1994	FI_MGR
109	Daniel	Faviet	DFAVIET	515.124.4169	16-AUG-1994	FI_ACCOUNT
110	John	Chen	JCHEN	515.124.4269	28-SEP-1997	FI_ACCOUNT

### Session State

Nancy

When you click Go, the page is submitted and the value is stored in a session.

When the same page is rendered, rows that match the session state value are displayed.

Search  Display 15

Report 1








EMPLOYEE_ID	FIRST_NAME	LAST_NAME	EMAIL	PHONE_NUMBER	HIRE_DATE	JOB_ID
108	Nancy	Greenberg	NGREENBE	515.124.4569	17-AUG-1994	FI_MGR

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In the example in the slide, you have a report with a search bar. When you enter a search criterion and click the Go button, the page is submitted. A process stores the search value in a session state and a branch to the same page is invoked. When the page is displayed again, a process runs to display only those rows that match the value stored in the session state.

## Scenario 3: Page Processes

	Customer Name	Address	City	State	ZIP Code
	Bradley, Eugene	Schoephoester Road	Windsor Locks	CT	06096
	Dulles, John	45020 Aviation Drive	Sterling	VA	20166
	Hartsfield, William	6000 North Terminal Parkway	Atlanta	GA	30320
	LaGuardia, Fiorello	Hangar Center, Third Floor	Flushing		
	Lambert, Albert	10701 Lambert International Blvd.	St. Louis		
	Logan, Edward	1 Harborside Drive	East Boston		
	O'Hare, Edward "Butch"	10000 West O'Hare	Chicago		

The session value is used to fetch the row.

### Session State

ID

When you click Edit, the ID value is stored in session state, and the page is redirected.

Customer Details

Cancel Delete **Apply Changes**

\* First Name

\* Last Name

Street Address

Line 2

City

\* State

\* Postal Code

Email

Phone Number

Alternate Number

\* Credit Limit

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This slide explains another scenario to understand page processing. In this example, you have an editable reports page. When you click the Edit icon for a row in the report, the ID value for the row is stored in session state and you are redirected to a forms page. When the form page is displayed, a process runs to fetch the row details by using the ID value stored in the session state.

## Scenario 4: Page Validation

Customer Details

Cancel Delete **Apply Changes**

\* First Name Eugene

\* Last Name Bradley

Street Address Schoephoester Road

Line 2

City Windsor Locks

\* State Connecticut

\* Postal Code 06096

Email

Phone Number (860) 555-1835

Alternate Number

\* Credit Limit 1000

1 error has occurred

- Credit Limit must not exceed \$5,000. ([Go to error](#))

If you get an error, a message is displayed on the same page, and no processing or computation occurs.

On success, the insert row process is executed, and another page is displayed.

Customer Record Processed.

Q- Go Actions Upload Data **Create Customer >**

Customer Name	Address	City	State	ZIP Code
Bradley, Eugene	Schoephoester Road	Windsor Locks	CT	06096
Dulles, John	45020 Aviation Drive	Sterling	VA	20166
Hartsfield, William	6000 North Terminal Parkway	Atlanta	GA	30320
LaGuardia, Fiorello	Hangar Center, Third Floor	Flushing	NY	11371
Lambert, Albert	10701 Lambert International Blvd.	St. Louis	MO	63145
Logan, Edward	1 Harborside Drive	East Boston	MA	02128
O'Hare, Edward "Butch"	10000 West O'Hare	Chicago	IL	60666

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In the example in the slide, you have a forms page. You enter the form details and click the Apply Changes button. The page is submitted and the validations that are created for the page are executed. If you entered data as required by the form and all validations run without error, a success message is displayed. In this example, an insert row process is executed and you are redirected to another page with a success message displayed in the notification area. If any validation fails, an error message is displayed.

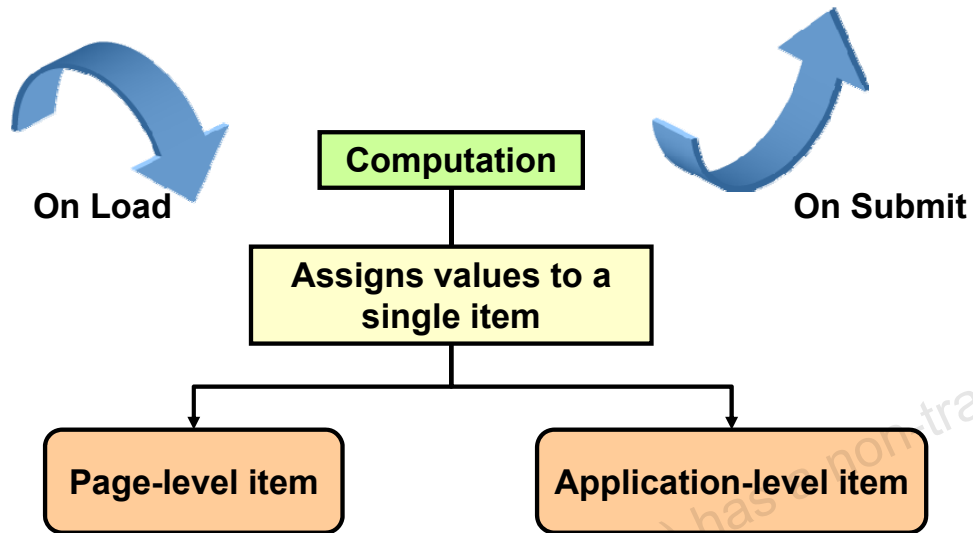
# Lesson Agenda

- Introducing Page Processing
- Including Computations
  - What Is a Computation?
  - Computation Use Cases
  - Creating an On Load Computation
  - Creating an On Submit Computation
- Including Processes
- Including Validations
- Including Branches

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# What Is a Computation?



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A computation is a logic that assigns values to a single item. You can create computations that are executed when a page is rendered or when a page is processed. You can use computations on page items and application-level items. Application-level computations assign a value to an application item when any page in an application is rendered or processed. A typical use of application computation is to store the number of the last page visited. In contrast, page-level computations assign a value to an identified item when a page is displayed or submitted (rendered or processed). The following slides discuss how to create page computations.

# Computation Examples

- Page-rendering computations
  - You want to retrieve values (such as total order or existing orders) from the database when a page is displayed.
  - You want to set the value of an item, depending on the existing values in the database or on some conditions.
- Page-processing computations
  - You want to store the values that are entered in two or more fields in a form in a single database column.
  - You want to perform calculations (such as handling fees) based on the values (the order) entered in a form.

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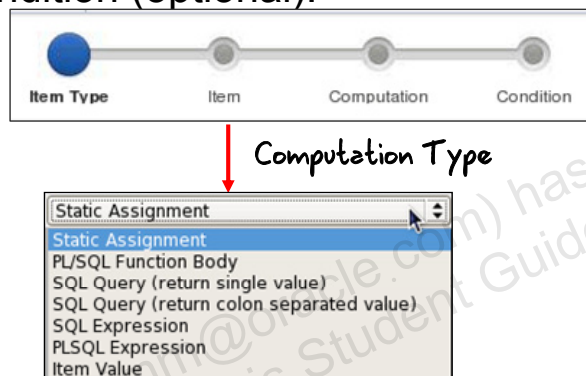
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The slide lists some scenarios when you can create page rendering or page-processing computations.

# Creating Computations

Access the Create Computation Wizard, and then perform the following steps:

1. Specify the item type.
2. Select the item, computation point, and computation type.
3. Enter the computation.
4. Specify a condition (optional).



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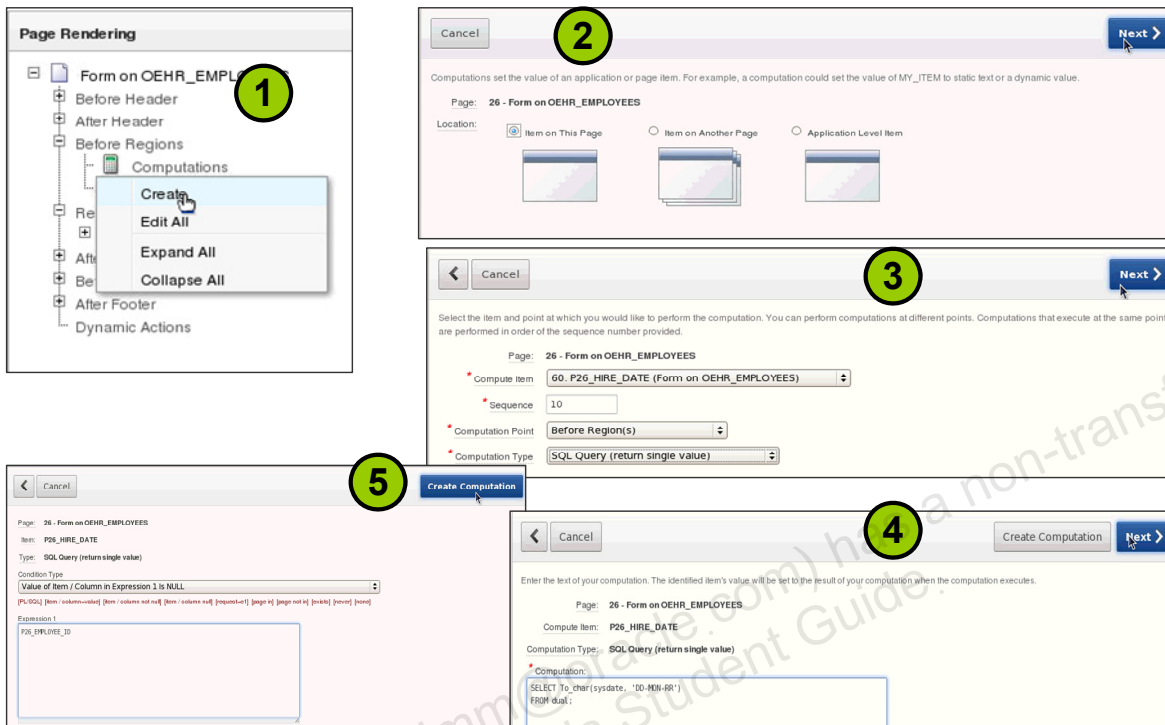
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To access the Create Computation Wizard in the Tree view, identify the node where you want to create the computation. For example, before or after a header, region, or footer in the Page Rendering section or after submit in the Page Processing section. To access the wizard in the Component view, click the create icon in the Computation section of page rendering or page processing.

To create a computation, perform the following steps:

1. Identify whether the item on which you want to create a computation is an item on the current page or a different page, or is an application item. Click Next.
2. Select the item from the list on which you want to create a computation. Specify whether the computation should be executed before or after the header, region, or footer or on submit. Select On New Instance if you want the computation to be executed for each new session. Select the type of computation that you want to create. Click Next.
3. Enter the computation to be executed. The syntax of the computation should correspond to the computation type that you selected in step 2. Click Next.
4. Optionally, add a condition. The computation will be executed only when the condition is met. Click Next.

# Creating a Page-Rendering Computation



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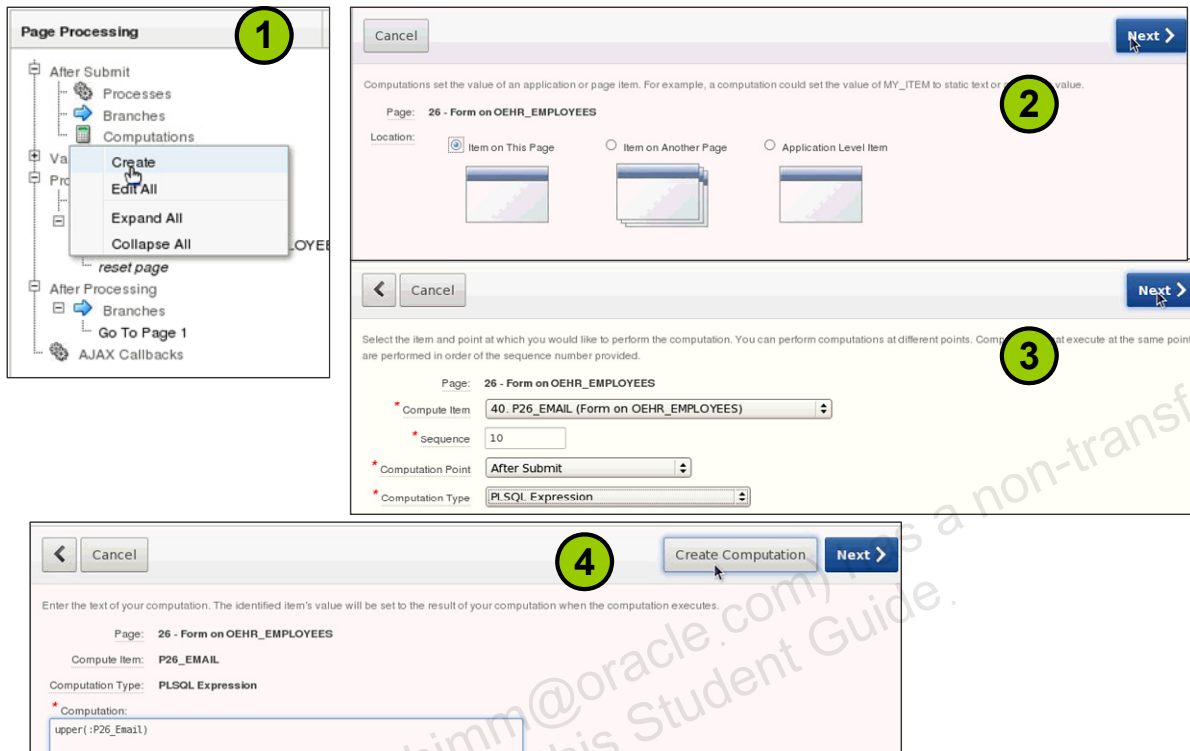
In this example, you create a computation before the regions are rendered to set the value of the hire\_date field to the current date. To create this page-rendering computation, perform the following steps:

1. Right-click Computation under the Before Regions node in the Page Rendering section and select Create.
2. Select "Item on This Page." Click Next.
3. Select P<n>\_HIRE\_DATE for Compute Item. Select SQL Query for Computation Type. Click Next.
4. In the Computation field, enter `TO_CHAR(sysdate, 'DD-Mon-RR')` and click Create.

The Computation is created and is listed under the Computations node.

When the hire\_date item is created by the Create Form Wizard, the default value of the item Source Used is "Always, replacing any existing value in the session state." For this example to work, you need to change this to "Only when current value in session state is null."

# Creating a Page-Processing Computation



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You can define the computations to be performed when the page is submitted from the Computations region of the Page Processing section. This computation is different from the computations of the page-rendering process.

In this example, you want to specify that P<n>\_CUST\_EMAIL that is entered should be stored in the database in uppercase. To create this page-processing computation, perform the following steps:

1. Right-click Computation under the After Submit node in the Page Processing section and click Create.
2. Select "Item on This Page" and click Next.
3. Select P<n>\_EMAIL for Compute Item, PLSQL Expression for Computation Type, and click Next.
4. In the Computation field, enter `upper (:P<n>EMAIL)`. In this example, you do not want any conditions. Click Create to create the computation. (To specify a condition, click Next.)

The Computation is created and is listed under the Computations node.

You can view the demonstration of an example about computation by opening the `/home/oracle/labs/demos/les10_computation.html` file.

## Quiz

Which of the following computation points would you select to execute the computation before the page is rendered?

- a. On New Instance
- b. Before Header
- c. After Header
- d. After Submit

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**Answer: b**

# Lesson Agenda

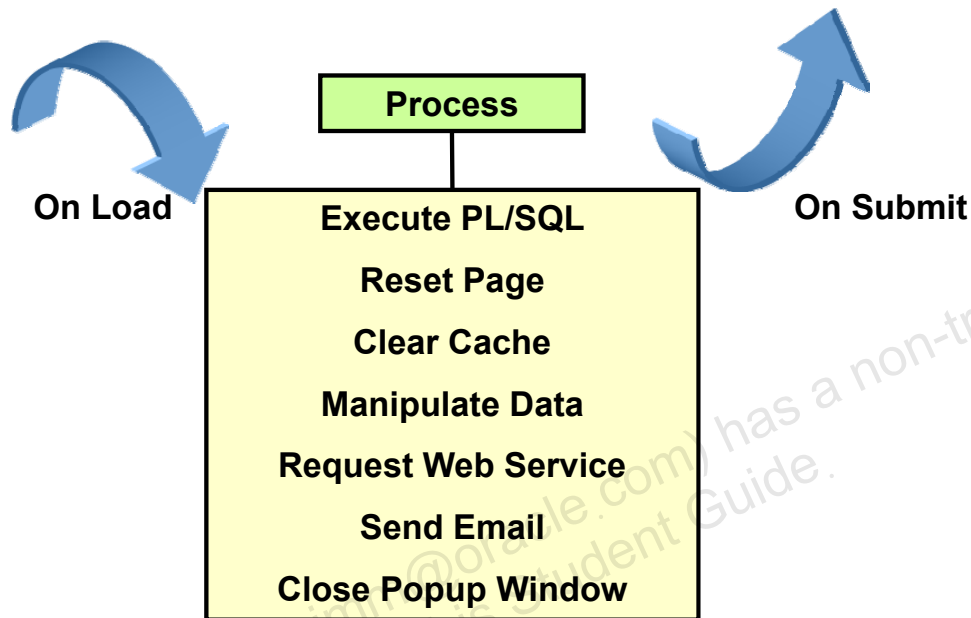
- Introducing Page Processing
- Including Computations
- Including Processes
  - What Is a Page Process?
  - Reviewing Automatically Created Processes
  - Creating an On Load Process
  - Creating an On Submit Process
  - Options to Populate Items in a Form
  - Creating a Tabular Form Process
- Including Validations
- Including Branches

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# What Is a Page Process?

