

Practices for Lesson 19: Altering an Existing Design

Chapter 19

Practice 19-1: Re-Engineer the HR Schema

Task

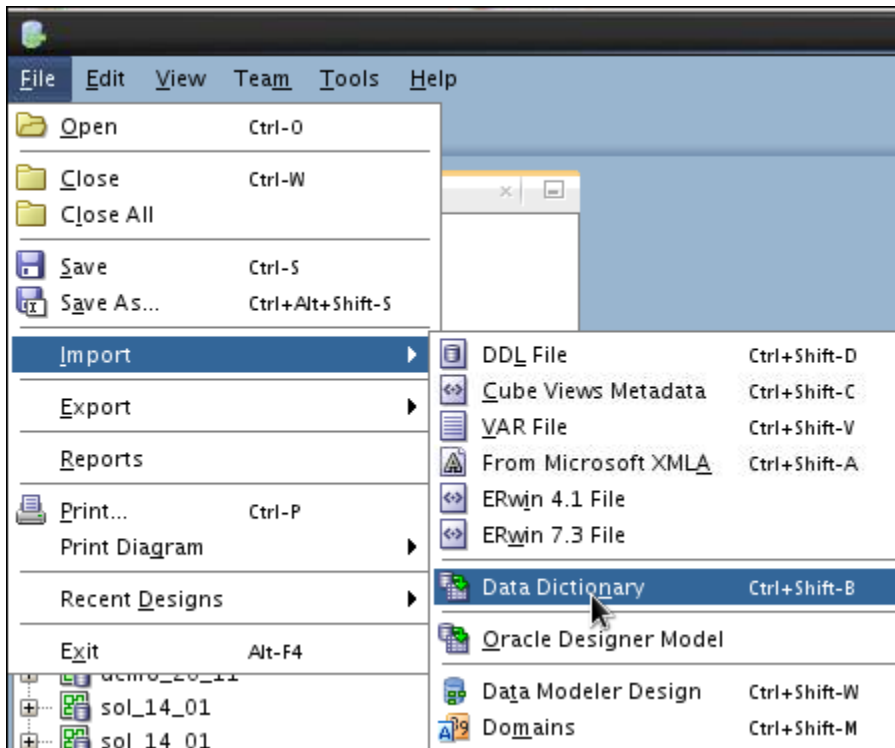
Perform the following tasks in Oracle SQL Developer Data Modeler:

1. Import all the tables in the `hr` schema from the data dictionary.
2. Reverse engineer to create a logical model.
3. Add the `DEPENDENTS` entity with the following attributes: `ID`, `Name`, and `Birthdate`. Create a relationship between `EMPLOYEES` and `DEPENDENTS`. `ID` is the unique identifier. You may import the `domains.xml` file from the solutions directory, and use the domains in the file as the data types for some of your new attributes.
4. Add `COST CENTER` to the `DEPARTMENTS` entity.
5. In the `EMPLOYEES` entity, move `HIRE_DATE` above the `EMAIL` attribute.
6. Create a 1:N relationship between `EMPLOYEES` and `DEPENDENTS`.
7. Forward engineer to a new relational model.
8. Compare the relational model with what is currently in the database.
Hint: Run the import from the data dictionary.
9. Preview the DDL. Were the correct `ALTER` statements generated?

Solution 19-1: Re-Engineer the HR Schema

The following is one possible solution to this practice.

1. Close all open models.
2. Select **File > Import**, and then select **Data Dictionary**. The **Data Dictionary Import Wizard** dialog box is displayed.



Note: If you created other database connections earlier in this course, those connections (such as `orcl_dm1`, which you created in practice 10-2) will also be displayed. In this practice, you will create and use new database connections; however, if you created the `hr_orcl` database connection earlier in the course using the same properties as in the following step 4, you can use that database connection and proceed with step 5.

3. Create a database connection to your database. Click **Add**. The **New / Select Database Connection** dialog box is displayed.

