C4. Creating APEX applications. Data input through APEX forms.

An APEX application is a user interface for an Oracle database. Using an application, the users can view, create, modify or delete records, according to the application logic.

When an application is created inside an APEX account, it gets its data from that account database. When a user login to an application, he connects to the database, so all modifications are made into one single place. In the same time, all users see the data from the database (there are no local databases for each application instance). This approach simplifies the development of the applications which requires multiple simultaneous connections from different hosts to one single, central database.

An APEX application consists of individual pages, which can be seen using a browser, in the same manner as a dedicated website. An individual page can have different settings and components, such as:

- *Title* – the page title
- *Navigation menus* – links to the other pages of the application, or external links
- *Breadcrumbs* – the position inside the application (ex: *Home -> Users -> Input*)
- *Regions* – a region is a window inside a page which can contain different components

The regions are the main way to organize data inside a page. A region can be local to its page, or it can be shared to a number of pages. In the last case, it is visible from all these pages. This is useful when

creating regions which need to appear in multiple pages, for example navigation menus.

The user enters data using regions named **FORMS** and sees the data using regions named **REPORTS**. APEX provides many predefined regions and pages, for entering or viewing data, displaying graphics and so on. In most of the cases an application can use these predefined forms as a starting point and customize them if needed.

In this laboratory will be presented the APEX support for data input (*FORMS*). A simple application will be created, which will provide the means to enter data into two tables.

ACTIVITY 1: create the following two tables, which will be managed by the application

DEPARTMENTS table

Column Name	Data Type	Nullable	Default	Primary Key
ID	NUMBER	No	-	1
NAME	VARCHAR2(50)	Yes	-	-
				1 - 2

DEPARTMENTS table stores a list of department names, such as Production, Sales, PR, etc.

PERSONS table

Column Name	Data Type	Nullable	Default	Primary Key
ID	NUMBER	No	-	1
NAME	VARCHAR2(50)	Yes	-	-
EMAIL	VARCHAR2(50)	Yes	-	-
MASTERE	DATE	Yes	-	-
SEX	CHAR(1)	Yes	-	-
DEP_ID	NUMBER	Yes	-	-
				1 - 6

PERSONS table stores a list of peoples, each one possibly being registered to a department. DEP_ID is a foreign key into DEPARTMENTS.

🖎 **ACTIVITY 2**: create the following APEX application using the example presented below

To create an application in APEX, the *Application Builder* menu is used. The *Create* button opens a wizard which can be used to setup the main application layout and theme. The already created applications also appear in this page and they can be modified or run. There are three types of applications: *Database*, *Websheet*, and *Packaged Application*. *Websheet* is a simple application, much like a spreadsheet page. Database application is the preferred way for more complex applications, because they are the most flexible type of applications.

On the next step of the wizard (*Pages*) we can add predefined pages to our application.

There are different predefined types of pages. The ones with "form" can be used enter data. In this example we created a page of type *Tabular Form*, using the DEPARTMENTS table and a page of type *Form*, using the PERSONS table. *Tabular Form* pages show the data in a spreadsheet like format. The created pages are shown above the page types:

In order to modify a page, its name can be clicked to show a settings form:

Shared Components are the components which are displayed on all or a set of the application pages. For now we leave this step with its default settings.

Attributes page lets us select some application global attributes, such as:

- *Authentication scheme* – an application can be accessible to anyone or it can be user/password protected
- *Language* – the language for predefined actions (buttons), such as *Add*, *Create*, etc.
- *Date/time format* – regional formats for date and time

User Interface Theme defines the main theme (graphics attributes) for our application. We selected the *Scarlet* theme for this example. When the application is created, APEX opens it in its own administration page:

From this administration page, any application settings or pages can be added, modified or deleted.