A page process is used to perform a specific action when a page is rendered or submitted.



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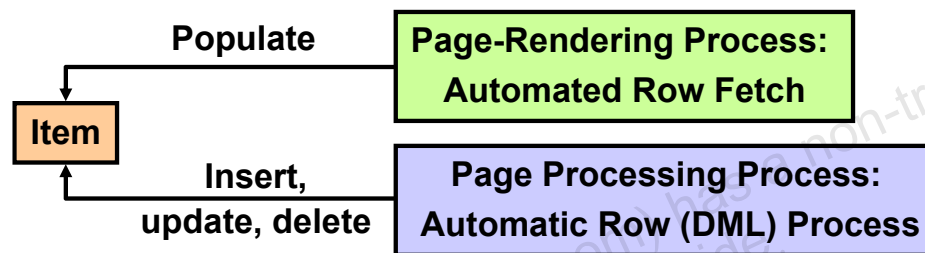
A page process is a specific event that runs when a page is loaded or submitted. You create a page process to execute some code (such as SQL or PL/SQL) or to make a call to the rendering engine. For example, you create a page process to alter data through an `INSERT`, an `UPDATE`, or a `DELETE` statement.

When you use wizards, such as Create Report or Create Form, some processes are automatically created. For example, a process to insert, update, or delete a row from the database is created when the user clicks the appropriate button. The next few slides discuss some automatically created processes.

# Automatic Processing Processes

Oracle Application Express provides automatic data manipulation language (DML) processing.

- You are not required to provide any SQL code.
  - Just reference a database column.
- The processes automatically perform lost update detection.



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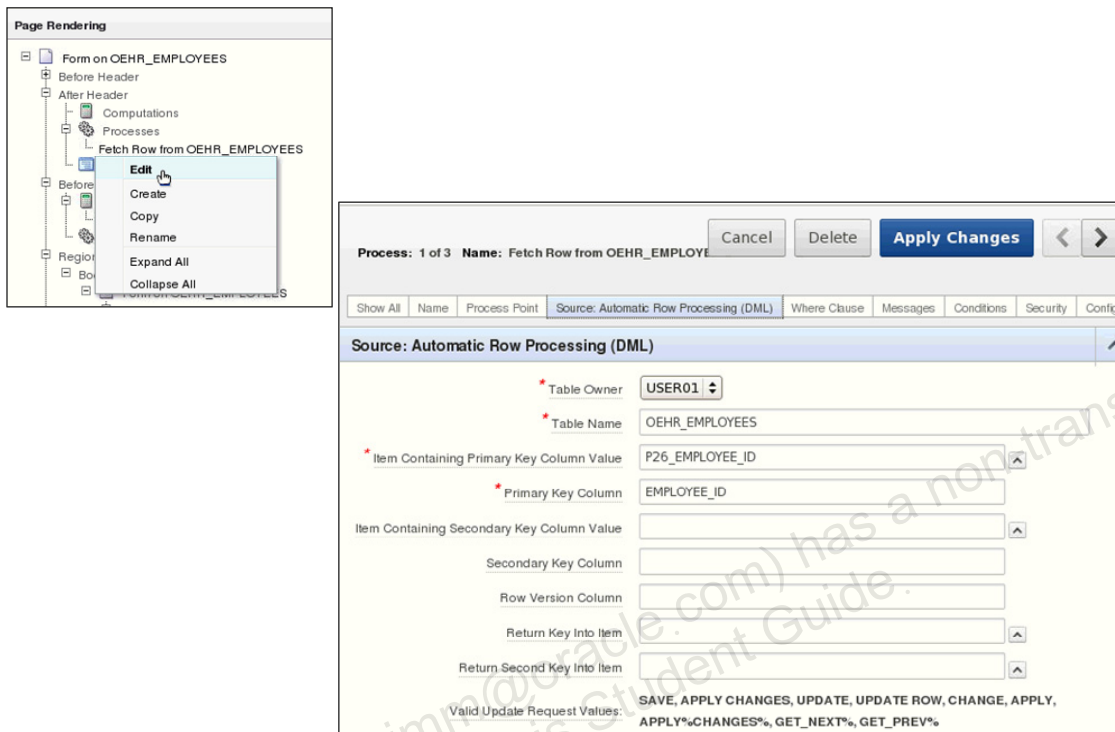
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When you create a form by using the Create Form Wizard, the wizard creates two processes:

- The Automated Row Fetch process that is executed when a page is rendered. This process populates the items by fetching data from the database.
- The Automatic Row (DML) process that is executed when a page is submitted. This process updates the database by using the `INSERT`, `DELETE`, or `UPDATE` command.

These processes are automatic in that you must specify only the database column names and not any SQL code. They also perform lost update detection. Lost update detection ensures that data integrity in applications is maintained where data can be accessed concurrently.

# Reviewing an Automated Row Fetch Process



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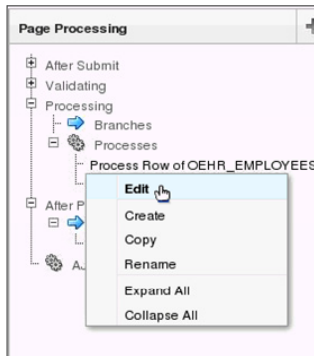
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An Automated Row Fetch process populates the fields in a form by retrieving data from a database table, by using a primary key column value.

To view an Automated Row Fetch process, navigate to the page definition of the page that contains a form created by the Create Form Wizard. Perform the following steps:

1. In the Page Rendering section, right-click "Fetch Row from <table\_name>" under the After Header node and select Edit.
2. The Edit Page Process page opens. You can view the process details. Click the Source tab. The table name, item name, and column name are listed.

# Reviewing an Automatic Row (DML) Processing Process



Field	Value
Table Owner	USER01
Table Name	OEHR_EMPLOYEES
Item Containing Primary Key Column Value	P26_EMPLOYEE_ID
Primary Key Column	EMPLOYEE_ID
Item Containing Secondary Key Column Value	
Secondary Key Column	
Row Version Column	
Allowed Operations	<input checked="" type="checkbox"/> Insert <input checked="" type="checkbox"/> Update <input checked="" type="checkbox"/> Delete
Return Key Into Item	
Return Second Key Into Item	
Valid Update Request Values	SAVE, APPLY CHANGES, UPDATE, UPDATE ROW, CHANGE, APPLY, APPLY%CHANGES%, GET_NEXT%, GET_PREV%
Valid Insert Request Values	INSERT, CREATE, CREATE_AGAIN, CREATEAGAIN
Valid Delete Request Values	DELETE, REMOVE, DELETE ROW, DROP

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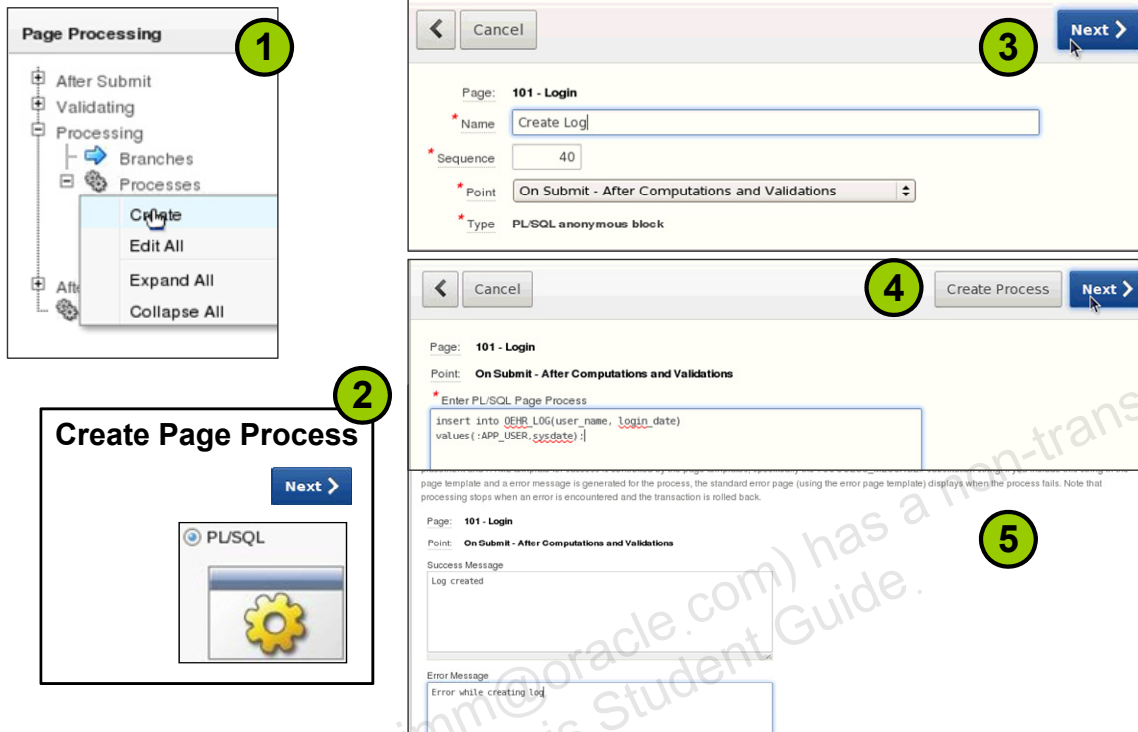
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An Automatic Row Processing (DML) process updates the database.

To view an Automated Row (DML) process, navigate to the page definition of the page that contains a form created by the Create Form Wizard. Perform the following steps:

1. In the Page Processing section, right-click "Process row of <table\_name>" under the Processing node and select Edit.
2. The Edit Page Process page opens. You can view the process details. Click the Source tab. The table name, item name, column name, and the operations that are allowed on the table are listed.

# Creating an On Submit Process



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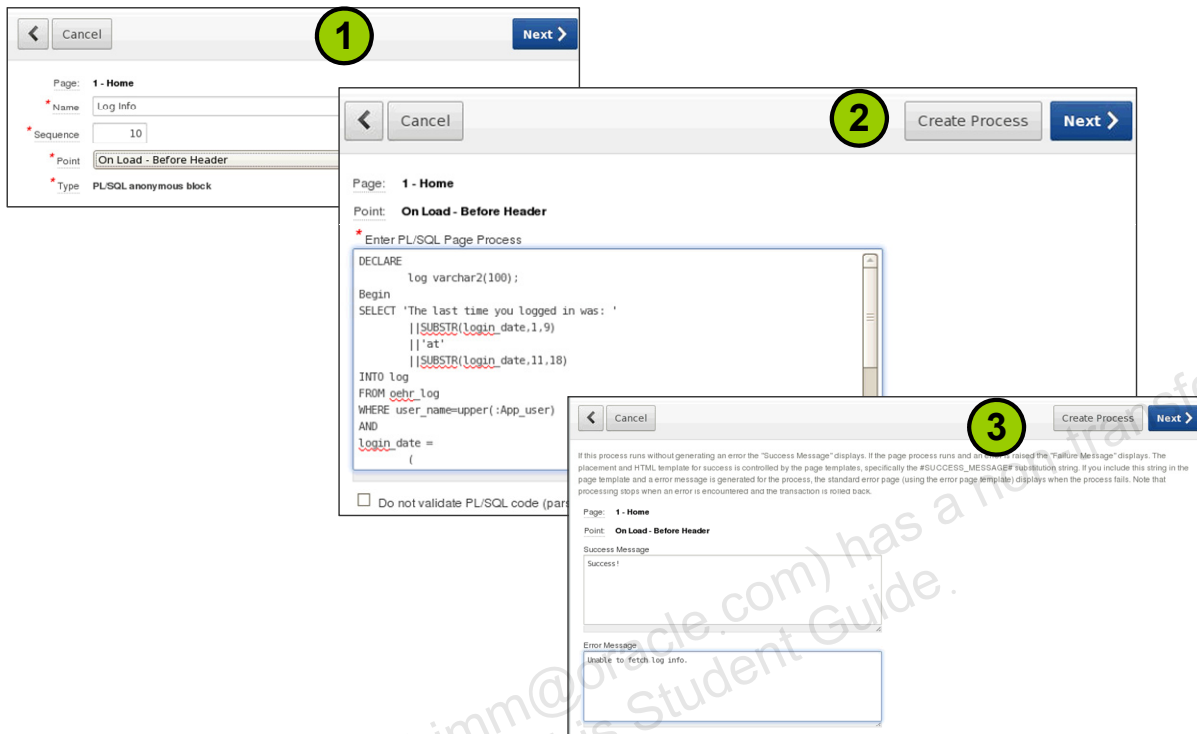
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In this example, you create an On Submit process to perform a logging function. Whenever users log in to the application, you want to store the user's name, and the login date and time in a database table. To create the page process, perform the following steps:

1. From the page definition for the Login page, right-click the Processes node under Processing in the Page Processing section and select Create.
2. Select PL/SQL for process type and click Next.
3. Enter a name for your process and accept the other default values. Click Next.
4. Enter the PL/SQL code in the text area. In this example, an `INSERT` command to enter the application username (`:APP_USER`) and the date/time information (`sysdate`) into an `OEHR_LOG` table is entered.
5. Enter the Success and Failure messages. Click Create Process. Optionally, you can specify a condition for executing the process by clicking Next.

You can view the demonstration of creating an On Submit process by opening the `/home/oracle/labs/demos/les10_processes.html` file.

# Creating an On Load Process



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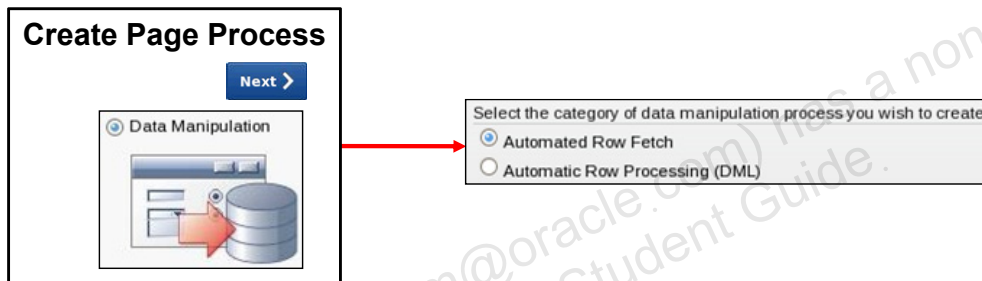
In this example, you create an On Load process to retrieve the date and time that a user last logged in to the application. To create the page process, navigate to the page definition for the page where you want to display the details. Right-click the Processes node under Before Regions in the Page Rendering section and select Create. Select PL/SQL for the process type, click Next, and then perform the following steps:

1. Enter a name for your process and accept the other default values. Click Next.
2. Enter the PL/SQL code in the text area. In this example, a `SELECT` query to retrieve the date and time that the user last logged in is entered.
3. Enter the Success and Failure messages. Click Create Process. Optionally, you can specify a condition for executing the process by clicking Next.

## Options to Populate Items in a Form

Items in forms are populated in one of the following ways:

- Create a form by using the wizard, and an Automated Row Fetch process is created automatically.
- Create a page-rendering process manually and define the type as Automated Row Fetch.
- Populate the form manually by referencing an item in a session state.



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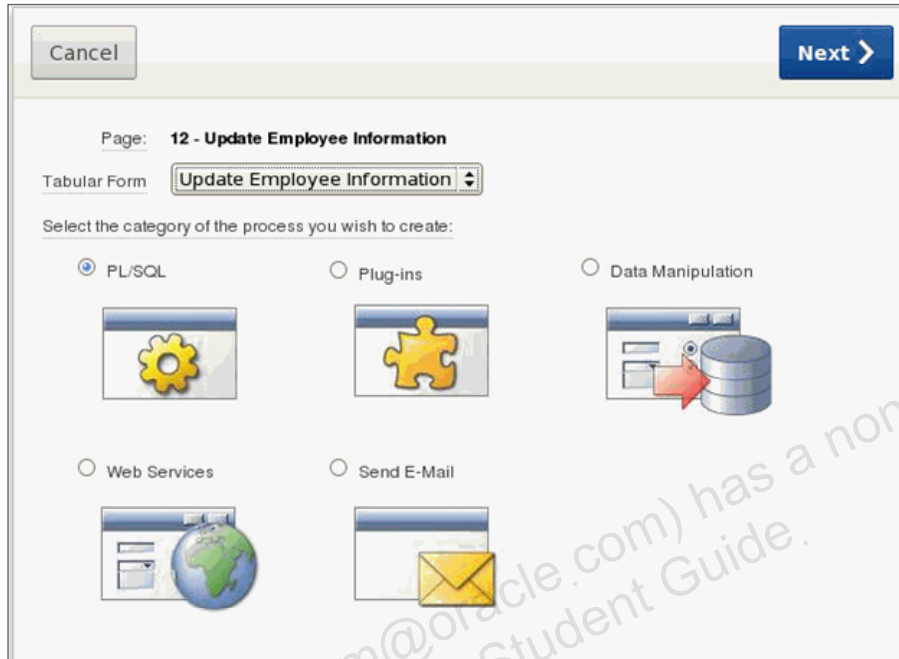
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In the previous slides, you reviewed the Automated Row Fetch process and also saw how to create a page process. To populate items in a form, you can use the Create Form Wizard so that the wizard automatically creates the required processes for you. Using the Create Form Wizard was covered in the lesson titled “Creating Forms.”

You can also create your own process. For this, you must select the Data Manipulation process type in the Create Page Process Wizard. You can then use the available options to create an automated process.

Alternatively, you can also populate the form manually by referencing an item in a session state.

# Creating a Tabular Form Process



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You can create processes on tabular forms. Perform the following steps:

1. Navigate to the page definition where the tabular form is created.
2. Select the Processes node, depending on when you want the process to execute.
3. Right-click the Processes node and select Create.
4. Select the tabular form from the Tabular Form list.
5. Select the type of process that you want to create and follow the wizard instructions.

# Lesson Agenda

- Introducing Page Processing
- Including Computations
- Including Processes
- Including Validations
  - What Are Validations?
  - Using the Create Validation Wizard
  - Creating a SQL Validation
  - Creating a PL/SQL Validation
  - Creating an Item String Comparison Validation
  - Creating a Regular Expression Validation
  - Creating a Tabular Form Validation
- Including Branches

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# What Are Validations?

The screenshot shows a web form for 'Order Management' with a 'Customer Details' section. A modal dialog box is open, indicating two validation errors:

- Last Name must have some value. ([Go to error](#))
- Credit Limit should be less than 5000 ([Go to error](#))

The form fields and their values are:

Field	Value
First Name *	Diane
Last Name *	
State	MI
Postal Code	48933
Email	Diane.Higgins@TANAGER.COM
Credit Limit	6000

Red text messages indicate the errors: 'Last Name must have some value.' and 'Credit Limit should be less than 5000'. The form also includes 'Cancel', 'Delete', and 'Create Customer' buttons.

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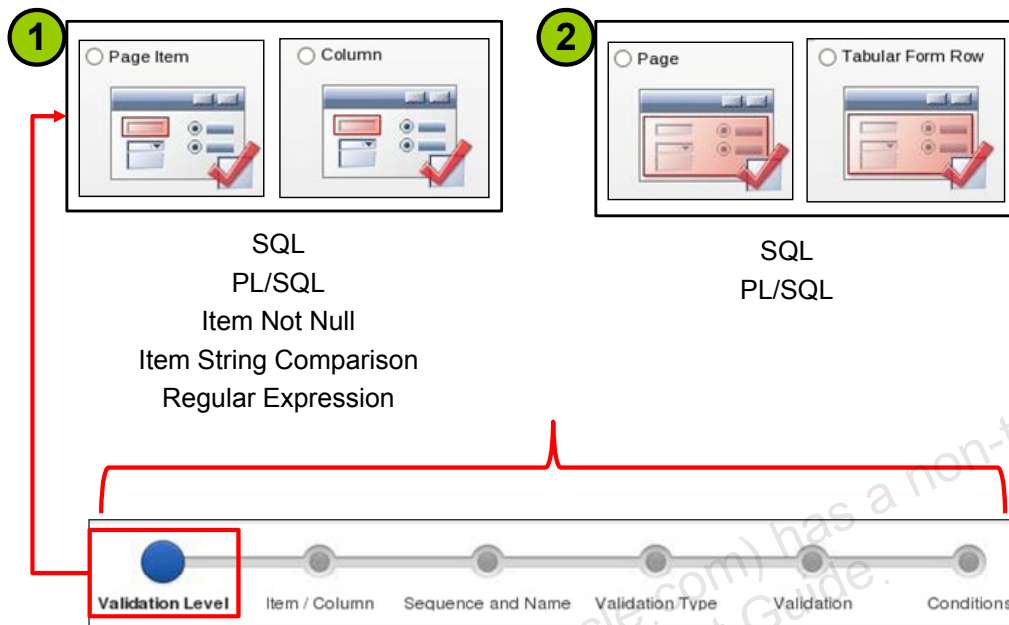
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A validation is a logical control to verify data. You create validations to ensure that an application user enters valid and accurate data. If all the validations created on the page succeed, Oracle Application Express proceeds to the next step of processing; otherwise, Oracle Application Express redraws the page and displays the items along with the validation messages.

When you use the Create Form Wizard, some validations are automatically created. For example, a Not Null validation is created for items that refer to a database column that is defined as Not Null. Similarly, if the database column is of type NUMBER, a validation to confirm that only numeric values are entered is created.

The slide example shows a form created by using the Create Form Wizard. The Not Null validations are created automatically by the wizard. The form also displays a red symbol for items that have their columns set as Not Null. A validation for the Credit Limit field is manually created to ensure that a value higher than 5000 is not entered.

# Using the Create Validation Wizard



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You can define a validation declaratively by using the Create Validation Wizard. To access the Create Validation Wizard, navigate to the page definition of the page where you want to create the validation. In the Page Processing section, right-click Validations under the validating node and select Create.

You can create two types of validations, depending on your form type:

- **Page Item/Column validation:** This validation is specific to a single item. If you select this option, the items on the current page are listed and you can choose the item that you want to validate. You can select from five methods, as listed in the slide, to define the validation. In the next few slides, you will see the creation of validations by using four of the methods. How to create a Not Null validation is not discussed. You can actually specify an item to be Not Null in the attributes of the item itself. If your form is a tabular form, you can create a validation on an entire column.
- **Page/Tabular Form Row validation:** This validation does not apply to any single item. It applies to an entire page. For a tabular form, it applies to a row. These validations can be of type SQL or PL/SQL.

The validation that you enter must be consistent with the validation type that you select.

# SQL Validation: Example

Create a validation to ensure that the salary entered is not a negative number.

The screenshot shows a web form titled "OEHR Employees" with a "Cancel" and "Create" button. The form contains several input fields: First Name (Jackson), Last Name (Lord), Email (JACKSON.LORD@ORACLE.COM), Phone Number, Hire Date (12-Oct-11), Salary (-250), Commission Pct, Manager Id, Department Id, and Job Id (AC\_ACCOUNT). A red error message box at the top states "1 error has occurred" with the message "Salary should be greater than zero! (Go to error)". A red asterisk is next to the Last Name and Hire Date fields. A red asterisk and the error message "Salary should be greater than zero!" are next to the Salary field.

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In this example, you create a validation to ensure that the value entered in the Salary field is not a negative value. You will display the error message in the notification area and next to the Salary item.

# Creating a SQL Validation

The image shows four sequential screenshots of the Oracle APEX 'Create Validation' wizard, numbered 1 through 4.

- Screenshot 1:** Shows the 'Create Validation' dialog. The 'Page' is 5 and the 'Item' is P5\_SALARY. The 'Sequence' is 10. The 'Validation Name' is 'Salary not negative'. The 'Error Display Location' dropdown is open, showing options: 'Inline with Field and in Notification' (selected), 'Inline with Field', 'Inline in Notification', and 'On Error Page'. A handwritten note says 'Select where to display the error.' with an arrow pointing to the selected option.
- Screenshot 2:** Shows the 'Select a validation type' screen. The 'SQL' radio button is selected. Other options include 'Not Null', 'String Comparison', 'Regular Expression', and 'PL/SQL'. A handwritten note '2' is next to the screen.
- Screenshot 3:** Shows the 'Pick the type of validation you wish to create' screen. The 'SQL Expression' radio button is selected. Other options are 'Exists' and 'NOT Exists'. A handwritten note '3' is next to the screen.
- Screenshot 4:** Shows the 'Create Validation' dialog with the 'Validation Code' field containing ':P5\_SALARY > 0' and the 'Error Message' field containing 'Salary should be greater than zero!'. A handwritten note '4' is next to the screen. Another note says 'Enter the validation.' with an arrow pointing to the code field, and 'Enter the error message.' with an arrow pointing to the error message field.

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To create a SQL validation, access the Create Validation Wizard. Select Page Item Validation and click Next. Select the salary item and click Next. Perform the following steps:

1. Enter a name for the validation and from the Error Display Location drop-down list, select a location to display the error. In this example, "Inline with Field and in Notification" is selected. Click Next.
2. Select SQL and click Next.
3. Select the type of SQL validation that you want to create and click Next. In this example, SQL Expression is selected.
4. Enter the validation and the error message. In this example, the value of the salary item should be greater than zero. Therefore, `:P<n>_SALARY > 0`; is entered. Click Create.

Run the form and fill in the details. In the Salary field, enter a negative number and click Apply Changes. You should get an error message in the notification area and next to the Salary item.

## PL/SQL Validation: Example

Create a validation to calculate the maximum salary and to ensure that the salary entered is not more than 10% of the maximum salary.

The screenshot shows a web form for 'OEHR Employees'. At the top, a red box indicates '1 error has occurred'. The form fields are as follows:

Field	Value
First Name	Jackson
* Last Name	Lord
* Email	JACKSON.LORD@ORACLE.COM
Phone Number	
* Hire Date	12-Oct-11
Salary	100000
Commission Pct	
Manager Id	
Department Id	
Job Id	AC_ACCOUNT

A red error message 'Salary entered is out of range.' is displayed next to the Salary field.

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In this example, you want to make sure that the salary entered is not higher than 10% of the maximum salary. You will display the error message only next to the Salary item.

# Creating a PL/SQL Validation

The image displays four sequential screenshots of the Oracle Create Validation Wizard, numbered 1 through 4.

- Screenshot 1:** Shows the initial step where the user specifies the validation sequence and location. The "Validation Name" is "Calculate Salary" and the "Error Display Location" is "Inline with Field and in Notification".
- Screenshot 2:** Shows the selection of a validation type. The "PL/SQL" option is selected.
- Screenshot 3:** Shows the selection of the validation type. The "Function Returning Boolean" option is selected.
- Screenshot 4:** Shows the final step where the user enters the validation code and the error message. The validation code is:

```
for c1 in (select max(salary) max_sal from oehr_employees)
loop
  if :P27_SALARY <= c1.max_sal * 1.1
  then return true;
  else return false;
end if;
end loop;
```

The error message is "Salary entered is out of range".

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To create a PL/SQL validation, access the Create Validation Wizard. Select Page Item Validation and click Next. Select the salary item and click Next. Perform the following steps:

1. Enter a name for the validation, and from the Error Display Location drop-down list, select a location to display the error. In this example, "Inline with Field and in Notification" is selected. Click Next.
2. Select PL/SQL and click Next.
3. Select the type of PL/SQL validation that you want to create and click Next. In this example, Function Returning Boolean is selected.
4. Enter the validation code and the error message. In this example, the maximum salary is retrieved. The value entered in the Salary field is compared to a value 10% higher than the maximum salary. If the entered salary is less than the calculated value, `true` is returned; otherwise, `false` is returned. Click Create.

Run the form and fill in the details. In the Salary field, enter 100000 and click Apply Changes. You should get an error message next to the Salary item.

## Item String Comparison Validation: Example

Create a validation to ensure that the specified special characters are not entered in the Email field.

The screenshot shows a web form titled "OEHR Employees" with a "Cancel" and "Create" button. The form contains several input fields: First Name (Jackson), Last Name (Lord), Email (JACKSON-LORD@ORACLE.COM), Phone Number, Hire Date (12-Oct-11), Salary (2000), Commission Pct, Manager Id, Department Id, and Job Id Id (AC\_ACCOUNT). A notification box at the top displays the message: "1 error has occurred" and "You can not specify special characters. (Go to error)".

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In this example, you want to make sure that the Email field does not contain special characters, which are ' , " , \* , & , ^ , \$ , # , - , and | . You will display the error message only in the notification area.

# Creating an Item String Comparison Validation

The image displays four sequential screenshots of the Oracle Create Validation Wizard, numbered 1 through 4.   
Screenshot 1: Shows the 'Specify the sequence in which your validation executes' screen. The 'Page' is 27, 'Item' is P27\_EMAIL, and 'Sequence' is 20. The 'Validation Name' is 'No special characters in email'. The 'Error Display Location' is set to 'Inline with Field and in Notification'.   
Screenshot 2: Shows the 'Select a validation type' screen. The 'Page' is 27 - OEHR\_EMPLOYEES, and 'Item' is P27\_EMAIL. The 'String Comparison' radio button is selected.   
Screenshot 3: Shows the 'Pick the type of validation you wish to create' screen. The 'Item / Column in Expression 1 does not contain any of the characters in Expression 2' radio button is selected.   
Screenshot 4: Shows the 'Create Validation' screen. The 'Validation Type' is 'Item / Column in Expression 1 does not contain any of the characters in Expression 2'. The 'Expression 2' field contains the special characters '!', '"', '\*', '&', '^', '\$', '#', '-', '|'. The 'Error Message' field contains 'You cannot specify special characters'. The 'Always Executes' dropdown is set to 'No'.

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To create an Item String Comparison validation, access the Create Validation Wizard. Select Page Item Validation and click Next. Select the email item and click Next. Perform the following steps:

1. Enter a name for the validation and from the Error Display Location drop-down list, select a location to display the error. In this example, "Inline in Notification" is selected. Click Next.
2. Select String Comparison and click Next.
3. Select the type of comparison that you want to perform and click Next. In this example, "Item in Expression 1 does not contain any of the characters in Expression 2" is selected.
4. Enter the special characters in the Validate String2 field. In this example, ('', '"', '\*', '&', '^', '\$', '#', '-', '|) are entered. Enter the error message text. Click Next.

Optionally, specify a condition and click Create. Run the form and fill in the details. In the Email field, enter `jackson-lord@aol.com` and click Apply Changes. You should get an error message in the notification area.

You can view the demonstration of this task by opening the `/home/oracle/labs/demos/les10_validations.html` file.

## Regular Expression Validation: Example

Create a validation to ensure that the phone number is entered in a particular format.

The screenshot shows a form titled "OEHR Employees" with fields for First Name, Last Name, Email, Phone Number, Hire Date, Salary, Commission Pct, Manager Id, Department Id, and Job Id. The Phone Number field contains "1003505555". An error message dialog box is displayed over the form, stating "Phone number must be in the form (999)999-9999".

Field	Value
First Name	Jackson
Last Name	Lord
Email	jackson.lord@oracle.com
Phone Number	1003505555
Hire Date	12-Oct-11
Salary	2000
Commission Pct	
Manager Id	
Department Id	
Job Id	AC_ACCOUNT

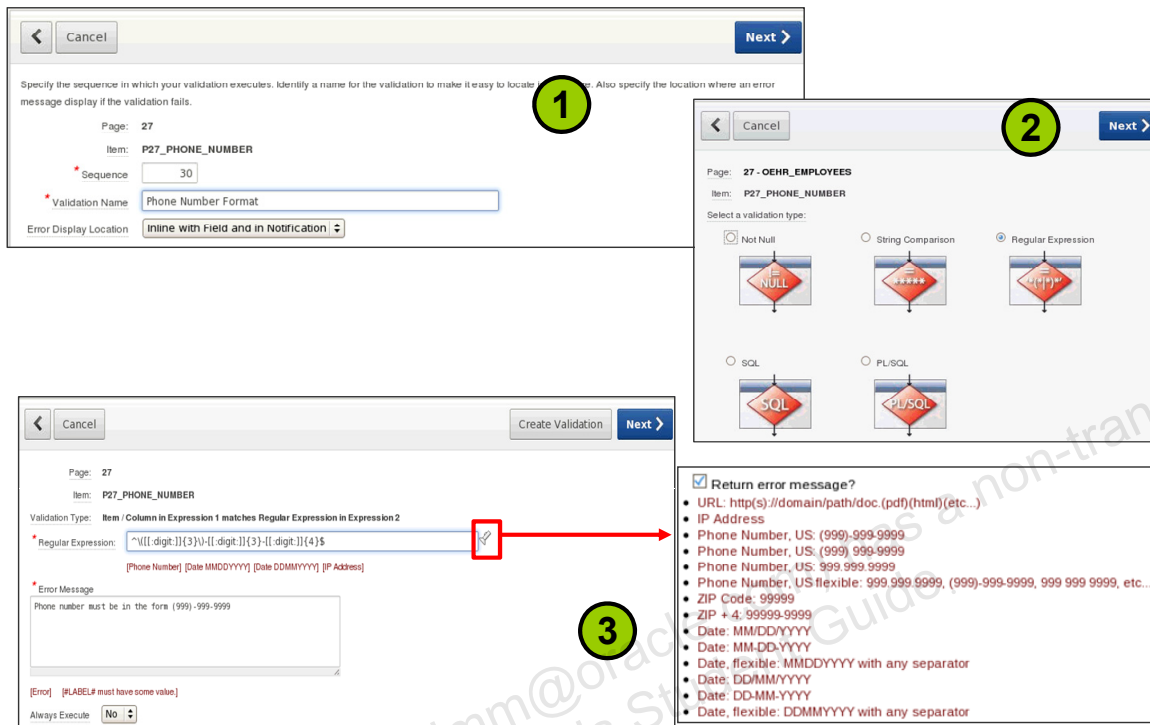
Phone number must be in the form (999)999-9999

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In this example, you want the phone number to be entered in this particular format: 999.999.9999. You will display the error message on the Error Page.