The screenshot shows the 'New / Select Database Connection' dialog box. On the left, there is a table with two columns: 'Connection Name' and 'Connection Details'. The first row shows 'orcl_dm1' and 'dm1@//localhost:1...'. Below this table is a 'Status' label. On the right side of the dialog, there are several input fields and checkboxes. The 'Connection Name' field is empty. Below it are 'Username' and 'Password' fields, both empty. There is a checked checkbox for 'Save Password' and a 'Connection Color' button. Below these are two tabs: 'Oracle' and 'JDBC'. The 'Oracle' tab is selected. Under the 'Oracle' tab, there is a 'Connection Type' dropdown set to 'Basic' and a 'Role' dropdown set to 'default'. Below these are fields for 'Hostname' (localhost), 'Port' (1521), and 'SID' (xe). There is also a 'Service name' field which is empty. At the bottom of the Oracle section, there are three unchecked checkboxes: 'OS Authentication', 'Kerberos Authentication', and 'Proxy Connection'. At the very bottom of the dialog, there are buttons for 'Help', 'Save', 'Clear', 'Test', 'Connect', and 'Cancel'.

4. Enter the following:
 - a. **Connection Name:** `hr_orcl`
 - b. **User Name:** `hr`
 - c. **Password:** `hr`
 - d. Select the **Save Password** check box.
 - e. **SID:** `orcl`

- Click **Test** to test your new connection. If the connection is valid, **Status: Success** is displayed at the bottom left corner of the dialog box. Then click **Connect** to connect to the database.

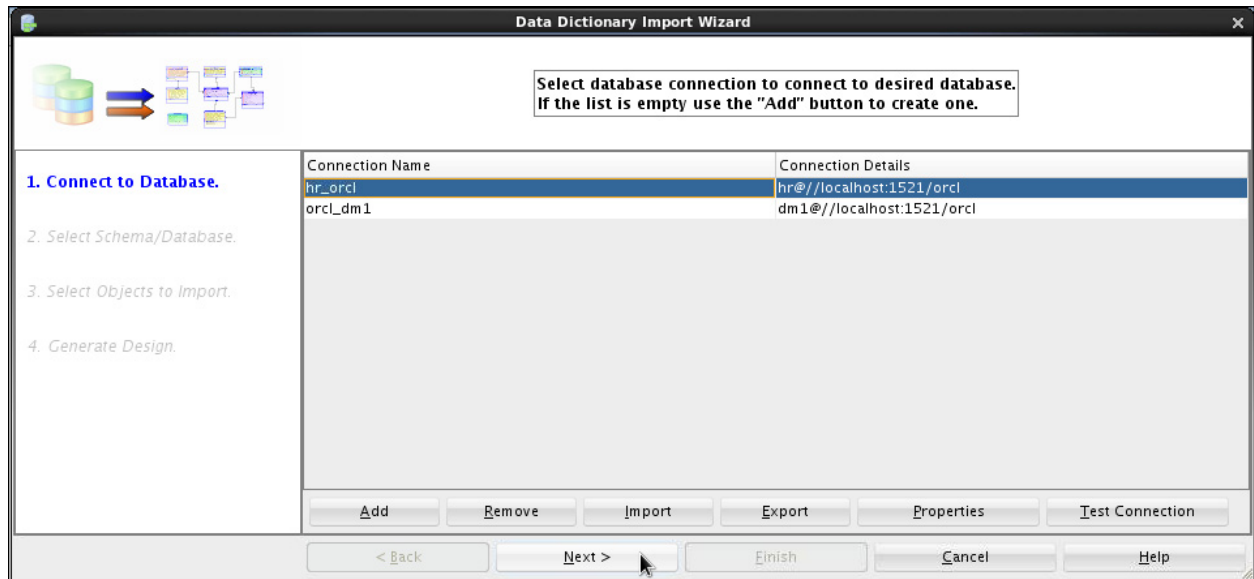
The screenshot shows the 'New / Select Database Connection' dialog box. The 'Connection Name' is 'hr_orcl', 'Username' is 'hr', and 'Password' is masked with two dots. The 'Save Password' checkbox is checked. The 'Oracle' driver is selected, and the 'JDBC' tab is active. The 'Connection Type' is 'Basic' and the 'Role' is 'default'. The 'Hostname' is 'localhost', 'Port' is '1521', and the 'SID' is 'orcl'. The 'Service name' is empty. The 'OS Authentication', 'Kerberos Authentication', and 'Proxy Connection' checkboxes are unchecked. The 'Status: Success' message is displayed in a red box at the bottom left. The 'Test' button is highlighted with a mouse cursor.

The screenshot shows the same 'New / Select Database Connection' dialog box. The 'Status: Success' message is now displayed in a black box at the bottom left. The 'Test' button is highlighted with a yellow border, and the 'Connect' button is highlighted with a mouse cursor.

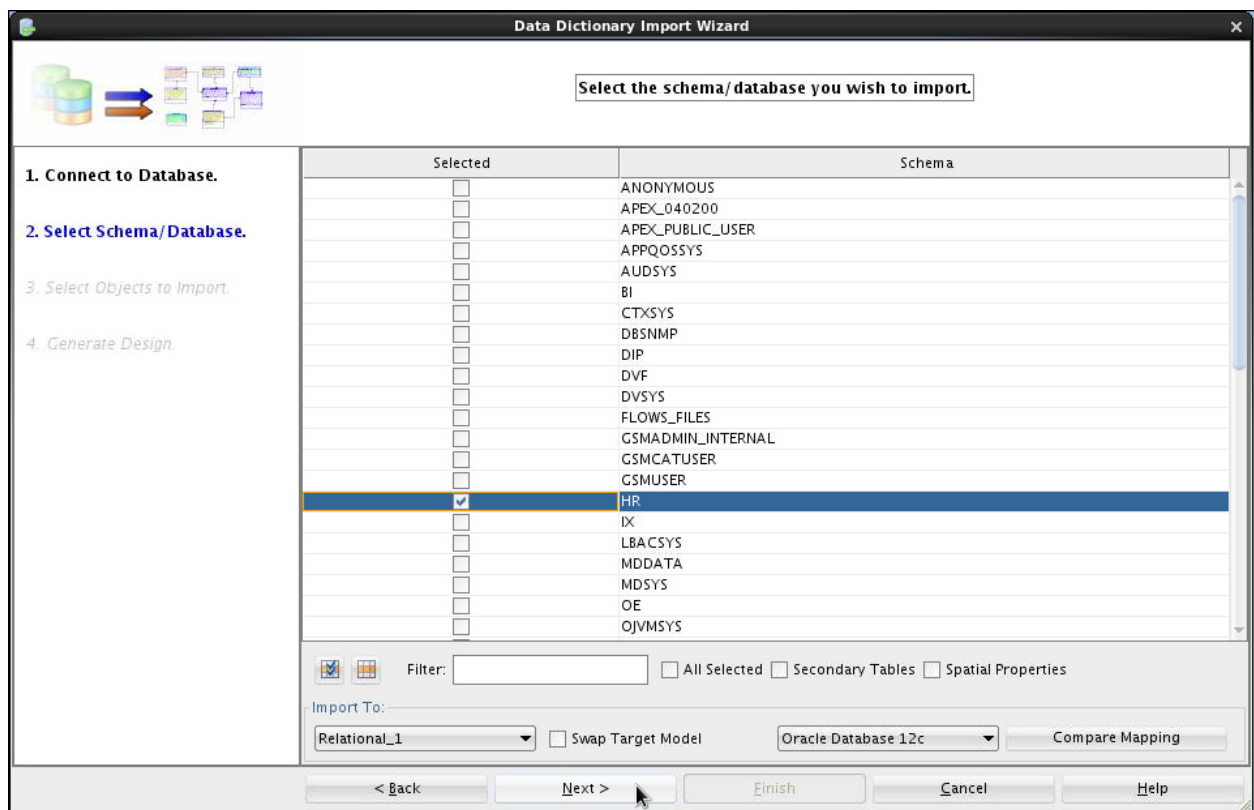
6. Select the `hr_orcl` connection that you just created, and then click **Next**.

Note: If you select another schema that the HR user does not have access to, you will see no objects when you click **Next**.