Using the *Run Application* button it can be started with its default generated settings and pages:

If we add new pages and we want them to be included in the navigation menu or if we want to edit shared components, we can use the *Shared Components* button from the application page:
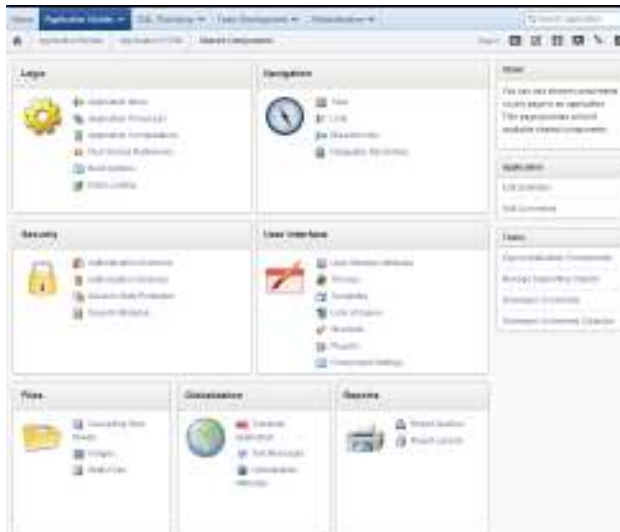
If new pages need to be added to the application, they can be created with the *Create Page* button. After

that, the attributes of a page can be modified by clicking on its name on the pages list.
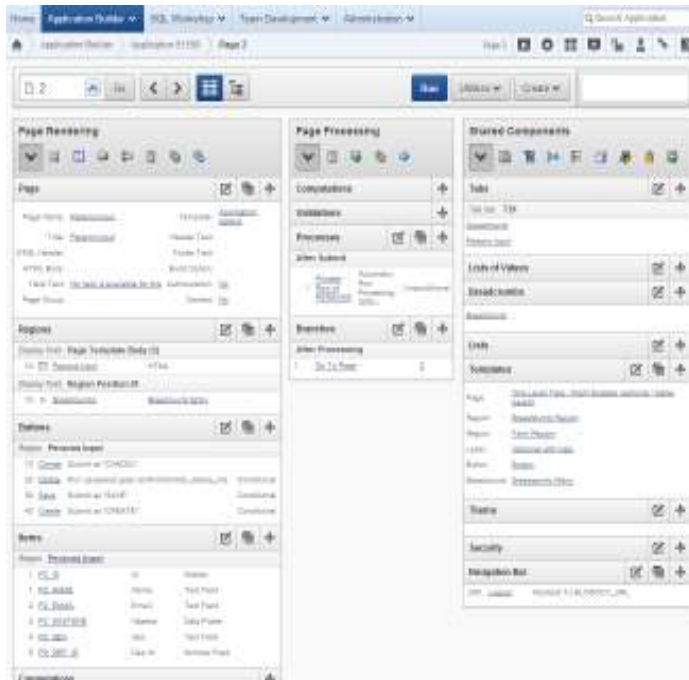
📑 **ACTIVITY 3**: in the page *Persons Input* customize the input field Sex to be shown as a *Radio Group*

The Sex input field takes two values (M and F, with the implicit value M). It would be better if we can represent this field as a radio button. An input field can be modified by clicking on its name, which will open its settings page. Here we can modify its various attributes, such as its label, page alignment, visual styles and so on. The *Identification* tab, field *Display as*, provides various ways to input data. We set it as *Radio Group*. Other tabs can change according with the

Display as value. For example *Radio Group* provides a new tab named *List of Values*, in which we can setup the values shown by the different radio buttons. There are several ways to provide values, and examples are given by clicking on the *List of Values Examples* link. *STATIC* or *STATIC2* are used for directly provided values else these values can be retrieved using a SQL query. The default value can be set from the *Default* tab. To show the values in a horizontal row instead of a vertical one, we can use the *Settings* tab.

✎ **ACTIVITY 4**: in the page *Persons Input* customize the input field *Department* to act as a foreign key in table DEPARTMENTS, allowing the user to directly select department names

First the *Display as* type must be set to *Select List*. In the *List of Values* tab we need to provide a SQL Select statement, which will retrieve the necessary values from the DEPARTMENTS table. The Select statement will provide for every row two values, in exactly this order:

- **first value** is the text to be displayed to the user in the *Select List* field – in our case it is the department name
- **second value** is the field in DEPARTMENTS which is referred by the foreign key – in our case it is department id

It can be seen that we can provide any sort order and we ordered alphabetically the departments names.

After the fields *Sex* and *Department* are correctly set, the *Persons Input* page should look like in the following image: