Application Builder

Using APEX 19

Video: https://www.youtube.com/watch?v=eMkFmGzQS3A
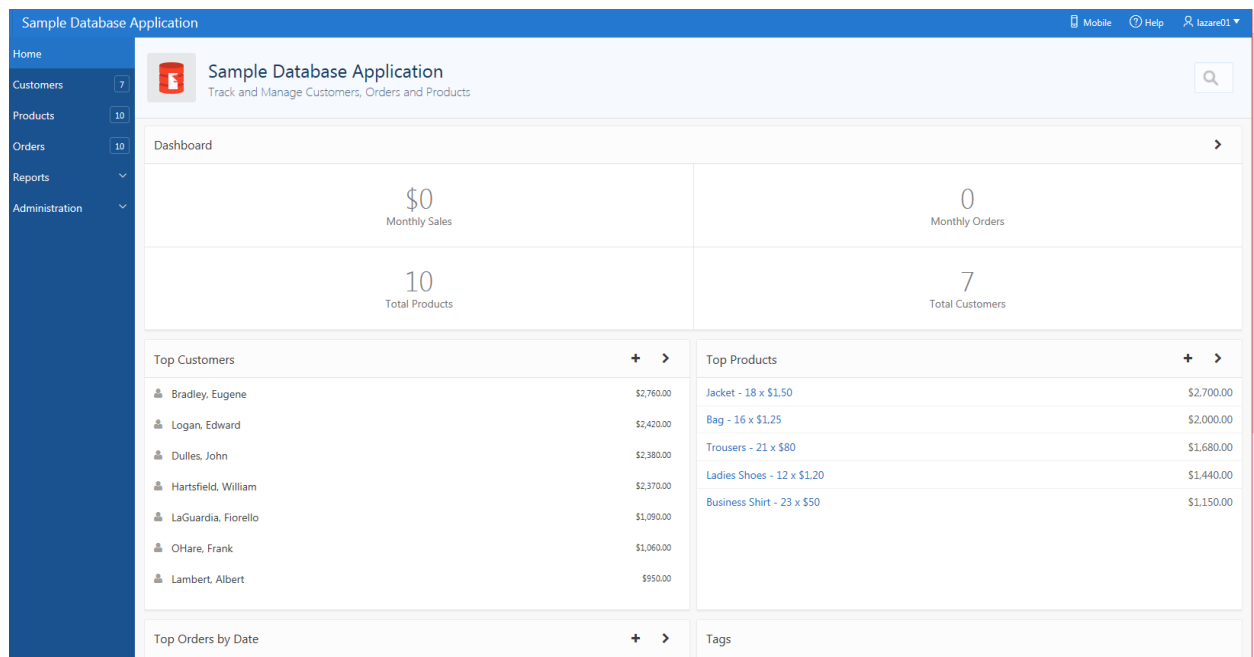
An example on how something is done

A task for you to complete

Good to know!

An example and a task for you to complete

How to Build a Database Application

Creating Forms (Apex Pages)

You can include a variety of different types of forms in your applications. You can include forms that enable users to update just a single row in a table or multiple rows at once. Application Builder includes a number of wizards you can use to create forms automatically, or you can create forms manually.

Topics:
- Creating a Master Detail Form - two pages with two related tables (new to Apex 19)
- Creating a Master Detail Form - one pages with two related tables.
- Creating a Form Using a Wizard (one table)
- Creating a Tabular Form (one table)
- Creating a Form Manually
- Validating User Input in Forms

Creating a Form based on two related tables (Master/Detail)

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.

Single Page Master Detail

A single page master detail features two editable interactive grids based on two related tables or views. Users select a row in the master grid to update the detail grid. Developers can create a single page master detail with either the Create Application Wizard or the Create Page Wizard.

A single page master detail features two editable interactive grids based on two related tables or views. Users select a row on the master grid to update the detail grid. In this example, when the user selects a department on the master grid to view employees in the detail grid. Developers can create a single page master detail with either the Create Application Wizard or the Create Page Wizard.

Two Page Master Detail

A two page master detail features two pages based on two related tables or views. **The first page is a non-editable interactive grid**. Users click the Edit icon on the first page edit details on the second page. For example, in the **Employee Application**, suppose you want to build a page which displays all employees working in a specific department. A row from the DEPT (master) table would be selected and the matching rows from the EMP table (detail) would be retrieved based on matching values in the EMP table using the foreign key field – deptno with the value held in the DEPT table dept_id field.