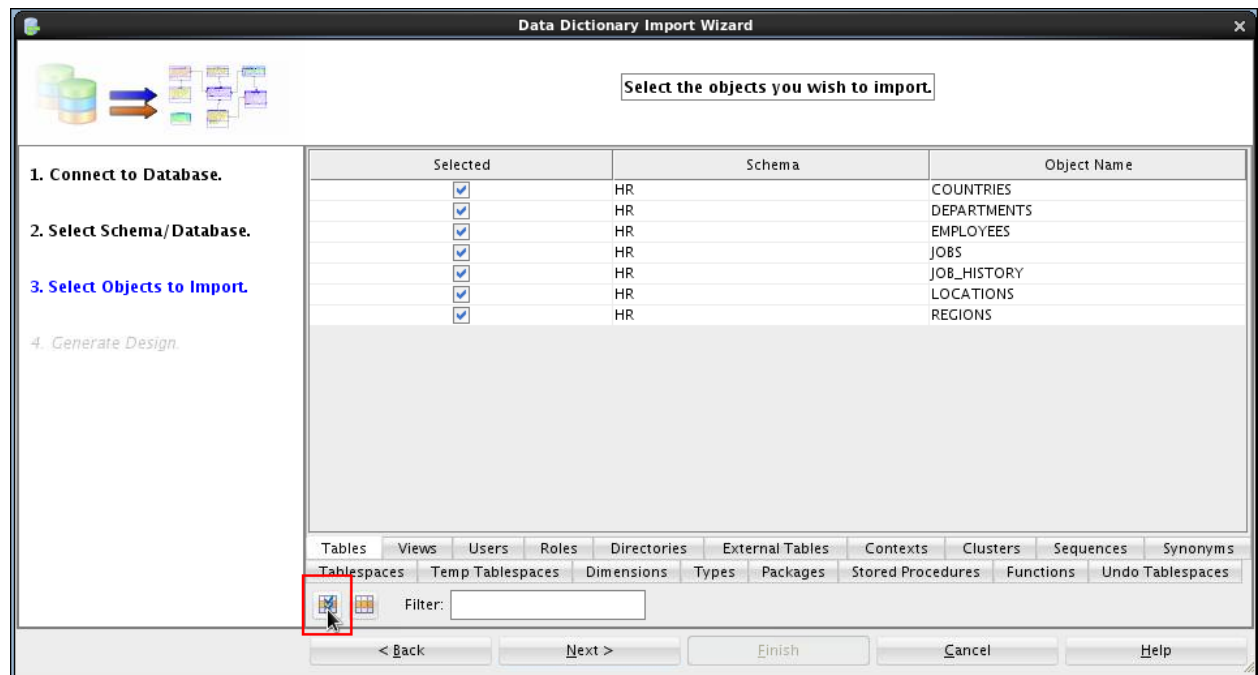
Note: If you have completed all of the earlier practices, you might see some additional database connections displayed.



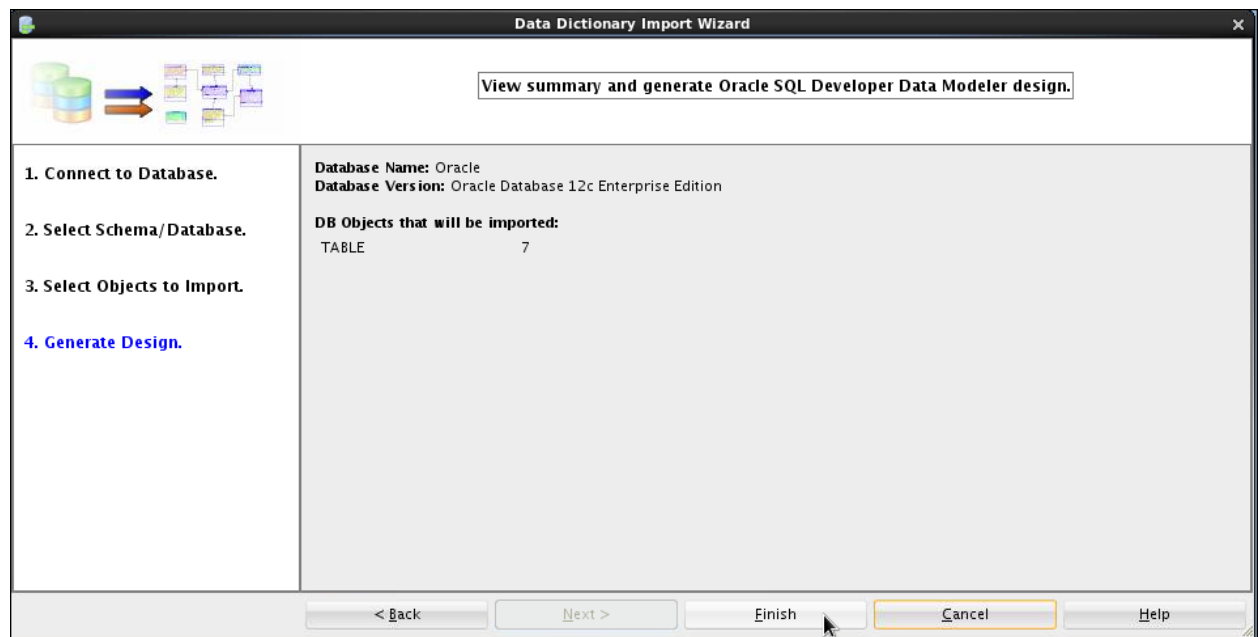
7. Select the HR schema from the list of available schemas and click **Next**.



8. Click the **Select All** icon  to select all the HR tables, and then click **Next**.



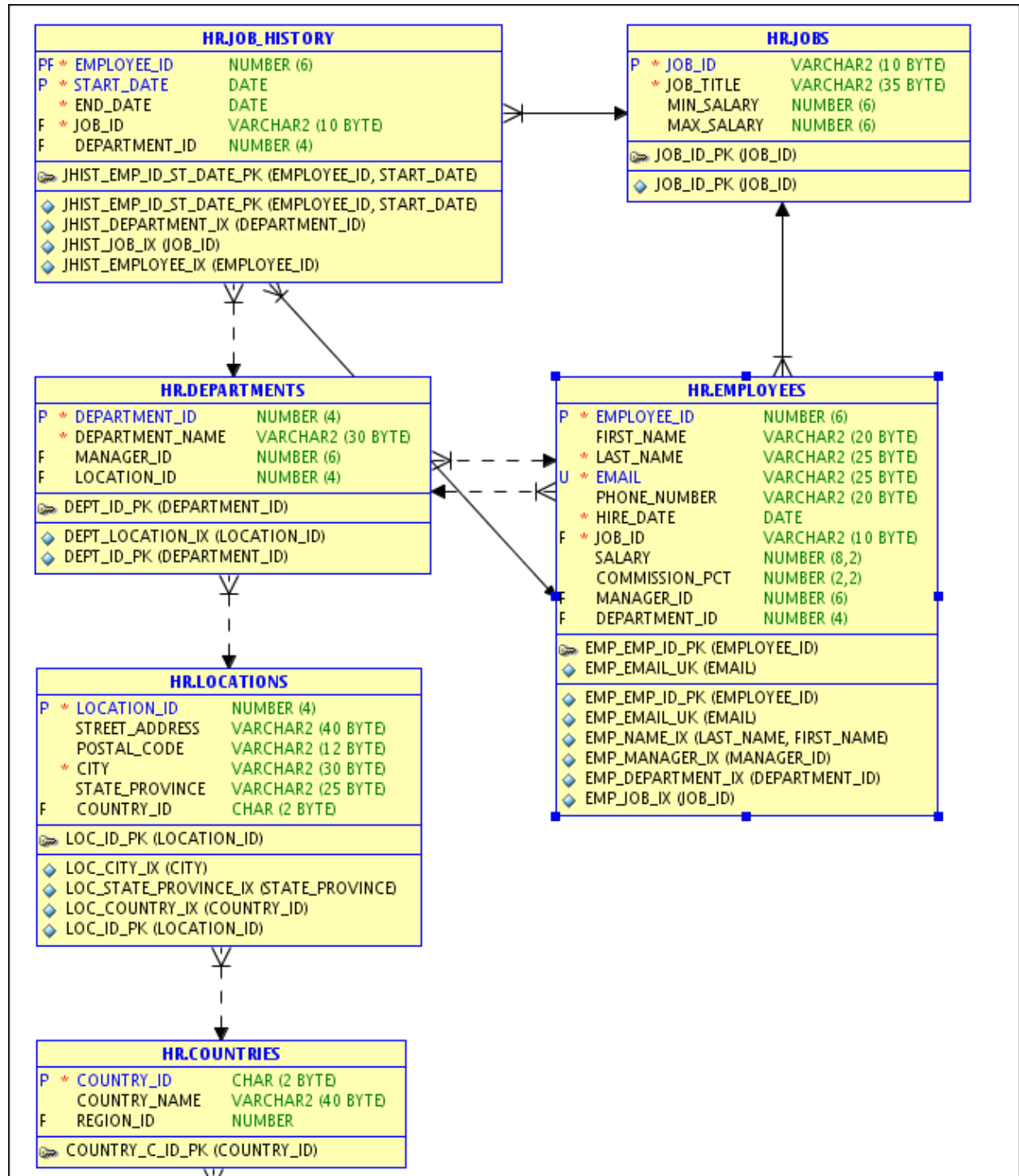
9. A summary of all the objects that will be imported is displayed. Click **Finish**.