# Creating a Regular Expression Validation



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To create a Regular Expression validation, access the Create Validation Wizard. Select Item Level Validation and click Next. Select the phone number item and click Next. Perform the following steps:

1. Enter a name for the validation and select a location to display the error. In this example, "Inline with Field and in Notification" is selected. Click Next.
2. Select Regular Expression and click Next.
3. Select an expression. You can click the search icon next to the Regular Expression field and select an expression from the pop-up window. In this example, Phone Number , US , 999 .999 .9999 is selected. This specifies the format in which the phone number can be entered in this field. Enter the error message text. Click Create.

Run the form and fill in the details. In the Phone Number field, enter 100305000 or any other invalid format and click Apply Changes. The Error Page should appear and display the error message.

# Tabular Form Validation: Example

Create a validation to ensure that the value entered in the Email column has no spaces.

The screenshot shows a tabular form titled "Tabular Form" with a table containing employee data. An error message box at the top states "1 error has occurred" and "No spaces allowed in email. (Row 1)". The table has columns for Employee Id, First Name, Last Name, Email, Hire Date, Department Id, and Job Id Id. The first row (Employee Id 198) has the email "DO CONNELL" entered, which is highlighted in red. The other rows have valid email addresses.

Employee Id	First Name	Last Name	Email	Hire Date	Department Id	Job Id Id
<input type="checkbox"/> 198	Donald	OConnell	DO CONNELL	21-JUN-99	50	SH_CLERK
<input type="checkbox"/> 199	Douglas	Grant	DGRANT	13-JAN-00	50	SH_CLERK
<input type="checkbox"/> 200	Jennifer	Whalen	JWHALEN	17-SEP-87	10	AD_ASST
<input type="checkbox"/> 201	Michael	Hartstein	MHARTSTE	17-FEB-96	20	MK_MAN
<input type="checkbox"/> 202	Pat	Fay	PFAY	17-AUG-97	20	MK_REP
<input type="checkbox"/> 203	Susan	Mavris	SMAVRIS	07-JUN-94	40	HR_REP

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In this example, you want to ensure that the value entered in the Email column does not have any spaces.

**Note:** Remember that a Tabular Form Validation can be created only on a page that contains a tabular form. Also, when you create a tabular form by using a wizard, it automatically creates some validations (such as not null, column must be numeric, and valid date), based on the column definition in the database.

# Creating a Tabular Form Validation

The image displays four sequential screenshots of the Oracle APEX Create Validation Wizard, numbered 1 through 4.   
Screenshot 1: Shows the 'Specify the sequence in which your validation executes' screen. Fields include Page (22), Tabular Form (Update Email Address Information), Column (CUST\_EMAIL), Sequence (10), Validation Name (Email should not have space), and Error Display Location (Inline with Field and in Notification).   
Screenshot 2: Shows the 'Select a validation type' screen. Options include Not Null, String Comparison (selected), Regular Expression, SQL, and PL/SQL.   
Screenshot 3: Shows the 'Pick the type of validation you wish to create' screen. The selected option is 'Item / Column specified contains no spaces'.   
Screenshot 4: Shows the 'Specify the error message' screen. The Validation Type is 'Item / Column specified contains no spaces' and the Error Message is 'No spaces allowed in email.' The 'Always Execute' dropdown is set to 'No'.

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To create a Tabular Form validation, access the Create Validation Wizard. Select Tabular Form from the list. Select Column type and click Next. Select the email item and click Next. Perform the following steps:

1. Enter the validation name and select the location to display the error message. In this example, "Inline with Field and in Notification" is selected. Click Next.
2. Select a validation and click Next. In this example, String Comparison is selected.
3. Select the comparison type and click Next. In this example, "Column specified contains no spaces" is selected.
4. Specify the error message and click Next.

Specify a condition if necessary, and click Create. Run the page. In the Email field, for any row, enter a space in the value and click Apply Changes. The error message should be displayed in the notification area.

## Quiz

Which of the following is *not* a validation method?

- a. PL/SQL
- b. Item Level Null
- c. HTML
- d. Regular Expression

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**Answer: c**

# Lesson Agenda

- Introducing Page Processing
- Including Computations
- Including Processes
- Including Validations
- Including Branches
  - What Is Branching?
  - Creating a Branch

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# What Is Branching?

The page is submitted and a new page is displayed.

Customer Details

Cancel Delete Apply Changes

\* First Name Eugene  
\* Last Name Bradley  
Street Address Schoephoester Road  
Line 2  
City Windsor Locks  
\* State Connecticut  
\* Postal Code 06096  
Email  
Phone Number (860) 555-1835  
Alternate Number  
\* Credit Limit 1000

Customer Record Processed

Q- Go Actions Upload Data Create Customer >

Customer Name	Address	City	State	ZIP Code
Bradley, Eugene	Schoephoester Road	Windsor Locks	CT	06096
Dulles, John	45020 Aviation Drive	Sterling	VA	20166
Hartsfield, William	6000 North Terminal Parkway	Atlanta	GA	30320
LaGuardia, Fiorello	Hangar Center, Third Floor	Flushing	NY	11371
Lambert, Albert	10701 Lambert International Blvd.	St. Louis	MO	63145
Logan, Edward	1 Harborside Drive	East Boston	MA	02128
O'Hare, Edward "Butch"	10000 West O'Hare	Chicago	IL	60666

Home Customers Products Orders

Home

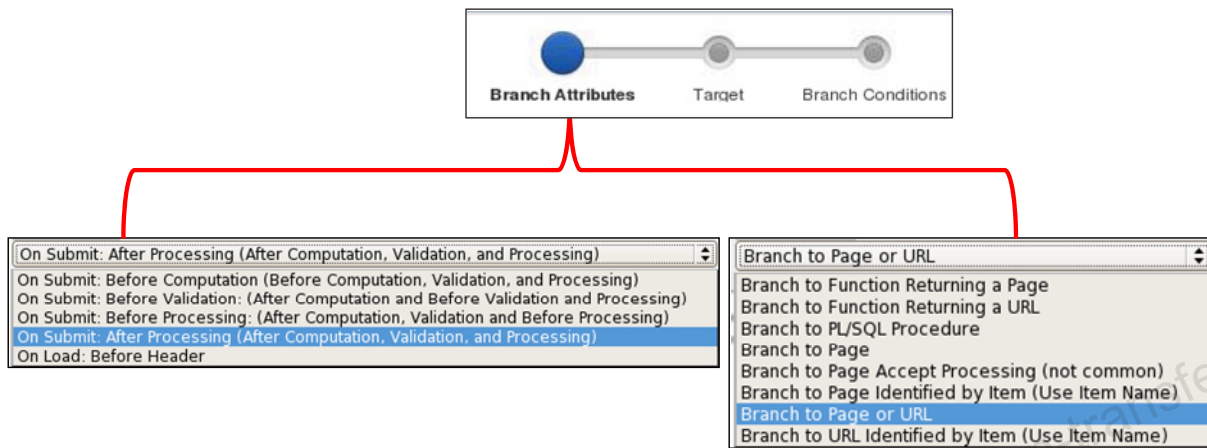
Redirect to another page

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A branch is an instruction executed in the Oracle Application Express engine to take the user from one page to another page, a URL, or a procedure. For example, you have a form page that accepts values from the user. After the form page is submitted, the Oracle Application Express engine executes the branch that navigates the user to another page. If the Cancel button is clicked, no processing occurs and the user is redirected to another page.

# Creating a Branch



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You can create a new branch by running the Create Page Branch Wizard and specifying the branch point and branch type. The branch points and branch types are shown in the slide. To access the Create Branch Wizard, right-click the branch node from the Page Processing section and click Create.

# Creating a Branch

1

2

3

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In this example, a branch to another page is created on submit, after computations, processes, and validations. To create the branch, access the Create Branch Wizard and perform the following steps:

1. Select the branch point and the branch type. Click Next.
2. Enter the page or URL to branch to. Click Next.
3. Specify conditions, if any, and click Create Branch.

## Summary

In this lesson, you should have learned to:

- Explain the difference between page rendering and page processing
- Create computations on application pages
- Create page processes
- Create validations to verify user input
- Create branches within an application

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This lesson explained the difference between page rendering and page processing. You should also have learned how to create computations, processes, and validations.

# Workshop 10 Overview: Creating and Manipulating Computations, Processes and Validations

This practice covers the following topics:

- Creating an On Load computation
- Creating an On Submit computation
- Creating an On Submit process
- Validating Form Items

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# 11

## Validating and Debugging Your Application

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# Objectives

After completing this lesson, you should be able to do the following:

- Use the Advisor to verify your application
- Manage user interface defaults by using the Attribute Dictionary
- Use the Debug option to debug your application

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In this lesson, you learn how to use the Advisor to verify your application, manage user interface defaults by using Attribute Dictionary and debug your applications using the Debug option.

# Lesson Agenda

- Using the Advisor
  - Resolving Advisor Errors/Warnings
- Managing Your Attribute Dictionary
- Using the Debug Option

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# Using the Advisor

Perform Check

Show All Checks to Perform Check Page(s)

**Checks to Perform**

**Errors:**

- References with Substitution Syntax
- References with Column Syntax
- References with Bind Variable Syntax
- Declarative References of Application Items, Page Items, Columns or Interactive Report Filters
- Referenced Page Number Exists
- Is Valid SQL or PLUSQL Code
- Fetch, DML, MR\* Processes are Valid
- Unconditional Branch before other Branches
- Referenced Button in When Button Pressed exists
- Button is not compatible with Dynamic Actions

**Performance:**

- V Function used in SQL Statements

**Usability:**

- Target Page Authorization is also set for Current Component
- Associated Item or Column

**Quality Assurance:**

- Hardcoded Application ID
- Report has Default Order
- Page Item has Help Text

**Security:**

- Target Page Authorization equals current Component Authorization
- Inappropriate use of Substitution Syntax

**Warnings:**

- Referenced Item is on Current Page
- Referenced Item is Page Item of Target Page
- References of Page Item in a String
- Clear Cache Page Number equals Target or Current Page
- Length of Item or Tabular Form Column Name
- Inconsistent references between Dynamic Actions and Buttons
- Protected Items in AJAX calls

Select All Deselect All

**Filter Result** Apply Filter

- Error (1)
- References with Substitution Syntax (1)
- Quality Assurance (18)
- Report has Default Order (5)
- Page Item has Help Text (13)

Applications > 108 - Order Management > Pages > 8 - Top Tier Salary > Regions > Top Tier Salary

Attribute	Region Source (Identifies the source of the region, reference Region Source Type)
Check	Report has Default Order
Category	Quality Assurance
Message	Report does not have a default order.
Value	<pre>select * from ( select OHR_EMPLOYEES.LAST_NAME as LAST_NAME, OHR_EMPLOYEES.EMAIL as EMAIL, OHR_FMS.OFFER_CAIARY as CAIARY from OHR_EMPLOYEES OHR_EMPLOYEES where OHR_EMPLOYEES.SALARY Between 5000 and 12000) where ( instr(upper("LAST_NAME"), upper(nvl(:PB_REPORT_SEARCH,"LAST_NAME"))) &gt; 0 or instr(upper("EMAIL"), upper(nvl(:PB_REPORT_SEARCH,"EMAIL"))) &gt; 0 )</pre>
View	

Applications > 108 - Order Management > Pages > 10 - Customer Address List > Regions > Customer Address List

Attribute	Region Source (Identifies the source of the region, reference Region Source Type)
Check	Report has Default Order
Category	Quality Assurance
Message	Report does not have a default order.
Value	<pre>SELECT "OHR_CUSTOMERS"."CUST_FIRST_NAME" "CUST_FIRST_NAME", "OHR_CUSTOMERS"."CUST_LAST_NAME" "CUST_LAST_NAME"</pre>

A list of issues is displayed based on your selections.

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Before deploying your application, you can use the Oracle Application Express Advisor (Advisor) to perform various sanity checks on your application.

The Advisor enables you to check the integrity and quality of your Oracle Application Express application. The Advisor functions like a compiler or LINT flagging suspicious behavior or errors. (LINT is a utility that examines and analyzes programs for style, usage, and portability issues.) By running the Advisor, you can check the integrity of your application based on the underlying metadata.

The Advisor performs several checks on your application or pages in your application, including programming errors, security issues, quality assurance, and other best practices.

After the Advisor is executed, your previous settings are recalled for the next use. You can also save the settings without executing by using the "Save as My Preferences" task in the Task menu.

To not perform a check on a particular violation, deselect the check box next to the violation. When there are no violations, you receive a message indicating that no errors or warnings were found.

In the example in the slide, you see that errors and quality assurance violations were found. You can click the View link for each violation to go to the page where you can correct the issue and then return to the Advisor to recheck. In the screenshot in the slide, a quality assurance anomaly was detected because there is a report that does not contain a default order.

Note that many of the checks are for informational purposes only and do not need to be resolved before deploying your application (unless you choose to do so).

To run the Advisor on an entire application, perform the following steps:

1. Navigate to your application.
  1. On the Workspace home page, click the Application Builder icon.
  2. Select your application.
2. Click Utilities.
3. Click Advisor.

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# Resolving Advisor Errors/Warnings

Region: 2 of 2 Name: Top Tier Salary

Page: 8 Top Tier Salary

Title: Top Tier Salary

Type: SQL Query

Specify a sort sequence for a column in your report.

Region Name: Top Tier Salary

Headings Type:  Column Names  Column Names (InitCap)  Custom  PL/SQL  None

Alias	Link	Edit	Heading	Column Width	Column Alignment	Heading Alignment	Show	Sum	Sort	Sort Sequence
LAST_NAME			LAST_NAME		left		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1
EMAIL			EMAIL		left		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.
SALARY			SALARY		left		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.

When moving the last column further down, it will show up as the first column of your report.  
When moving the first column up, it will be moved to the end of your report.

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You can click the View link (visible in the screenshot in the previous slide); the Report definition for the page is displayed. To define the sort sequence, click the Report Attributes tab and select the sort sequence for one of the columns (in this case, `FIRST_NAME`) and click Apply Changes. Rerun the Advisor to see that the violation is no longer in the list.

You can view the demonstration about using the Advisor by opening the `/home/oracle/labs/demos/les11_using_advisor.html` file.

## Quiz

You must resolve all errors and warnings before deploying your application.

- a. True
- b. False

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**Answer: b**

# Workshop 11-1 Overview: Using the Advisor

This workshop covers the following topics:

- Running the Advisor and correcting the warning
- Change the settings in the Advisor

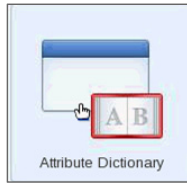
# Lesson Agenda

- Using the Advisor
- Managing Your Attribute Dictionary
  - Changing Item Properties
  - Review Items/Report Columns
  - Modifying Attributes in the Dictionary
- Using the Debug Option

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# Managing Your Attribute Dictionary



View a list of pages that contain items and report columns.

Page	Name	Page Type	Group Name	Displayed Items	Displayed Report Columns
0	Global Page - jQuery Mobile Smartphone	Global Page	Unassigned	0	0
1	Home	Home	Unassigned	0	0
2	Home	Navigation Page	Unassigned	0	0
3	Customers	Interactive Report	Unassigned	0	14
4	Employee Commission	Interactive Report	Unassigned	0	4
8	Top Tier Salary	Report	Unassigned	2	3
10	Customer Address List	Report	Unassigned	0	8
14	Items and Buttons	DML Form	Unassigned	11	0
15	Customer Details	DML Form	Unassigned	7	0
18	List of Orders	Report	Unassigned	0	7
19	Master Detail	DML Form	Unassigned	8	4
22	Update Email Address Information	Tabular Form	Unassigned	0	3
23	Global Page - Desktop	Global Page	Unassigned	0	0
25	Customer Feedback	Navigation Form	Unassigned	3	0
101	Login	Login	Unassigned	2	0
201	Employee List	Static HTML	Unassigned	0	0
202	Employee Detail	DML Form	Unassigned	10	0
1001	Login	Login	Unassigned	2	0

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The Attribute Dictionary contains a set of attributes about a column that are used in creating forms and reports. The definitions are matched by column name and a particular definition can be shared by several columns by using synonyms.

You can use Page Item and Report Column definitions to update the Attribute Dictionary. You can also use the Attribute Dictionary to update page items and report columns.

Hidden objects, those in hidden regions, and button items are not counted in the number of candidate items and report columns, because these are not used in the updates.

Select the page that you want to work with. You can also access the Attribute Dictionary for a particular page by navigating to the page definition and selecting Utilities > Attribute Dictionary.

# Reviewing Items and Report Columns

**Page Items**

**Update Page**  
• 0 Items for update

**Update Attribute Dictionary**  
• Review 10 Items for insert into the Attribute Dictionary  
• 0 Items for update of the Attribute Dictionary

**Summary**

Total Page Items	11
Displayed Items	10
Potential New Entries	10
Potential Updates	0
Identical Attributes	0

**Report Columns**

**Update Page**  
• 0 Report Columns for update

**Update Attribute Dictionary**  
• 0 Items for insert into the Attribute Dictionary  
• 0 Report Columns for update of the Attribute Dictionary

**Summary**

Review the list of items or report columns. Determine which attributes to include in the Attribute Dictionary.

Page: 19 - Master Detail Cancel Update Attribute Dictionary

Include in Update:  Label  Help Text  General Format Mask  Default  Form Format Mask  Width  Height  Data Type

<input type="checkbox"/>	Region A	Item	Will Become	Label	Format Mask	Help Text	Default	Width	Help
<input type="checkbox"/>	Edit CEHR_ORDERS	P19_CUSTOMER_ID	CUSTOMER_ID	Customer Id	-	-	-	30	1
<input checked="" type="checkbox"/>	Edit CEHR_ORDERS	P19_ORDER_DATE	ORDER_DATE	Order Date	-	TIMESTAMP WITH LOCAL...	-	-	-
<input type="checkbox"/>	Edit CEHR_ORDERS	P19_ORDER_ID_COUNT	ORDER_ID_COUNT	-	-	-	-	30	-
<input type="checkbox"/>	Edit CEHR_ORDERS	P19_ORDER_MODE	ORDER_MODE	Order Mode	-	CHECK constraint	-	30	1
<input type="checkbox"/>	Edit CEHR_ORDERS	P19_ORDER_STATUS	ORDER_STATUS	Order Status	-	0: Not fully entered...	-	30	1
<input type="checkbox"/>	Edit CEHR_ORDERS	P19_ORDER_TOTAL	ORDER_TOTAL	Order Total	-	CHECK constraint	-	30	1
<input type="checkbox"/>	Edit CEHR_ORDERS	P19_PROMOTION_ID	PROMOTION_ID	Promotion Id	-	Sales promotion ID ...	-	30	1
<input type="checkbox"/>	Edit CEHR_ORDERS	P19_SALES_REP_ID	SALES_REP_ID	Sales Rep Id	-	References cehr_emp...	-	30	1

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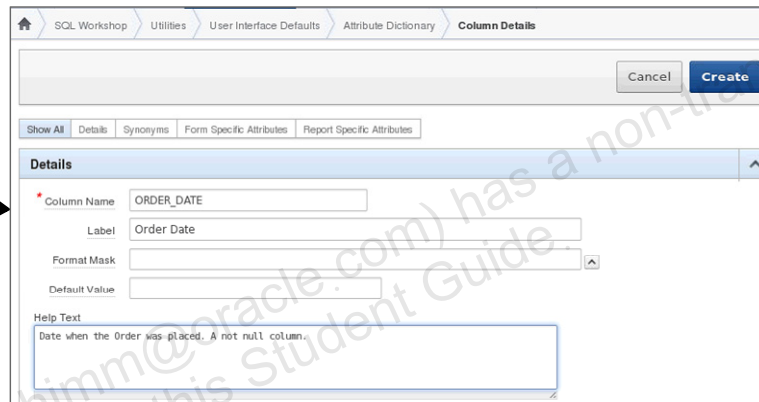
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When you create an item on a page or create a report, you must review and evaluate which attributes you want to update in the dictionary. In the slide example, you want to update the Attribute Dictionary with all the attributes (such as Label and Help text) for the P19\_ORDER\_DATE item. Select the check box for the appropriate row and click Update Attribute Dictionary. The page number prefix is removed when the Attribute Dictionary entry is created. For example, P19\_ORDER\_DATE becomes ORDER\_DATE.

# Modifying Attributes in the Dictionary



You can modify attributes in the Attribute Dictionary using SQL Workshop utilities.



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User Interface Defaults enable you to assign default user interface properties for regions and items. The wizard enables you to specify whether you want to use user interface defaults if they exist. When you create a form or report by using a wizard, the wizard uses this information to create default values for region and item properties. Using user interface defaults can save valuable development time and has the added benefit of providing consistency across multiple pages in an application. User interface defaults are divided into two categories: the Table Dictionary and the Attribute Dictionary.

- The Table Dictionary enables you to specify defaults for tables and columns that are initialized from the database definition.
- The Attribute Dictionary enables you to create defaults based on attribute or column names (and thereby usable for all tables). Attribute definitions can also have synonyms, allowing more than one attribute to share a common definition.

The Table Dictionary takes priority over the Attribute Dictionary when user interface defaults are used during creation of pages and regions. If a table-and-column combination exists, that combination is used rather than an attribute definition of the same name.

This can be useful, for example, when you want to have a specific label or Help text for the `CREATED_BY` column in the `EMP` table. However, use more generic defaults for `CREATED_BY` in another table.

To view a list of the columns in the Attribute Dictionary, select SQL Workshop > User Interface Defaults and click the Attribute Dictionary tab. To make changes to a column, click the Edit icon for the column, make your changes, and click Apply Changes.

You can view the demonstration about managing attribute dictionary by opening the `/home/oracle/labs/demos/les11_managing_attribute_dictionary.html` file.

## Quiz

Nancy wants to apply the same Help text to all her Order Status items on all pages in her application. What must she do to make this happen? (Choose all that apply.)

- a. Add an item on a page with the Help text.
- b. Add a table with a new Status column.
- c. Review the column and update the directory.
- d. Create a new page with the column already in the dictionary.

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**Answer: a, b, d**

# Workshop 11-2 Overview: Managing Your Attribute Dictionary

This workshop covers the following topics:

- Adding items from a page to the Attribute Dictionary
- Updating the Attribute Dictionary for the items
- Using the User Interface defaults in a new form.

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# Lesson Agenda

- Using the Advisor
- Managing Your Attribute Dictionary
- Using the Debug Option
  - What Is the Debug Option?
  - Enabling and Disabling Debug Mode
  - Viewing the Debug Messages
  - Troubleshooting Issues

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# What Is the Debug Option?

The Debug option is used to:

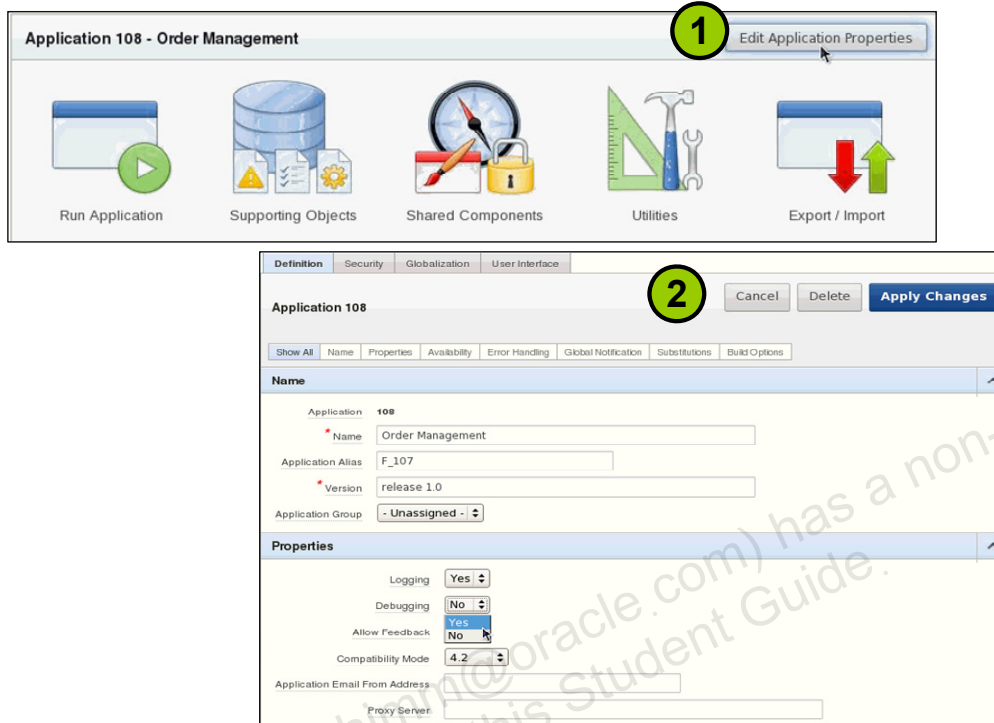
- View the processing details of a page
- Check the performance of a page

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The Debug mode is a built-in mechanism used to track down unexpected application behavior. The debug option is used at run time to view the processing of a page. It provides useful information about what is happening in the background. In addition, it can be used to check the performance of a given page so that the performance can be tuned.

# Enabling and Disabling Debug Mode



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You can configure whether end users can run the application in debug mode by using the Debugging attribute on the Edit Application Definition page. Running an application in debug mode is useful when an application is under development. If the application is run from the Application Express development environment, debugging can always be enabled. A developer who is logged into the application's workspace can always run the application in debug mode. To enable or disable debugging feature in your application during development, perform the following steps:

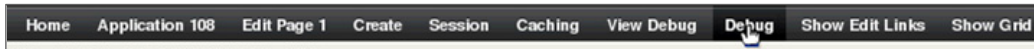
1. On the application's home page, click the Edit Application Properties button.
2. Click the Properties tab, select Yes for Debugging, and click Apply Changes.

To disable the debugging option for an application, perform the same steps and set the debugging field to No.

# Debugging an Application

## Turning debug mode ON

Click Debug.



Set the Debug argument to YES.

`http://localhost:8080/apex/f?p=108:1:3505293171146720::YES:::`

## Turning debug mode OFF

Click No Debug.



Set the Debug argument to NO.

`http://localhost:8080/apex/f?p=108:1:3505293171146720::NO:::`

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You can turn on debug mode for an application at run time by using one of the following methods:

- Click the Debug link on the Developer toolbar.
- Set the Debug attribute in the URL to YES.

To turn off debug mode, use one of the following methods:

- Click the No Debug link on the Developer toolbar.
- Set the Debug attribute in the URL to NO.

**Note:** Before you want to debug a page, you should click the Debug option before you make any changes because the page will be reset when you do this. For example. If you make a change to a form, then click Debug. The page will be reset back to the original values in session state allowing you not to lose the changes you made.

# Viewing the Debug Messages: SHOW Application

The screenshot shows the Oracle Developer toolbar with the 'View Debug' button highlighted. Below the toolbar, the 'Debug' window is open, displaying a table of debug messages. A red box highlights the '21' in the 'View Identifier' column, and a red arrow points from this box to the 'Message' column in the table below. The table shows the following messages:

Elapsed	Execution	Message	Level	Graph
0.03843	0.00013	OH OW: application="108" page="1" workspace="" request="" session="7250" 12875498"	4	
0.03855	0.00030	Reset NLS settings	4	
0.03884	0.00019	alter session set NLS_LANGUAGE='AMERICAN'	4	

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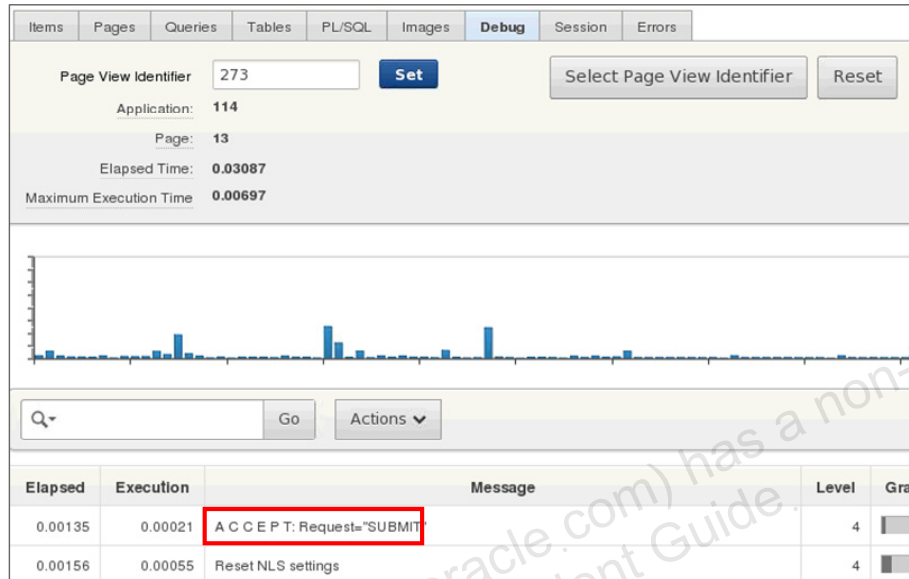
When a page is rendered, a set of messages is displayed under “SHOW application.” The messages displayed include the following (in the order in which they appear):

- NLS Language messages
- Authentication messages
- Session state messages
- BEFORE\_HEADER and AFTER\_HEADER processing messages for any branching, computations, and processes
- Region
- Item
- BEFORE\_FOOTER and AFTER\_FOOTER processing messages for any branching, computations, and processes

In addition to the preceding messages, the timing is displayed to make it clear how long each process is taking.

In the slide example, after a page is displayed, you click the View Debug button on the Developer toolbar. The Debug messages are shown. You can place the cursor over the graph to view additional details.

## Viewing the Debug Messages: ACCEPT Request



The screenshot shows the Oracle Developer toolbar with the 'Debug' tab selected. The toolbar includes buttons for 'Items', 'Pages', 'Queries', 'Tables', 'PL/SQL', 'Images', 'Debug', 'Session', and 'Errors'. Below the toolbar, there is a 'Page View Identifier' field with the value '273' and a 'Set' button. To the right, there is a 'Select Page View Identifier' button and a 'Reset' button. Below these, there are fields for 'Application: 114', 'Page: 13', 'Elapsed Time: 0.03087', and 'Maximum Execution Time: 0.00697'. A bar chart is visible below the fields. Below the chart, there is a search field with a magnifying glass icon, a 'Go' button, and an 'Actions' dropdown menu. Below the search field, there is a table with the following data:

Elapsed	Execution	Message	Level	Graph
0.00135	0.00021	ACCEPT: Request='SUBMIT'	4	
0.00156	0.00055	Reset NLS settings	4	

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When values in a form have been changed and submitted, ACCEPT Request messages are displayed before the SHOW application. When the debug option is enabled, the following messages appear in the following order:

- NLS Language messages
- Session state messages
- ON\_SUBMIT\_BEFORE\_COMPUTATION process
- BEFORE\_COMPUTATION branch
- AFTER\_SUBMIT computation
- BEFORE\_VALIDATION branch
- BEFORE\_PROCESSING branch
- AFTER\_SUBMIT process
- AFTER\_PROCESSING branch

In the slide example, you click a SUBMIT button, and then click the View Debug button on the Developer toolbar. The Debug messages are displayed.

You can view the demonstration about using the Debug option by opening the `/home/oracle/labs/demos/les11_debugging.html` file.

# Troubleshooting Issues

## Scenario

Employee Id	First Name	Last Name	Customer Id	Email	Department
155	Oliver	Tuvault	104	OTUVAULT	Sales
155	Oliver	Tuvault	105	OTUVAULT	Sales

Employee Detail

Employee Id \* 155

First Name

Last Name \*

Email \*

Phone Number

Hire Date \*

Job Id \*

Salary

## Solution

Page Rendering

Page Processing

Fetch Row from OEHR\_EMPLOYEES

Process Type: Automated Row Fetch

Process: F|@OWNER#@OEHR\_EMPLOYEES:P4\_ROWID:ROWID

Process: 1 of 3 Name: Fetch Row from OEHR\_EMPLOYEES

Name

Page: 4 Employee Detail

Name: Fetch Row from OEHR\_EMPLOYEES

Type: Automated Row Fetch

Process Point

Sequence: 10

Process Point: On Lead - After Header

Run When: Once Per Page Visit (default)

Source: Automatic Row Processing (DML)

Table Owner: ORA01

Table Name: OEHR\_EMPLOYEES

Item Containing Primary Key Column Value: P4\_EMPLOYEE\_ID

Primary Key Column: EMPLOYEE\_ID

Change ROWID to EMPLOYEE\_ID

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Consider an example where you have an Employee Details form that is linked to an Employee Report. When you pass values to the form by using the edit link in the report, you notice that the form fetches a row that uses the ROWID as the primary key column. However, the link in the report specifies a value for EMPLOYEE\_ID as the primary key. You will find that the form does not display any values. This is due to a mismatch in the column used as the primary key. You can fix this issue by changing the primary key column in the form from ROWID to EMPLOYEE\_ID, which will display the values in the form.

# Workshop 11-3 Overview: Debugging Your Application

This workshop covers the following topics:

- Enabling debugging in your application
- Turning debug on
- Modifying a record
- Viewing the results
- Troubleshooting issues

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# Summary

In this lesson, you should have learned how to:

- Use the Advisor to verify your application
- Manage user interface defaults by using the Attribute Dictionary
- Use the Debug Option

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In this lesson, you learnt about using the Advisor, managing user interface defaults using the Attribute Dictionary and also use the Debug option.