Important Note: You are advised to run the scott.sql and re-create emp and dept tables again. This is in case you are still practicing SQL and PL/SQL tasks. This workbook has used scott.sql, however if you have written Triggers and PL/SQL, you may want to use **scott**.sql (emp and depts tables), which is only slightly different – tables and sequences names .

About Master Detail Forms

When running a master detail form, data is rendered as a report using various form elements (including text fields, text areas, date pickers, select lists, radio groups, and so on).

To add(insert) a new row, you Click on **Create**. To edit row details Click on the **Edit** icon (pen).

For numeric and date fields, you can also pre-define date and number format masks, or apply those format masks after generating the initial form. Wizard generated master detail forms also automatically create validations for some columns. Validations are created for columns that are set to NOT NULL in the underlying table and columns of type NUMBER, DATE or TIMESTAMP. Note that validations are not created for columns if the column is set to read-only, either based on the user's selection, or defined user interface defaults.

Creating an Application from Scratch

You can create an application based on a table, query, or drill-down query by selecting **Create Application** in the Create Application Wizard.
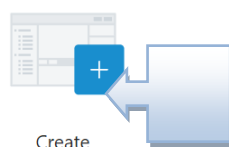
To create an application:
1. On the Workspace home page, click the **Application Builder** icon.
2. Click the **Create** button.
3. For **Create an Application,** select **New Application**. Then Click **Next**.

Create an Application
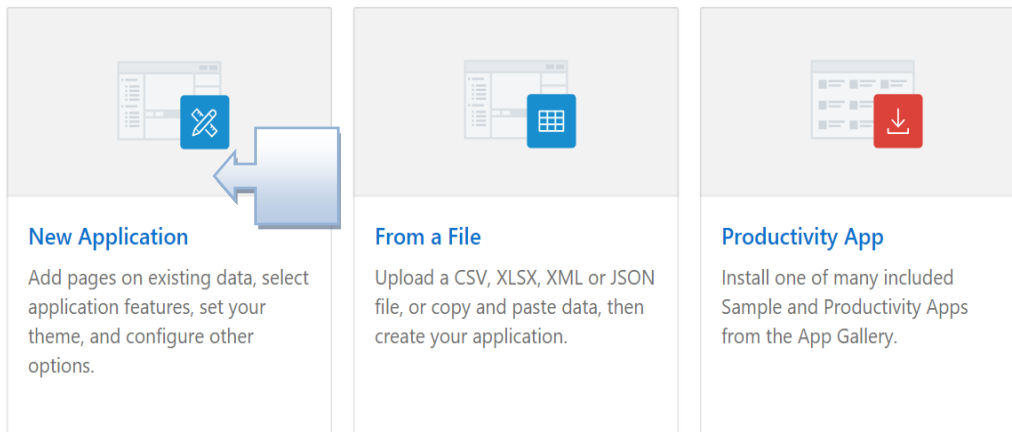
4. Enter the following and click **Next**:
   a. Name - Enter a name to identify the application. **Enter: HR_Application**
   b. Theme – leave the default theme. A Theme can be changed at later stage.
   c. You could click on **Create Application** at this stage.

View Blueprint | Load Blueprint

Create an Application

Name
HR_Application

Appearance
Vita, Side Menu

Pages ⓘ

+ **Add Page**

🏠 Home   Blank   Edit 🏠

Features ⓘ   Check All

☐ ⓘ About Page
Add about this application page

☐ 🔍 Access Control
Enable role-based user authorization

☐ 👤 Activity Reporting
Include user activity and error reports

☐ ⚙ Configuration Options
Enable or disable application features

☐ 💬 Feedback
Allow users to provide feedback

☐ ✎ Theme Style Selection
Update default application look and feel

Settings ⓘ

Application ID
355

Schema
LAZARE01

Authentication
Application Express Accounts

Language
English (en)