10. Seven tables were imported successfully. Click **Close**.



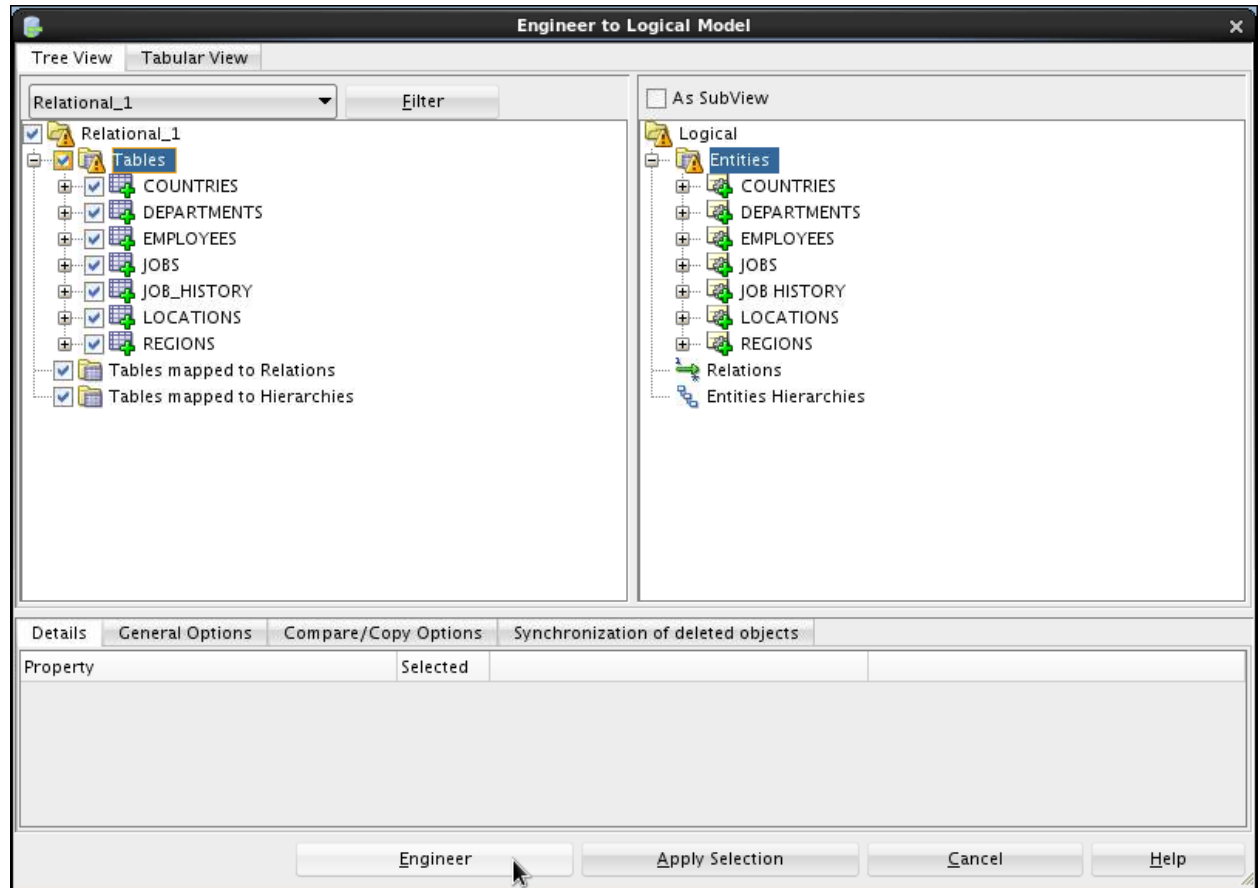
11. Your relational model is displayed. The following is a portion of the relational model.