# 12

## Adding Shared Components That Aid Navigation

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# Objectives

After completing this lesson, you should be able to do the following:

- Explain the use of shared components in an application
- Create and edit the following navigational shared components in an application:
  - Parent and standard tabs
  - Navigation bar entries
  - Lists
  - Breadcrumbs

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In this lesson, you learn how to create, edit, and use navigational shared components (tabs, navigation bars, lists, and breadcrumbs) in your application.

# Lesson Agenda

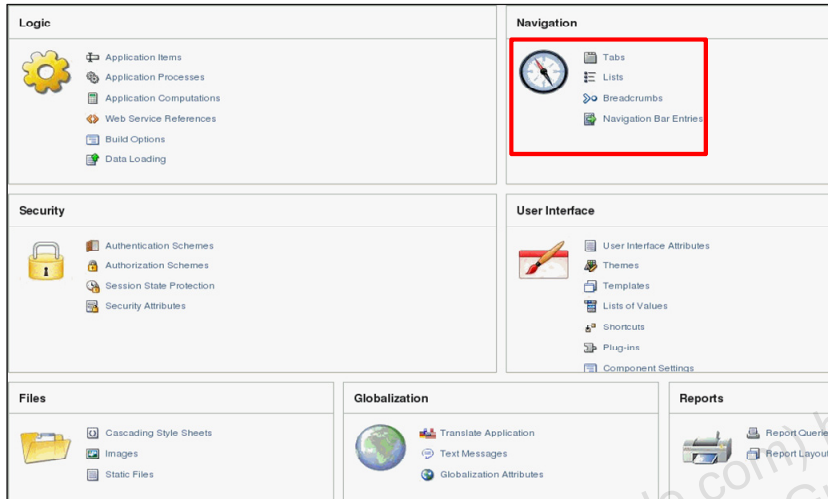
- Introducing Shared Components
  - What Are Shared Components?
  - Navigational Shared Components
- Creating Tabs
- Creating Lists
- Creating Breadcrumbs
- Creating a Navigation Bar

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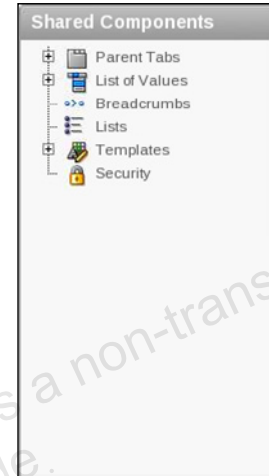
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# What Are Shared Components?

## Shared Components Page



## Page Definition



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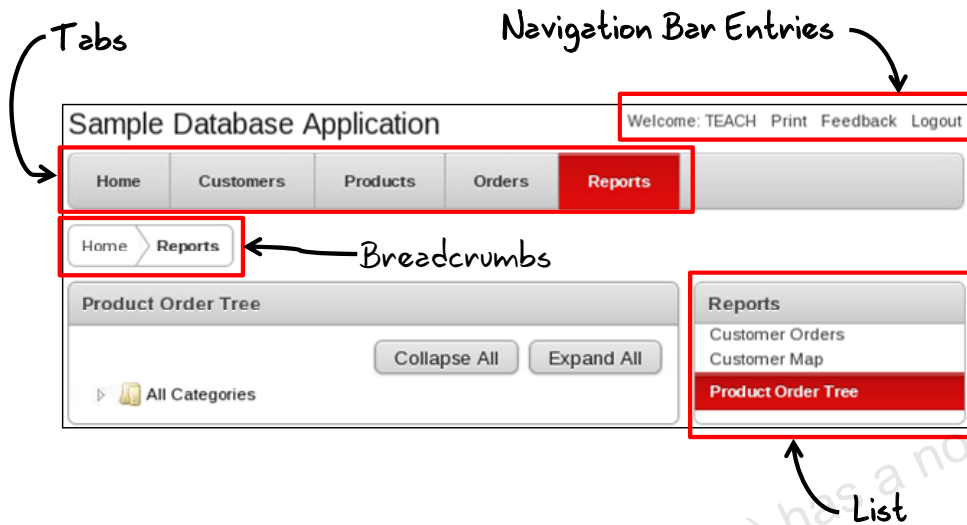
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Shared components are components that can be included on one or more pages of your application. The Shared Components Page screenshot in the slide shows the categories of shared components that you can include in your application.

In the Shared Components section of a page's definition (shown in the Page Definition screenshot in the slide), you can view the shared components that are included on that page.

In this lesson, you learn how to create navigational shared components: tabs, lists, breadcrumbs, and navigation bar entries.

# Navigational Shared Components



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An application typically uses a combination of tabs, lists, navigation bars, and breadcrumbs.

- Tabs are used to provide navigation between the major components of an application.
- A list is a collection of links. Each list entry is associated with a page.
- Breadcrumbs are a hierarchical list of links. They show you where you are within the application.
- A navigation bar is used to link text or an image to a page. You need not reference it on every page (as you must do with the other navigational shared components). An application can have only one navigation bar.

The slide shows the Sample Application interface. Home, Customers, Products, Orders, Reports are the tabs. Print, Feedback, and Logout links at the top-right of the page are the navigation bar entries. Home > Reports are the breadcrumbs used to go back and forth between the pages within the application's major components. The Reports section on the right is a list. Thus, you can use a combination of tabs, lists, navigation bars, and breadcrumbs to navigate within an application.

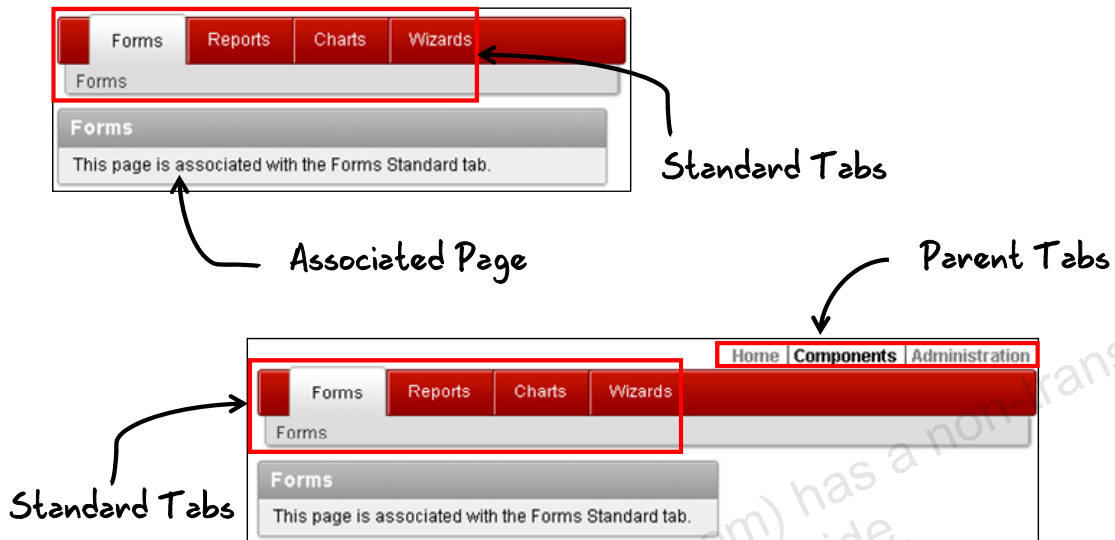
# Lesson Agenda

- Using Shared Components
- Creating Tabs
  - Types of Tabs
  - Creating a Tab Set
  - Adding Tabs
- Creating Lists
- Creating Breadcrumbs
- Creating a Navigation Bar

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# Types of Tabs



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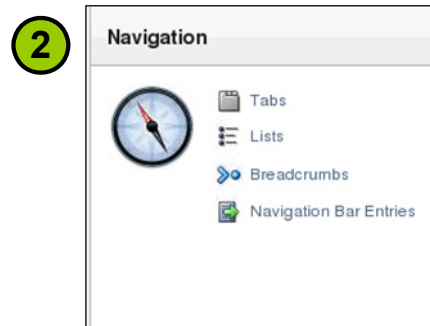
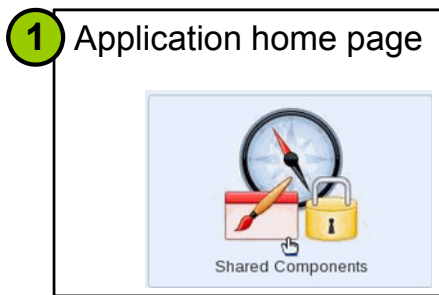
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You create tabs to provide navigation within the major components of an application. Tabs are positioned at the top section of an application. When you click a tab, it displays the associated page.

In Oracle Application Express, you can create two types of tabs: parent and standard. If you want only one level of tabs in your application, you must create a standard tab set. Each tab is associated with a specific page. If you want two levels of tabs, you must create a parent tab. The parent tab displays a page, which has its own standard tab set.

You must make sure that your application template and page template support the type of tab that you create for an application. For example, if you create a two-level tab set with parent and standard tabs, you must ensure that the application page template has a two-level tabs option selected. Also, you must ensure that the page-level template does not override the application-level template. You learn how to view template properties and edit them in the lesson titled "Working with Themes, Templates, and Files."

# Accessing the Tabs Page



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When you create an application or a page, the Create Application and Create Page wizards provide options to create tabs in the application or on the page. You can view the existing tabs in your application and modify them or create a new tab from the Tabs page. To access the Tabs page, perform the following steps:

1. On the application home page, click the Shared Components icon.
2. On the Shared Components page, click the Tabs link in the Navigation pane. The Tabs page is displayed.

Alternatively, perform the following steps:

1. On the application home page, click a page.
2. In the Shared Components section in the page definition, right-click the Tabs node and select Create or Edit All.

# Managing Tabs

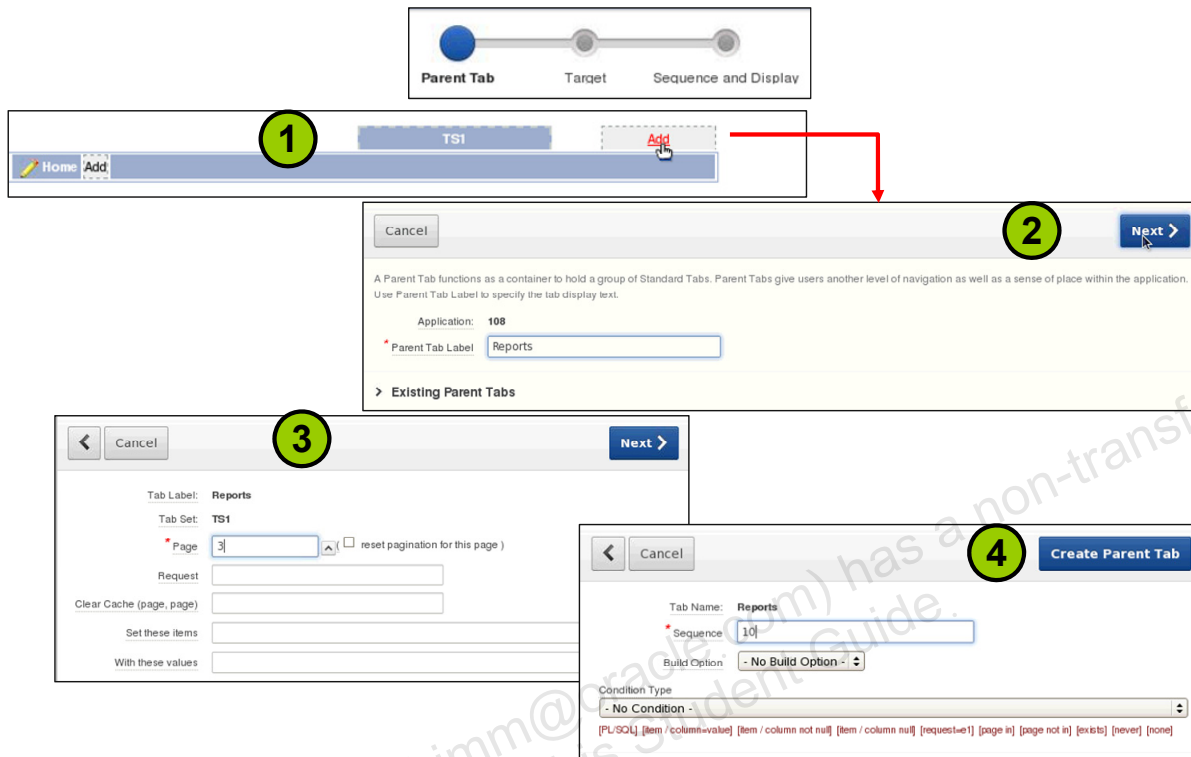
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The Manage Tabs page has a graphical layout of the tabs. You can add a new tab to the parent or standard set. The slide shows the tabs available for the Demo application. Because no parent tab is created, a pseudo-parent tab, TS1, is assigned to hold the standard tabs. Tasks that you can perform are listed in the Parent Tab Tasks and Standard Tab Tasks lists (at the bottom right of the page).

# Creating Parent Tabs



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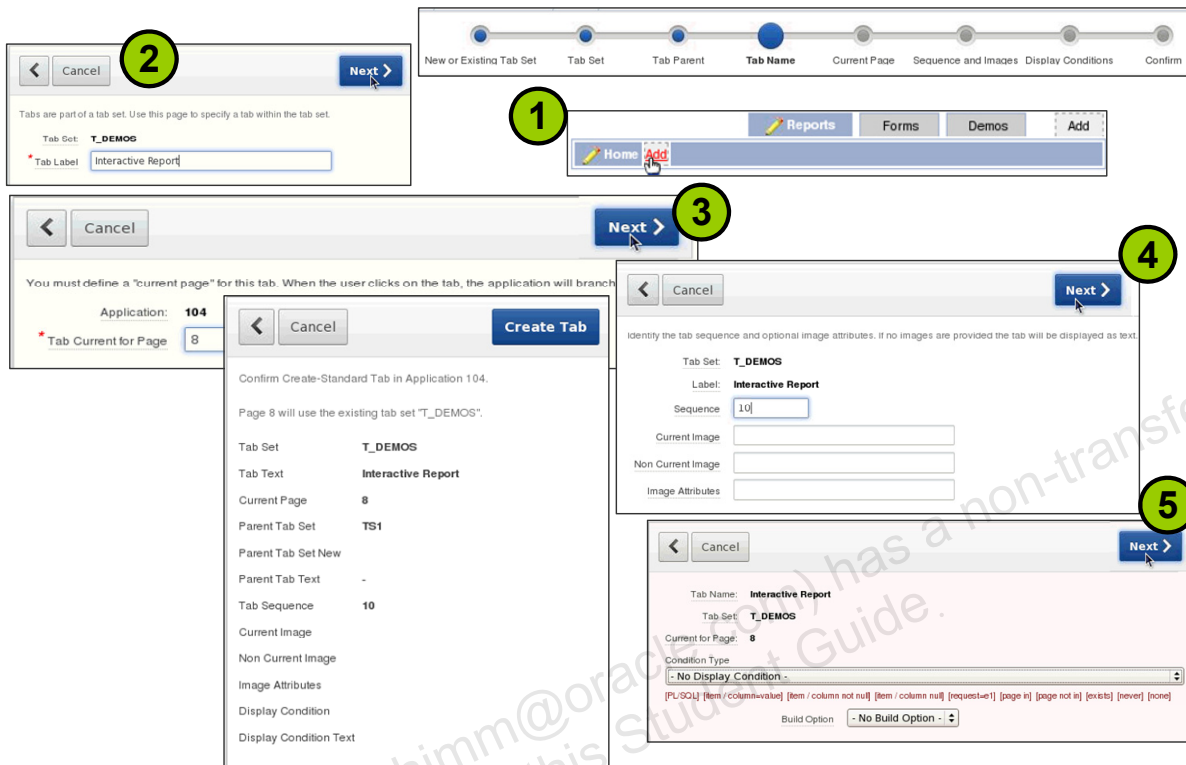
To create a parent tab, perform the following steps:

1. Click the Add link on the parent-level tabs on the Manage Tabs tab. The Create Parent Tab Wizard starts.
2. Enter the Parent Tab Label and click Next. In the slide example, Reports is entered.
3. Indicate the target of the tab, and click Next. In this example, page 3 is specified.
4. Accept the default or specify a different sequence and click Create Parent Tab.

In this example, the Reports parent tab is created. Similarly, a Forms parent tab can be created.

**Note:** To be able to see two-level tabs in your application, ensure that you are using the required templates for your application and pages.