Advanced Settings

User Interface Defaults

Your Application is now created. If you run it all you will see is a blank canvas, with the label of the application at the top left. Now you are ready to add some content to it, by adding tables that will be

used to manage data. In our case these are Dept and Emp tables. You may want to re-run your **Scott** script to recreate your tables, if you haven't done so already.
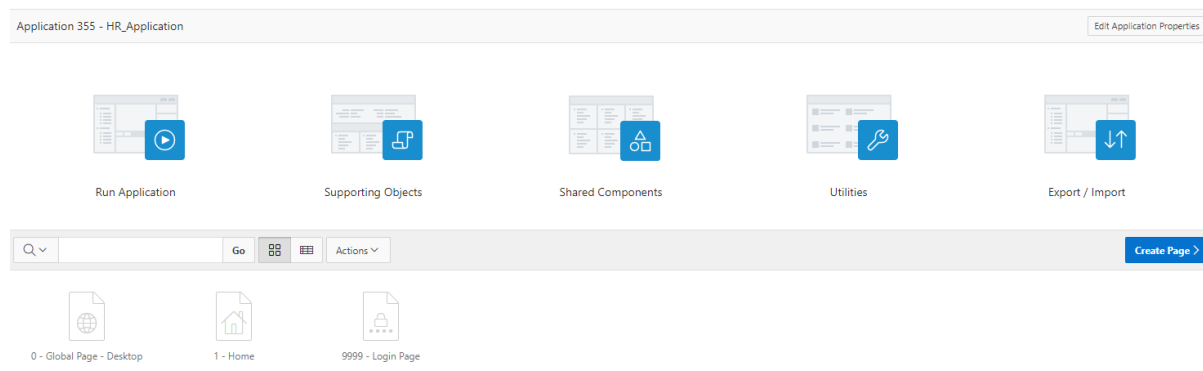
Creating a Master Detail Form

The Create Page Wizard provides **support** for creating a master detail from two tables. When created using a wizard, the master form on a master detail form page includes buttons that enable the user to move forward and backward within the master result set. While running the wizard, you choose which columns determine the navigation order.

To create a master detail form using the Create Page Wizard:
1. On the Workspace home page, click the **Application Builder** icon.
2. Select the **Application and** Click **Create Page** button.

3. On Create Page, select **Master Detail**. This is NEW in Apex 19 – three types of Master Detail forms.

4. Choose **Stacked** option and click on **Next**

5. On Page Attributes for Page Name type in **HR Details**

6. Click **Next**.

7. For Navigation Menu, select how you want this page integrated into the Navigation Menu. Depending upon the option you select, additional attributes appear. Click **Next**.

Create Master Detail   ×

◉ ─────────── ● ─────────── ○ ─────────── ○

Navigation Menu

Navigation Preference
  ○ Do not associate this page with a navigation menu entry   ⑦
  ◉ **Create a new navigation menu entry**
  ○ Identify an existing navigation menu entry for this page

* New Navigation Menu Entry   `HR Details`   ⑦

Parent Navigation Menu Entry
```
- No parent selected -
Home
```
⑦

[<]   Cancel   **Next >**

8. For Master Source select details as specified on the form below:

Create Master Detail   ×

◉ ─────────── ◉ ─────────── ● ─────────── ○

Master Source

* Master Region Title   `Department`   ⑦

* Table / View Owner   `LAZARE01` ⌄   ⑦

* Table / View Name   `DEPT (table)` ☰   ⑦

* Primary Key Column   `ROWID` ⌄   ⑦

* Select Columns ⑦

	↰	DEPTNO (Number)
	»	DNAME (Varchar2)
	>	LOC (Varchar2)
	<	
	«	

⊼ ↑ ↓ ⊻

[<]   Cancel   **Next >**

9. For Detail Source, specify details as displayed below:

Create Master Detail

* Detail Region Title	Employee	?
Show Only Related Tables:	● Yes ○ No	?
Table / View Owner	**LAZARE01** ?	
* Table / View Name	EMP	?
* Primary Key Column	ROWID	?
* Master Detail Foreign Key	DEPTNO -> DEPTNO	?

* Select Columns ?

EMPNO (Number)
ENAME (Varchar2)
JOB (Varchar2)
MGR (Number)
HIREDATE (Date)
SAL (Number)
COMM (Number)
DEPTNO (Number)

[<] Cancel   **Create**

10. Click **Create. Done. Run the application**

You may be asked to log in. This is the view you should have.

You can also use Oracle Docs to learn how to create different types:

- About Master Detail Forms

- Creating a Master Detail Form Using the Create Application Wizard

- Creating a Side by Side Master Detail Using the Create Page Wizard

- Creating a Stacked Master Detail Using the Create Page Wizard

- Creating a Two Page Drill Down Master Detail Using the Create Page Wizard

https://docs.oracle.com/en/database/oracle/application-express/19.1/htmdb/managing-master-detail-forms.html#GUID-6143A5AE-FCAB-4D7F-8B8C-7EFBE39359FB

Task:
- Insert a new department.
- Add two new employees in the new department.
- Check in Object Browser that the new details are there.

How to use the Form
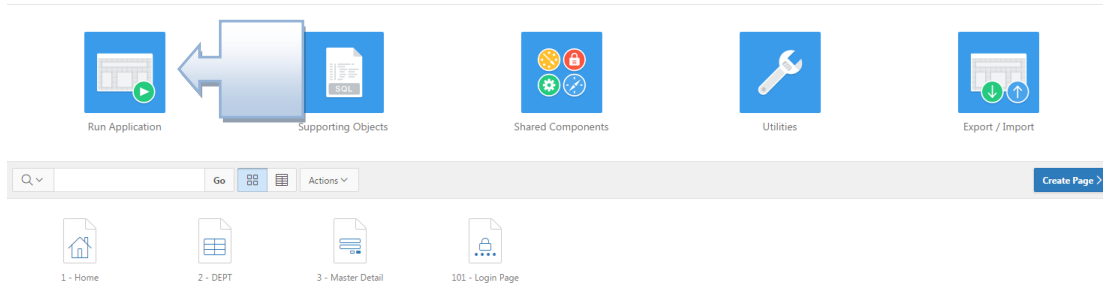
1. Click on the **Run** Button.
2. After you **log in** on the first page you'll see is the **Dept table** details. You may need to click on the link: DEPT on the side.
   a. by using **Add_Row button.** Add any record you want then Click on **Save** button. You may be asked as well to add employee details at this stage.

   b. You can now add a new record for EMP Detail table by using **Add_Row button.** Add any record you want then Click on **Save** button. Again pay attention that empno is not available to add a record.

   c. Try now to Update salary for any employee to 2000. **Save** the change.
   d. To Delete a detail table (emp) record, make sure you checked record you want to delete and press **Delete_Checked.**

Creating a Master/Detail – Side by Side Form

To create a single page Side by Side Form using the Create Page Wizard:
1. Navigate to the application builder
2. Select an application and Click **Create Page**.
3. On Create Page, select **Master Detail,** choose **Side by Side and click on Next**
4. In the Master Detail Page Name(Value Required) enter: HR Different View.
5. For Navigation Menu, select **Create a new navigation menu entry** and then select **Home**
6. For Master Detail Page Select options shown below:

Click on Create and Run the form. The view will look like the one below:

Try to create on your Master Detail type of page Drill Down

How do to it you can follow instructions here, or watch lecture recording.
https://docs.oracle.com/en/database/oracle/application-express/19.1/htmdb/managing-master-detail-forms.html#GUID-13B701BC-5F10-414E-898A-0399103CCB8D

Developing Reports

When creating a database application, you can include two types of reports: an **interactive report** or a **classic report**. The main difference between these two report types is the extent to which end users can customize the appearance of the data through searching, filtering, sorting, column selection, highlighting, and other data manipulations.

To learn more about different types of reports and other options, not discussed in the workbook, please visit
https://docs.oracle.com/en/database/oracle/application-express/19.1/htmdb/developing-reports.html#GUID-A63ECD33-D759-4725-9666-A02719FB35B8

Interactive Reports

To create an interactive report, developers either select a table or provide a SQL statement. Developers can restrict the capabilities available to end users (such as disabling download or support for hiding column). When the end user views the report, report functionality is same across all reports in the application.

When viewing an interactive report, end users can customize how and what data displays. By default, interactive reports include a search bar, an Actions menu, column heading menus, and Edit icons in the first column of each row. Using options on the Actions menu, users can alter the report layout by hiding or exposing specific columns and applying filters, highlighting, and sorting. They can also define breaks, aggregations, charts, group by, and add their own computations. Once customised, the report can be saved as either a private or public report.
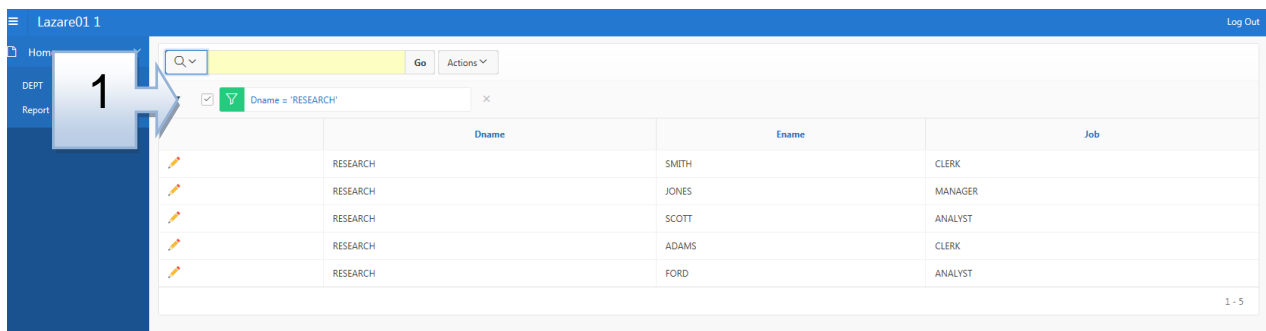
The following is an example of an Interactive Report. What it means is that you can view an output form one or more table, and you can drill up or down through the data in the report. This is why it is called Interactive.

To develop an interactive table you can select either a table or provide a SQL statement. In the example below you can see that an SQL statement is used to create this Interactive report above.
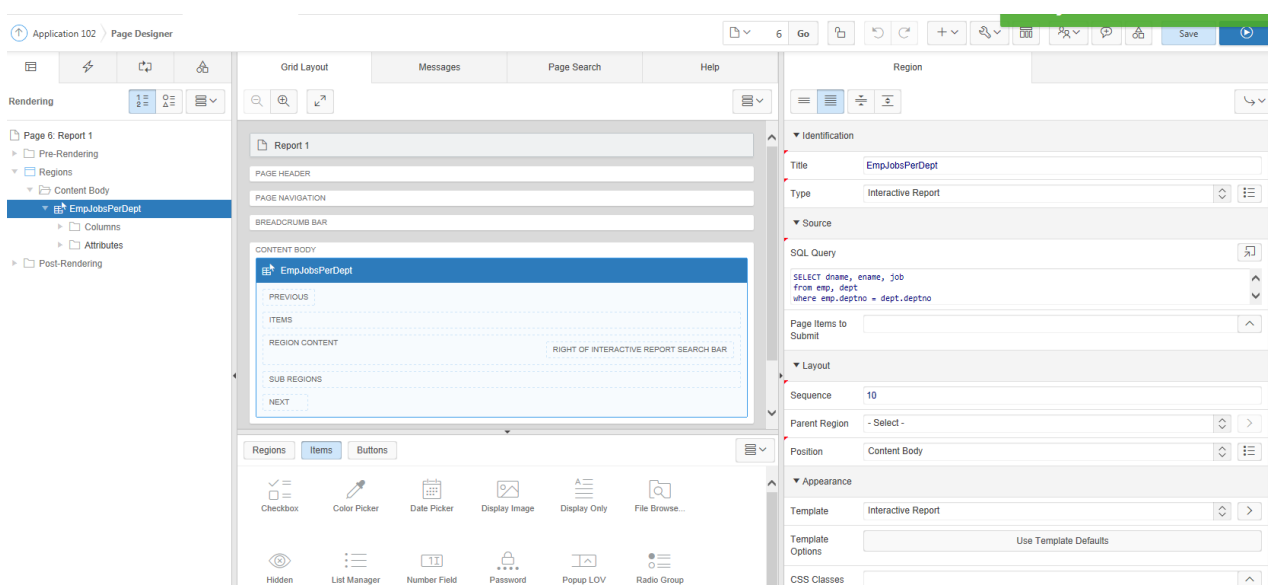
When viewing an interactive report, end users can customize how and what data is displayed. By default, interactive reports include a search bar, an Actions menu, column heading menus, and Edit icons in the first column of each row. Using options on the Actions menu, users can alter the report layout by hiding or exposing specific columns and applying filters, highlighting, and sorting. They can also define breaks, aggregations, charts, group by, and add their own computations. Once customized, the report can be saved as either a private or public report.

See the example below, for employees who are working in the department Research:

How to create an Interactive Report using a Wizard

https://docs.oracle.com/en/database/oracle/application-express/19.1/htmdb/creating-report-create-page-wizard.html#GUID-6AB94A05-66FD-408B-A43E-0FDF5227057A

1. Go to Application page for **HR_Application** and click on **Create Button.**
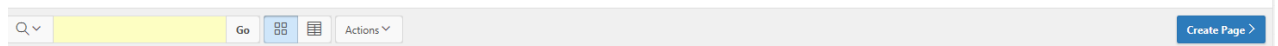
2. Select **Report** icon.
3. On the Next page select **Interactive report**. Try to remember the ICON for the interactive report.
4. On the next page specify for Page Name: InteractiveReport and click **Next**.
5. On the Navigation Menu page select the second option. In Parent Navigation Menu Entry select Home.

6. Click **Next**
7. Type in the following query and don't forget to validate your query before clicking **Next**.

Create Interactive Report

Report Source

Data Source: **Local Database** | REST Enabled SQL Service | Web Source ⑦

* Source Type: ○ Table ● **SQL Query** ⑦

* Enter a SQL SELECT statement ⑦

Validation successful ✕

```
1  select dname, ename, job from emp, dept where emp.deptno = dept.deptno
```

› **SQL Query Example**

‹   Cancel   **Create**

---

8. **Validate** your query by clicking on the 'tick' option, and click on **Create**.

9. Run your Interactive report and sort data accoding to a job, and then filter employee names.

To change name on the Report – if not labelled accordingly from the beginning:

Excersise: Create another Interacative Report of your own choice, using one of the SQL queries you've produced previously in SQL&PL/SQL workbook.

Classic Reports

In contrast, except for sorting and simple filtering, end users cannot customize a classic report. The following is an example of a classic report built on top of the same data.

Report 1

Empno	Ename	Job ↑≡	Mgr	Hiredate	Sal	Comm	Deptno
7788	SCOTT	ANALYST	7566	19-APR-87	3000		20
7902	FORD	ANALYST	7566	03-DEC-81	3000		20
7876	ADAMS	CLERK	7788	23-MAY-87	1100		20
7900	JAMES	CLERK	7698	03-DEC-81	950		30
7934	MILLER	CLERK	7782	03-JAN-82	1300		10
7369	SMITH	CLERK	7902	17-DEC-80	800		20
7566	JONES	MANAGER	7839	02-APR-81	2975		20
7698	BLAKE	MANAGER	7839	01-MAY-81	2850		30
7782	CLARK	MANAGER	7839	09-JUN-81	2450		10
7839	KING	PRESIDENT		17-NOV-81	5000		10
7499	ALLEN	SALESMAN	7698	20-FEB-81	1600	300	30
7521	WARD	SALESMAN	7698	22-FEB-81	1250	500	30
7654	MARTIN	SALESMAN	7698	28-SEP-81	1250	1400	30
7844	TURNER	SALESMAN	7698	08-SEP-81	1500	0	30
1	jj	boss	7499	20-FEB-81	9999		30

Download

1 - 15   Next ▶

To create a classic report, developers either select a table or provide a SQL statement. Classic reports support general keyword search capability, the ability to specify the number of rows that display, and basic column sorting.

How to create a Classic Report

On the Workspace home page, click the **Application Builder** icon.
- Select the application e.g **HR_Application**
- Click **Create Page** and click **Next**.
- Click on Report.
- Select a report type - **Classic Report** and click **Next**.
- On this page: Leave the default values and Click **Next**.

a. Follow the on-screen instructions. You could give a name to your report: Classic Report
- On the Navigation Menu page select the **second option**: *Create a new navigation menu entry* and highlight HOME page (if you have got one) in the box below.
- Type in the following query:
  a. *SELECT dname, ename, job FROM emp, dept WHERE emp.deptno = dept.deptno*
  b. Validate the query and click on **Next**

Create Classic Report

Report Source

Source Type ○ Table ● SQL Query ⑦

Enter a SQL SELECT statement ⑦

Validation successful

```
1 SELECT dname, ename, job  FROM emp, dept WHERE emp.deptno = dept.deptno
```

Column Headings: ● Derived from query columns ○ Generic columns

> SQL Query Example

< Cancel   Create

- Confirm your report and click on **Create**.
- **Run** your Classic report.Values in your report may look differently, but the colums and layout will be the same:

Did you know?

Editing Column Attributes in Page Designer

You can edit Column attributes to precisely control the report layout. For example, you can use these attributes to alter column headings, change column positioning, hide a column, or control how users can manipulate a column.

To access Column attributes:

View the page in Page Designer. When Page Designer appears.
- In the Rendering tree, locate the region and expand the Columns node.
- The columns appear in the Rendering tree.
- Select a column to edit
- The Property Editor displays the attributes for that column.

- Edit the appropriate attributes. To learn more, see field-level Help.
- To edit the column heading:
  - Locate and expand Heading.
  - Edit the Heading and Alignment attributes.
- To control how users can manipulate a column:
  - Locate and expand Enable Users To.
  - For Enable Users To, select Yes or No to control how users can manipulate the report.
- To save your changes click Save. To save and run the page, click Save and Run
- Page.

Editing Interactive Report Attributes in Page Designer

You can edit report attributes to precisely control how a report works. For example, you can use these attributes to configure pagination, create error messages, configure the Search bar, Action menu, and download options, control if and how users save the report, and configure supported views.

To edit report attributes in Page Designer:
- View the page in Page Designer. Page Designer appears.
- In the Rendering tree, locate the region containing the report.
- Under Region, select the **Attributes** node.
- The Property Editor displays the report attributes in the Property Editor.
- Edit the appropriate attributes. To learn more, see field-level Help.
- To save your changes click **Save**. To save and run the page, click **Save and Run**

Charts

Charts are useful for showing summary data in graphical form. APEX allows you to extract data from your tables and display the results in the form of charts. A variety of chart types are available including Bar and Pie charts.

Suppose you want to display a 2D Pie chart showing the comparison of CASH against CREDIT CD purchases, you can do this using the charting facilities as follows:

Adding a Chart to a New Page

To create a **chart** on a new page:

1. On the Workspace home page, click the **Application Builder** icon.
2. Select your application
3. Click **Create Page**.
4. Select **Chart** and click **Next**.

5. For Region, select Pie and click **Next**.
6. On Page and Attribute page fill in the following:

Click **Next**.

7. Select the option *Create a new navigation menu entry* and highlight HOME page (if you have got one) in the box below and click **Next**.
8. Enter your query. In our example enter:

Create Chart   ×

✓ ————— ✓ ————— ✓ ————— ● ————— ○
                                   Source

Source Type ○ Table ● **SQL Query** ⑦

*SQL Query ⑦

↺ ↻ 🔍 ↔ 🔝 A⁻⁻ ⊘   ⚙⌄

Validation successful   ×

```
1  select dname, sal from emp, dept where emp.deptno = dept.deptno
```

Page Items to Submit [   ] ∧ ⑦

Maximum Rows [   ] ⑦

< Cancel   **Next >**

---

9. Validate query and click Next.
10. On column Mapping, please select the following:

Create Chart   ×

✓ ————— ✓ ————— ✓ ————— ✓ ————— ●
                                              Column Mapping

Chart Type: **Pie** ⑦

*Label Column [DNAME   ⌄] ⑦

*Value Column [SAL   ⌄] ⑦

< Cancel   **Create**

11. Click Create and Run your page.
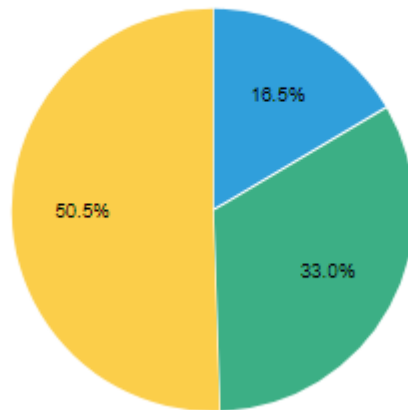
This workbook gives you basic ideas about different interface components in Apex. We suggest you investigate applications such as Sample Report and Charts for further guidance on what can be done by Apex Builder.

In your weekly folder, you've also got links to Apex pages on how to create Maps, Calendar, Charts, Reports etc.

Managing Database Application Components

Review the following using oracle document pages

Creating Maps
Creating Calendars
Creating Charts

https://docs.oracle.com/en/database/oracle/application-express/19.1/htmdb/managing-database-application-components.html#GUID-E7598ABE-5077-4A1F-A3F9-1C89EE2B2CE8