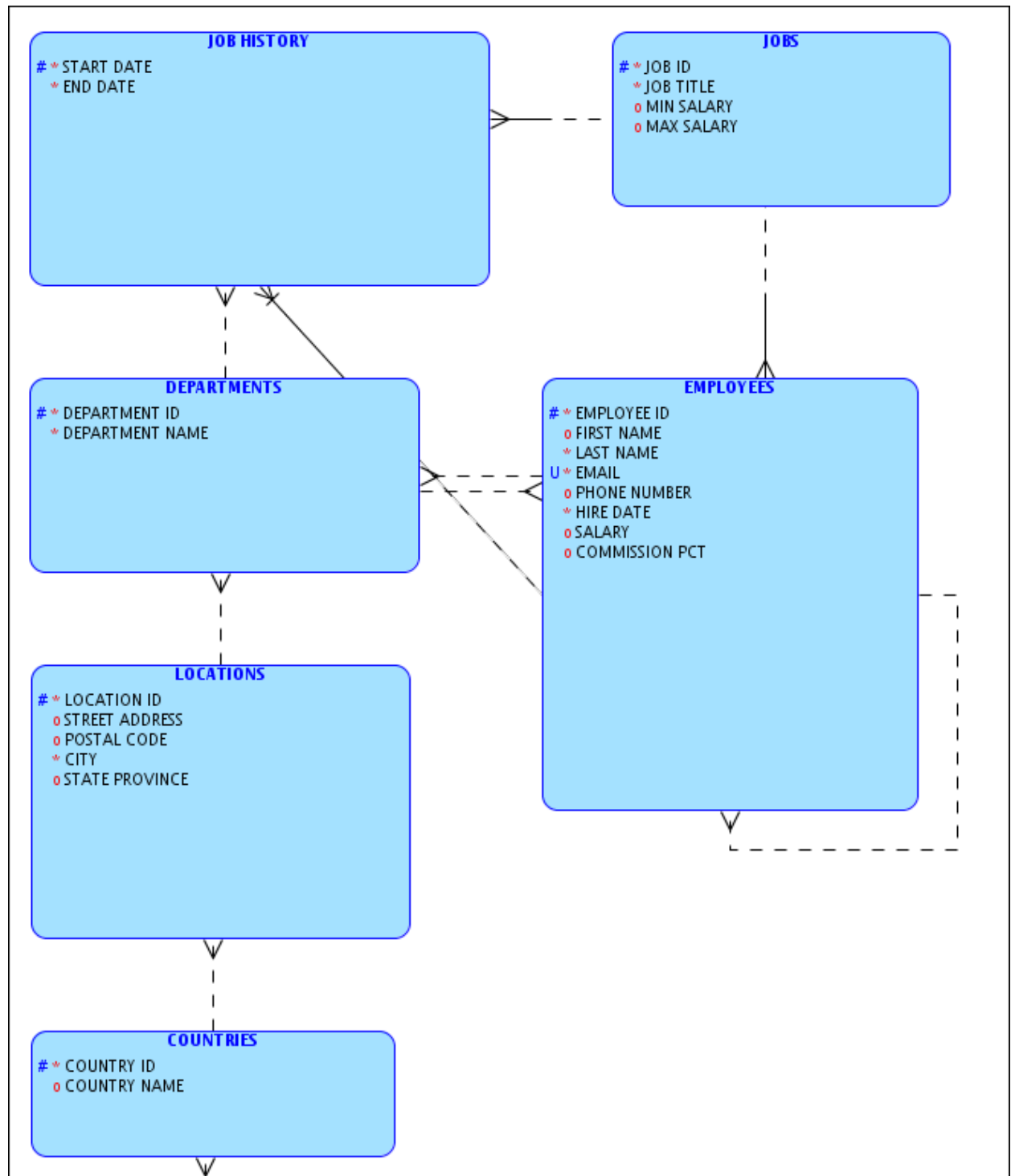
12. You can now reverse engineer to create the logical model. Click the **Engineer to Logical**

Model  icon.