# Creating Standard Tabs



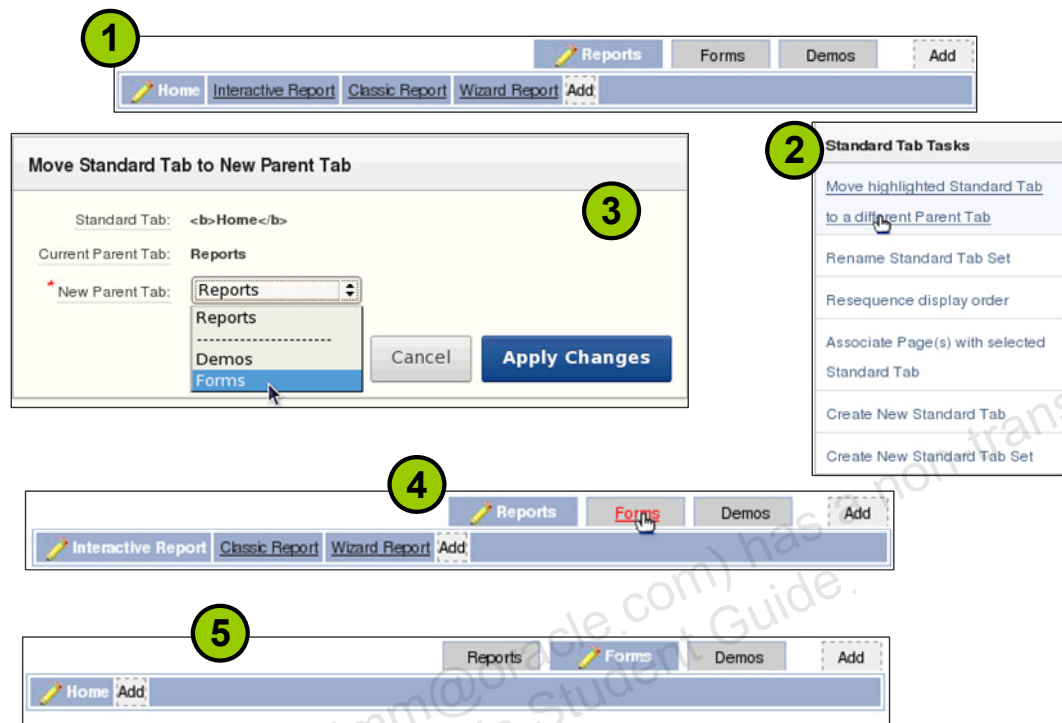
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To create a standard tab, perform the following steps:

1. On the Manage Tabs tab, ensure that the required parent tab is selected and click the Add link in the standard tabs level. The wizard automatically picks up the details for the Tab Set and Tab Parent and starts from the Tab Name step.
2. Enter the Tab Label and click Next. In the slide example, Interactive Report is entered.
3. Indicate the page that is associated with the tab and click Next. In this example, page 2 is specified.
4. Specify a sequence for the tab.
5. (Optional) Specify the conditions under which the tab is displayed.
6. Click Next.
7. Review the details and click Create Tab.

# Reassigning a Standard Tab



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To assign a standard tab associated with a parent tab to another parent tab, perform the following steps:

1. Ensure that the standard tab that you want to move is selected. In the slide example, the Home tab is selected.
2. Click the “Move highlighted Standard Tab to a different Parent Tab” link in the Standard Tab Tasks list.
3. Select the new parent tab for the standard tab and click Apply Changes. In this example, the Forms tab is selected.
4. Note that the Home tab is no longer listed in the standard tab set for the Reports parent tab.
5. Click the Forms parent tab to confirm that the Home tab is now listed on it.

You can view the demonstration about creating and using tabs in your application by opening the `/home/oracle/labs/demos/les12_standard_tabs.html` file.

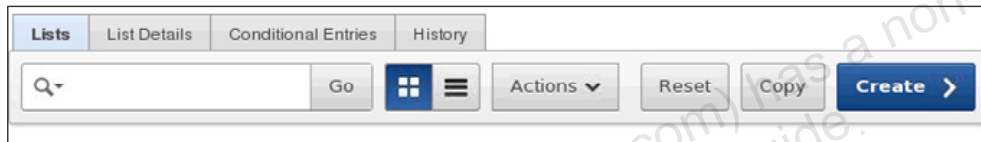
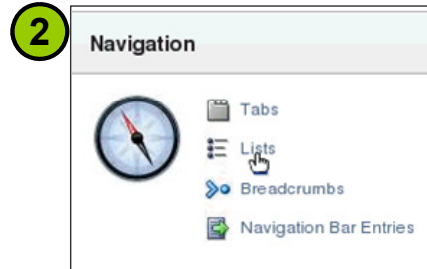
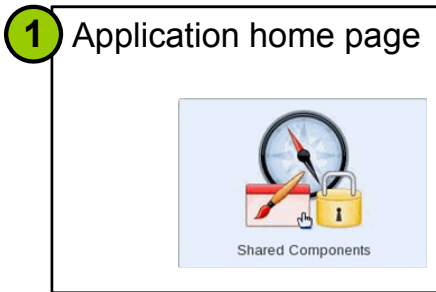
# Lesson Agenda

- Using Shared Components
- Creating Tabs
- Creating Lists
  - Accessing the Lists Page
  - Creating a Static List
  - Creating a List Entry
  - Creating a List Region
  - Creating a List Region on Global Page
- Creating Breadcrumbs
- Creating a Navigation Bar

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# Accessing the Lists Page



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A list is a collection of links. Each link is called a list entry. For each list entry, you must specify the display text, a target URL, and other attributes that control when and how the entries in the list are to be displayed.

To access the Lists page, perform the following steps:

1. On the application home page, click the Shared Components icon.
2. On the Shared Components page, click the Links link in the Navigation pane.

Alternatively, perform the following steps:

1. On the Application home page, click a page.
2. In the Shared Components section in the page definition, right-click the Lists node and select Create or Edit All.

The Lists page is displayed. Existing Lists, if any, are displayed on the Lists tab. You can create a new list or copy a list from another application. (The other application must reside in the same workspace.)

# Creating a Static List

Source Name and Type Query or Static Values Confirm

Cancel **1** Next >

A List is a static or dynamic definition used to display a specific type of page item, such as progress bars, a navigation list.

Create List:  
 From Scratch  
 As a Copy of an Existing List

Cancel **2** Next >

A list is a shared collection of links, each link is called a list entry. You control the appearance of a list through list templates. You add a list to a page by creating a list region. Deleting a list will cause referencing regions to be removed.

Name:

Type:  Static  
 Dynamic

Build Option:

Cancel **3** Next >

List Name: **Tasks**

List Entry Label	Target Page ID or custom URL
1 Create Employee	5
2 View Employee List	6
3 Edit Multiple Employees	8
4	
5	

Cancel **4** Create List

List Name: **Tasks**

Create List Region(s):

List Entry Label	Target Page ID or custom URL
1 Create Employee	5
2 View Employee List	6
3 Edit Multiple Employees	8
4	
5	

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To create a static list, click the Create button on the Lists page and perform the following steps:

1. Ensure that From Scratch is selected and click Next.
2. Enter a name for the list. Accept the other defaults and click Next.
3. Enter the text for the list entries and specify the page number that you want to link with each entry. Click Next.
4. You can create a list region on the current page. In this example, you accept the defaults and click Create.

The static list is created. You can edit the list to add additional list entries.

You can view the demonstration of using static lists by opening the `/home/oracle/labs/demos/les12_static_list.html` file.

# Creating List Entries

The screenshot shows the Oracle Lists page with the 'Tasks' list selected. The 'Create List Entry' button is highlighted in red. Below the table, the 'List Entry' form is visible, showing the 'List Entry Label' field with the text 'Create Master Detail Record' and the 'Target' field with the value 'Page in this Application'.

Sequence	Name	Parent Entry	Target	Conditional	Updated	Level	Authorization Scheme	Copy
10	<a href="#">Create Employee</a>	-	?p=&APP_ID:.5.&SE					
20	<a href="#">View Employee List</a>	-	?p=&APP_ID:.6.&SE					
30	<a href="#">Edit Multiple Employees</a>	-	?p=&APP_ID:.8.&SE					

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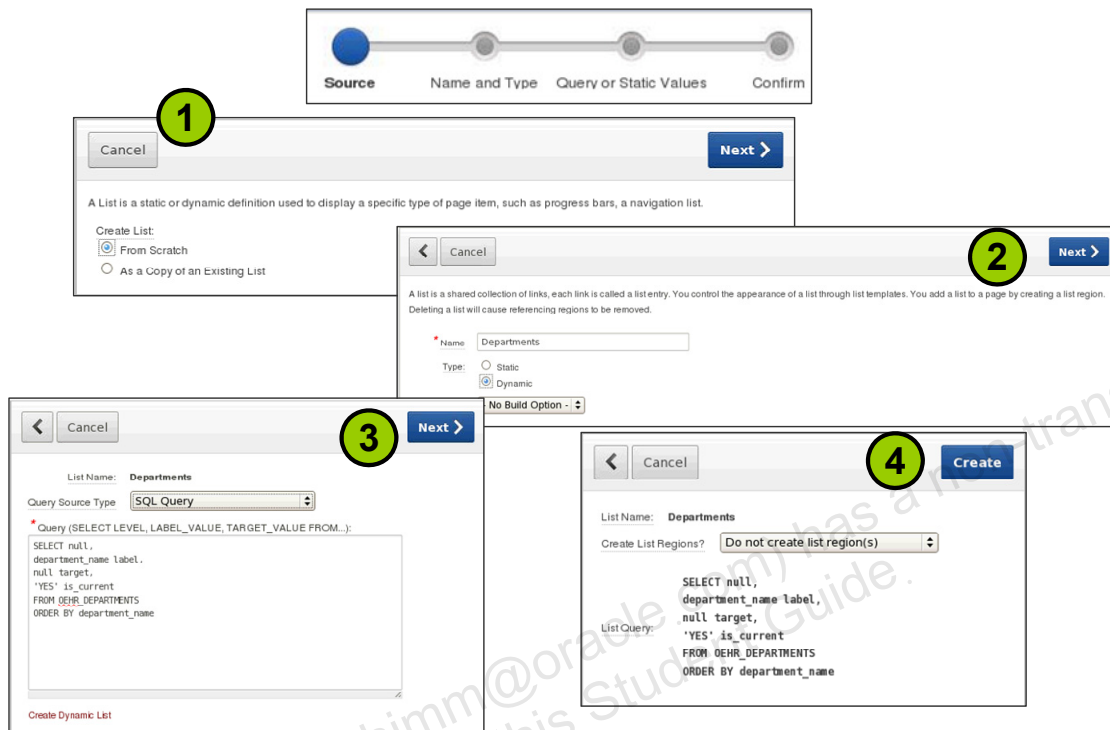
After you create a list, you can populate the list. You can also create new list entries in lists that are already populated. To create a list entry, perform the following steps:

1. Click Create List Entry on the Lists page.
2. Enter the text for the link in the List Entry Label field. On the Target tab, enter the page that you want to associate this list entry with. Click Create.

The list entry is created.

**Note:** On the Entry tab, if you select a list item for the Parent List Entry field, you can create a hierarchical list.

# Creating a Dynamic List



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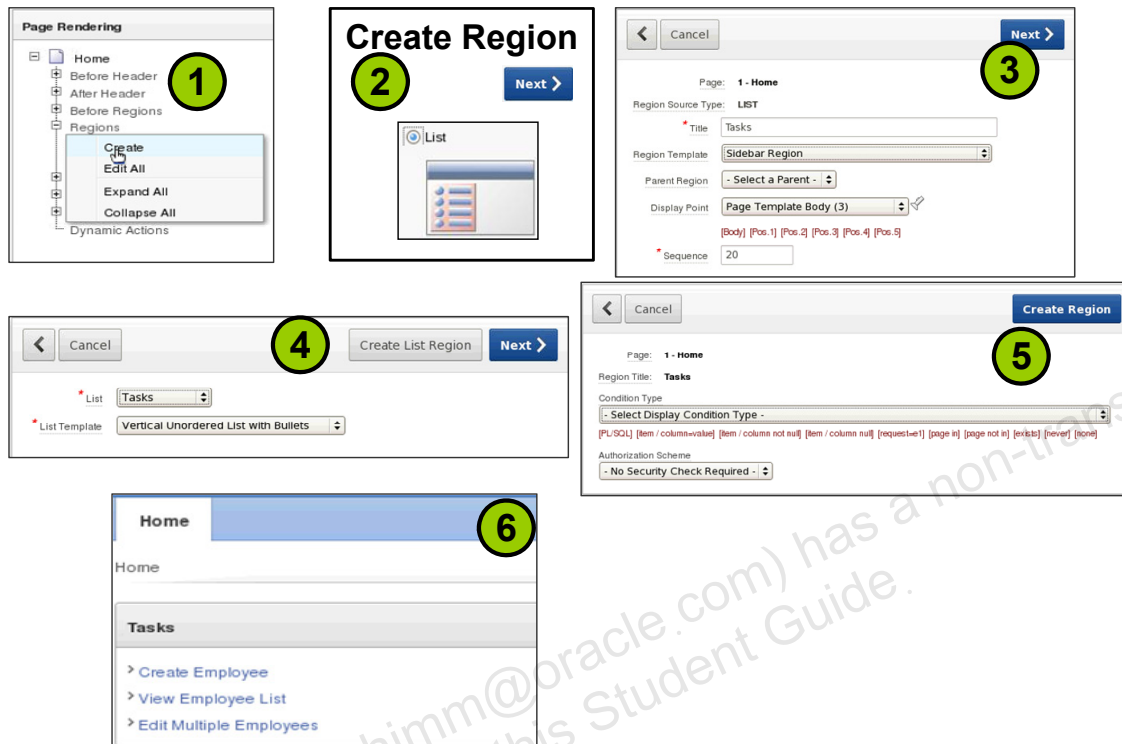
To create a dynamic list, click the Create button on the Lists page and perform the following steps:

1. Ensure that From Scratch is selected and click Next.
2. Enter a name for the list and select Dynamic for Type and click Next.
3. Enter the SQL Query to create the list and click Next. You can view examples of SQL queries by clicking the Examples link at the bottom.
4. You can create a list region on the current page. In this example, you accept the defaults and click Create.

The dynamic list is created. You can edit the query to modify the list entries.

You can view the demonstration of creating dynamic lists by opening the `/home/oracle/labs/demos/les11_dynamic_list.html` file.

# Creating a List Region



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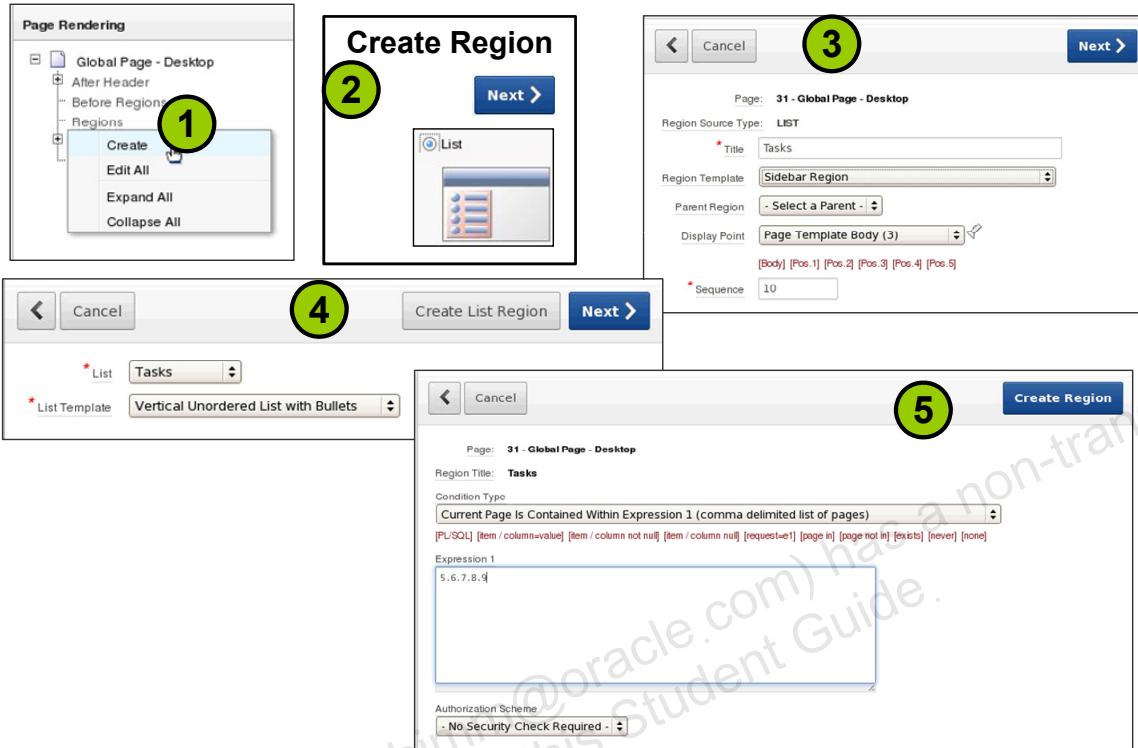
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After you create a list and populate it with values, you can add the list to a page. To add the list to a page, navigate to the page's definition and perform the following steps:

1. Right-click the Regions node and select Create.
2. Select the List option and click Next.  
**Note:** You see the list option in the Create Regions Wizard only if the application already has a list.
3. Specify the region details and click Next.
4. Select the list from the List drop-down list and click Next.
5. (Optional) Specify any conditions for the display of the region.
6. Click Create Region.

The list region is created on the page.

# Creating a List Region on the Global Page



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To display a list on multiple pages of an application, you can create the list region on a global page and specify the pages where the region should be displayed. Navigate to the page definition for the global page and perform the following steps:

1. Right-click the Regions node and select Create.
2. Select List and click Next.
3. Specify the region details and click Next.
4. Select the list from the Lists drop-down list and click Next.
5. Click the “[page in]” link below the Condition Type field and enter the pages that you want the region to be displayed on in the Expression 1 field. (You can enter multiple page numbers by separating them with a comma.) Click Create Region.

If you run your application, you should see the list region displayed on the pages that you specified.

# Lesson Agenda

- Using Shared Components
- Creating Tabs
- Creating Lists
- **Creating Breadcrumbs**
  - Viewing a Breadcrumb
  - Creating Breadcrumb Entries
  - Reparenting Breadcrumbs
  - Creating a Breadcrumb Region
- Creating Navigation Bar

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# Viewing a Breadcrumb

The first screenshot shows the 'Navigation' pane with a compass icon and a list of options: Tabs, Lists, Breadcrumbs (highlighted with a green circle 1), and Navigation Bar Entries. The second screenshot shows the 'Breadcrumbs' page with a search bar, 'Go' button, 'Actions' dropdown, 'Reset' button, and a 'Create Breadcrumb' button (highlighted with a green circle 2). The third screenshot shows the breadcrumb hierarchy table with columns: Name, Sequence, Page, Parent, Page Exists, Authorization Scheme, and Page Authorization Scheme. The table contains three entries: Home, Order Entry, and Master detail.

Name	Sequence	Page	Parent	Page Exists	Authorization Scheme	Page Authorization Scheme
Home	10	<a href="#">1</a>	(null)	Yes	(null)	(null)
Order Entry	10	<a href="#">8</a>	1. Home	Yes	(null)	(null)
Master detail	10	<a href="#">15</a>	8. Order Entry	Yes	(null)	(null)

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A breadcrumb is a hierarchical list of links. It shows you where you are within the application. You can click a specific page name link to view that page immediately. The breadcrumb path is displayed below the standard tab at the top of each page. You can define the Breadcrumb region in global page so that it appears on all pages or on each page individually. Conditions can be defined to exclude the breadcrumb region from specific pages where they are not to be displayed, such as pop-up LOV pages.

By default, each application contains one breadcrumb. The breadcrumb contains multiple breadcrumb entries. The Create Page Wizard provides an option to create a breadcrumb entry. To view the breadcrumb for an application, perform the following steps:

1. On the Shared Components page, click the Breadcrumbs link in the Navigation pane.
2. On the Breadcrumbs page, the existing breadcrumb is listed. Click the icon to view the breadcrumb entries for the breadcrumb. To create a new breadcrumb, click the Create Breadcrumb button.
3. The current breadcrumb hierarchy appears. You may navigate to a page by clicking the associated link. You can also add another breadcrumb entry by clicking the Create Breadcrumb Entry.

# Creating Breadcrumb Entries

Breadcrumb Entry: Interactive Report

Cancel Delete Apply Changes

Show All Breadcrumb Entry Target Conditions Authorization Configuration

**Breadcrumb**

Breadcrumb Breadcrumb

\* Page 24

**Entry**

Sequence 10

Parent Entry - Select Parent -

\* Short Name Interactive Report

Long Name

**Target**

Target is a Page in this Application

Page 24

reset pagination for this page

Request

Clear Cache (comma separated page numbers)

Set these items (comma separated name list)

With these values (comma separated value list)

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To create a new entry in a breadcrumb, click the breadcrumb icon on the Breadcrumbs page. The Entries page appears. Click the Create Breadcrumb Entry button. A Create/Edit page appears (shown in the slide).

In the Breadcrumb section, ensure that the required breadcrumb is selected for the Breadcrumb field. For the Page field, enter the page on which you want the breadcrumb to appear.

In the Entry section, enter the name for the entry. You can also specify a parent entry for the entry that you are creating.

In the Target section (not shown in slide), specify the page that should appear when the entry is clicked.

You have an option to change the title of the referenced page to the same as the breadcrumb name. To do this, select the check box for "Page Name and Title" in the Synchronize Breadcrumb With section (in the upper-right corner of the page).

# Reparenting Breadcrumbs

The first screenshot (1) shows the 'Tasks' menu with 'Reparent Entries within this Breadcrumb' selected. The second screenshot (2) shows the 'Reparent To' dropdown set to 'Home' and the 'Reparent Checked Entries' button, with a table of breadcrumb entries where 'Interactive Report' is checked. The third screenshot (3) shows the same table after the reparenting process, with 'Interactive Report' now listed under the 'Home' parent.

	Name	Sequence	Page
<input type="checkbox"/>	<a href="#">Home</a>	10	<a href="#">1</a>
<input type="checkbox"/>	<a href="#">Order Entry</a>	10	<a href="#">8</a>
<input type="checkbox"/>	<a href="#">Master detail</a>	10	<a href="#">15</a>
<input checked="" type="checkbox"/>	<a href="#">Interactive Report</a>	10	<a href="#">24</a>

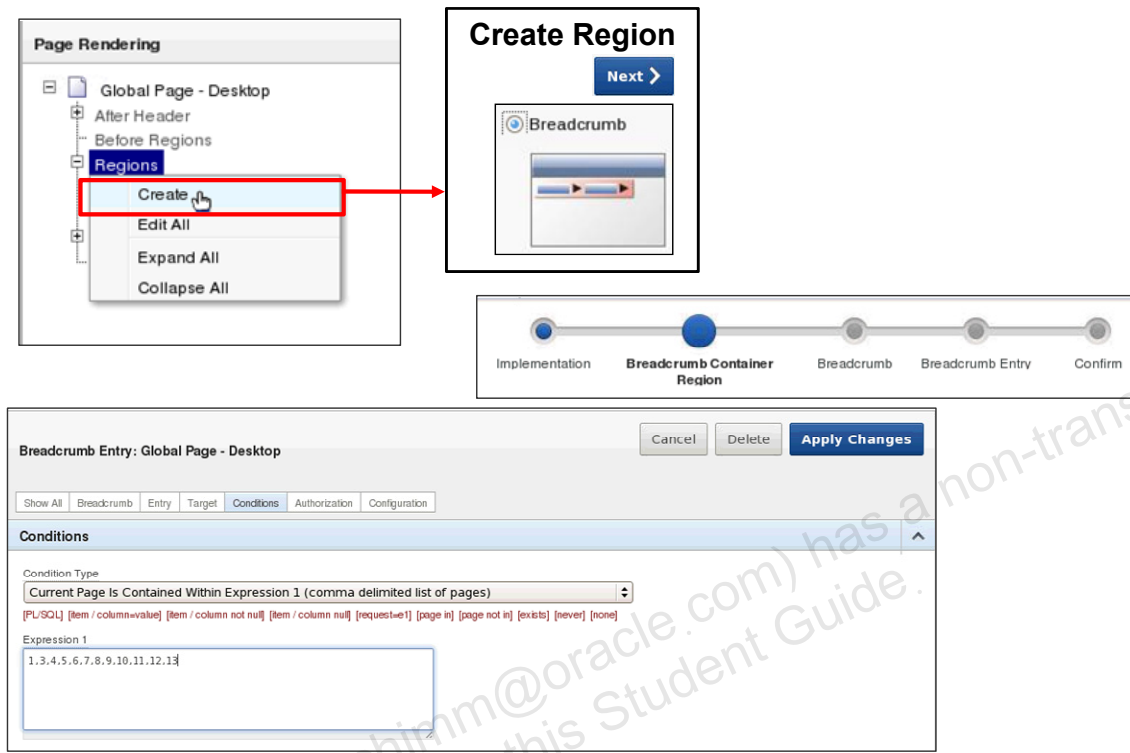
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You can change the parent entry for one or more breadcrumb entries. To reparent the breadcrumb entries, perform the following steps:

1. On the Breadcrumb page, select “Reparent Entries within this Breadcrumb” from the Tasks menu (in the bottom-right corner of the page).
2. Select a parent entry for the Reparent To field. Select the check box for each breadcrumb that you want to reparent. Click the Reparent Checked Entries button. The entry is now listed under the new parent.

# Creating a Breadcrumb Region



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To display a breadcrumb on a page, you must create a breadcrumb region. You can create the breadcrumb region in global page, and then specify the pages that should display the breadcrumb.

To create a breadcrumb region, from the page definition for global page, right-click the Regions node and click Create. Select Breadcrumb in the Create Region Wizard and click Next. Follow the wizard instructions. The breadcrumb region is created.

To specify the pages on which the breadcrumb region should be displayed, right-click the breadcrumb region node and select Edit. On the Edit Region page, click the Conditions tab. Click the "[page in]" link for Condition Type and enter the page numbers, separated by a comma, in the Expression 1 field. Click Apply Changes.

If you run the application, you should see the breadcrumb region on the pages that you specified.

**Note:** On the page that you specified, a breadcrumb entry should have been created.

You can view the demonstration of creating a breadcrumb by opening the `/home/oracle/labs/demos/les11_breadcrumb.html` file.

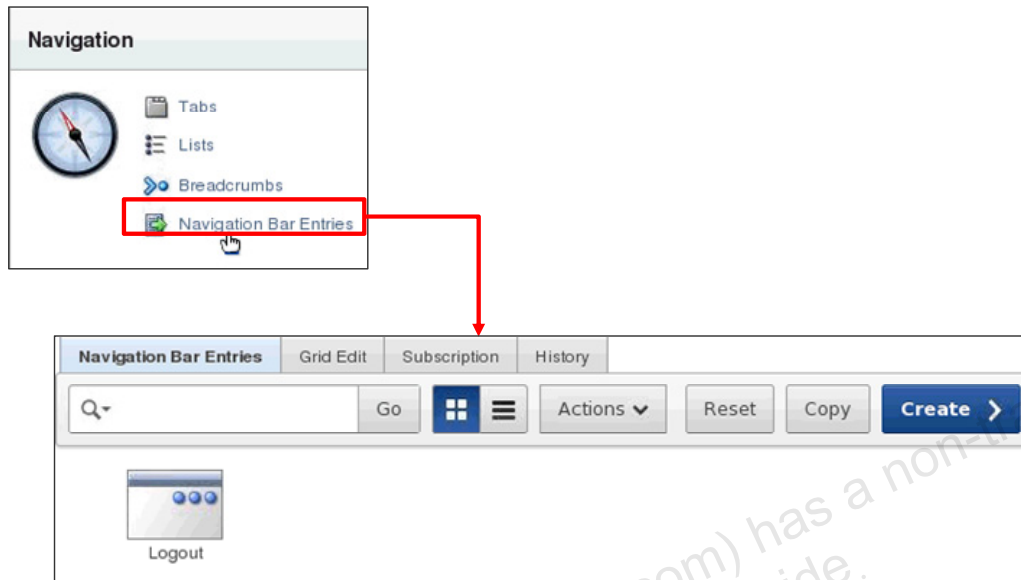
# Lesson Agenda

- Using Shared Components
- Creating Tabs
- Creating Lists
- Creating Breadcrumbs
- Creating a Navigation Bar
  - Accessing the Navigation Bar Entries Page
  - Creating a Help Page
  - Creating a Navigation Bar Entry

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# Accessing the Navigation Bar Entries Page



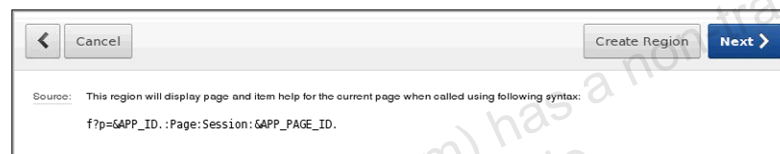
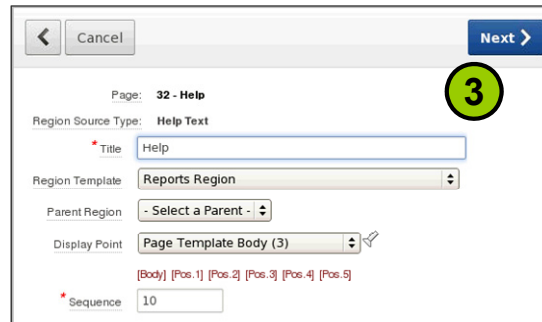
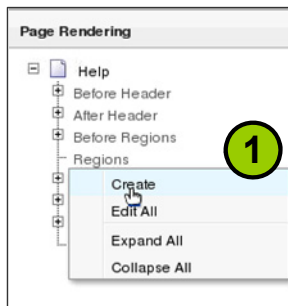
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Each application can have only one navigation bar. The items inside the navigation bar are called navigation bar entries. Some of the typical situations where you use navigation bars are accessing the home page and linking to a Help page. The location of the navigation bar depends on the associated page template. You use text or images when you create a navigation bar icon.

If you click the Navigation Bar Entries link from the application's Shared Components page, you can view the navigation bar entries for the application.

# Creating a Help Page



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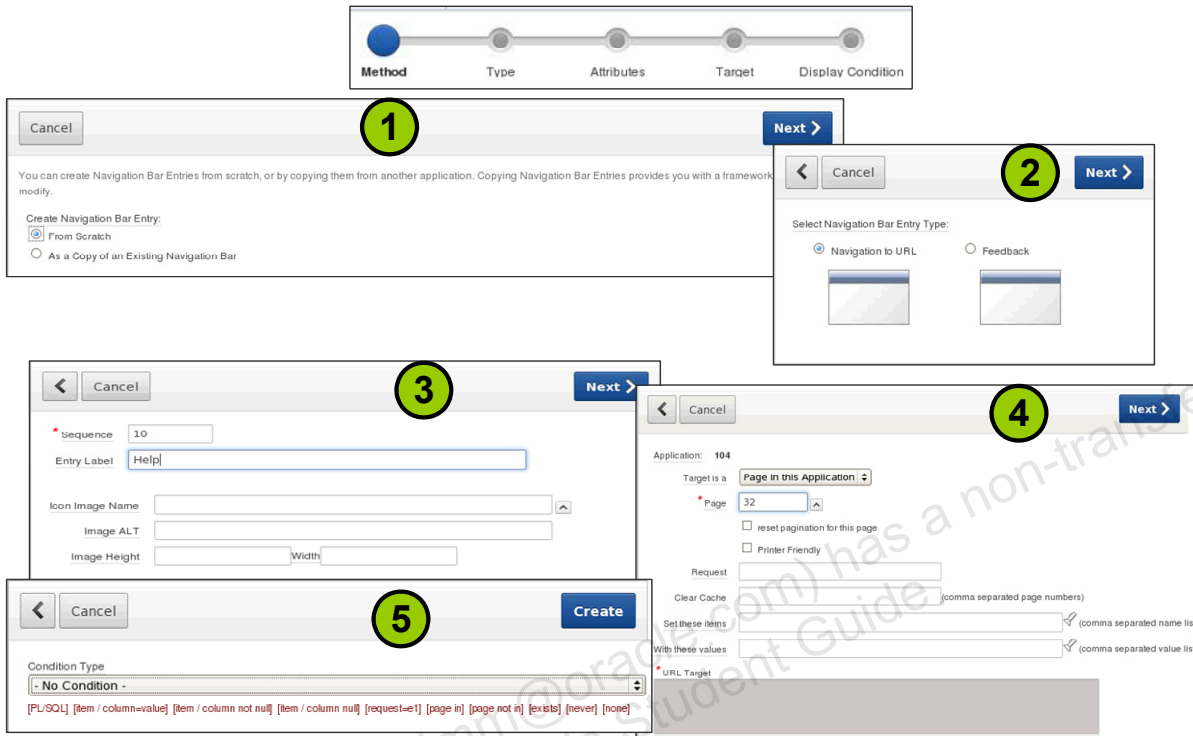
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In the next slide, you create a Help navigation bar entry. Before you do that, however, you must create a Help page in the application. Create a blank page and perform the following steps:

1. In the page definition of the blank page, right-click the Regions node and select Create.
2. Select the Help Text option and click Next.
3. Enter a title for the help region and click Next.
4. Click Create Region.

The Help page with a Help Text region is created. When this page is accessed, the page help and item help (if any) are displayed.

# Creating a Navigation Bar Entry



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Click the Create button on the Navigation Bar Entries page. The Create Wizard opens, and you perform the following steps:

1. Select From Scratch and click Next. You can also copy from another application.
2. Select “Navigation to URL” and click Next.
3. Enter the name for the entry and click Next.
4. Specify the target help page to be linked to the entry and click Next.
5. (Optional) Specify a condition. Click Create.

The navigation bar entry is successfully created.

You can view the demonstration about creating a navigation bar entry by opening the `/home/oracle/labs/demos/les11_navigation_bar_entry.html` file.

## Quiz

Which shared components would you use to create a shared collection of links on a page?

- a. Breadcrumbs
- b. Lists
- c. Navigation bar entries
- d. Tabs

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**Answer: b**

# Summary

In this lesson, you should have learned how to:

- Provide an overview of shared components
- Include the following shared components in your application:
  - Parent and standard tabs
  - Navigation bars
  - Lists
  - Breadcrumbs

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In this lesson, you learned how to create, edit, and use navigational shared components in your application.

# Workshop 12 Overview: Adding Shared Components That Aid Navigation

This practice covers the following topics:

- Creating a list
- Creating and editing standard tabs
- Creating a Help page and adding a navigation bar entry
- Editing navigation bar entries
- Creating a conditional display of a navigation bar

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