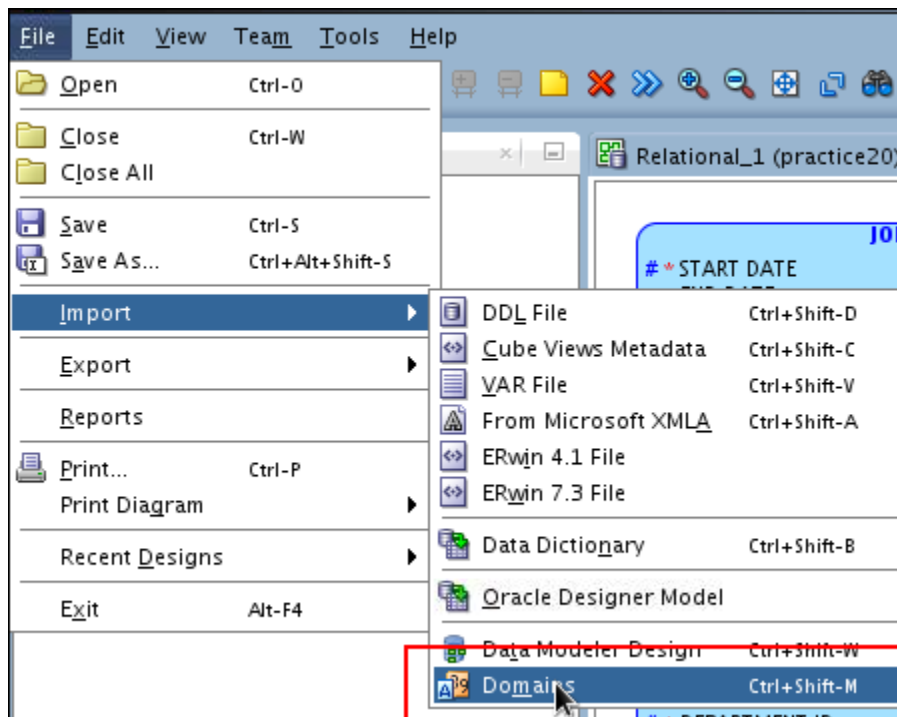
13. Expand the **Tables** node to see the mapping. Click **Engineer**.



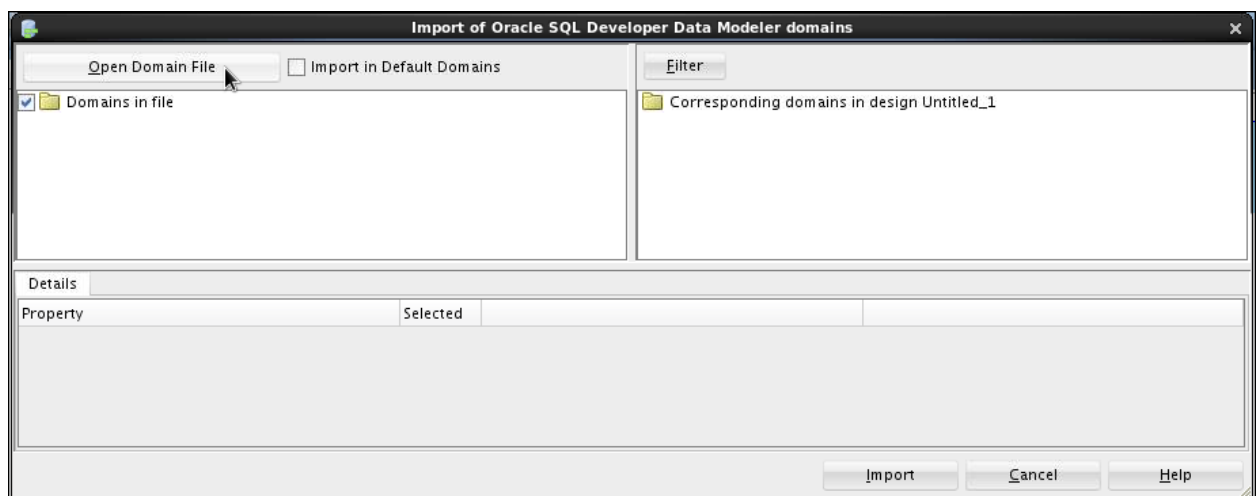
14. Your logical model is displayed. Save your design. Select **File > Save As** and then provide a name for your design such as `practice19.dmd`, and then click **Save**.



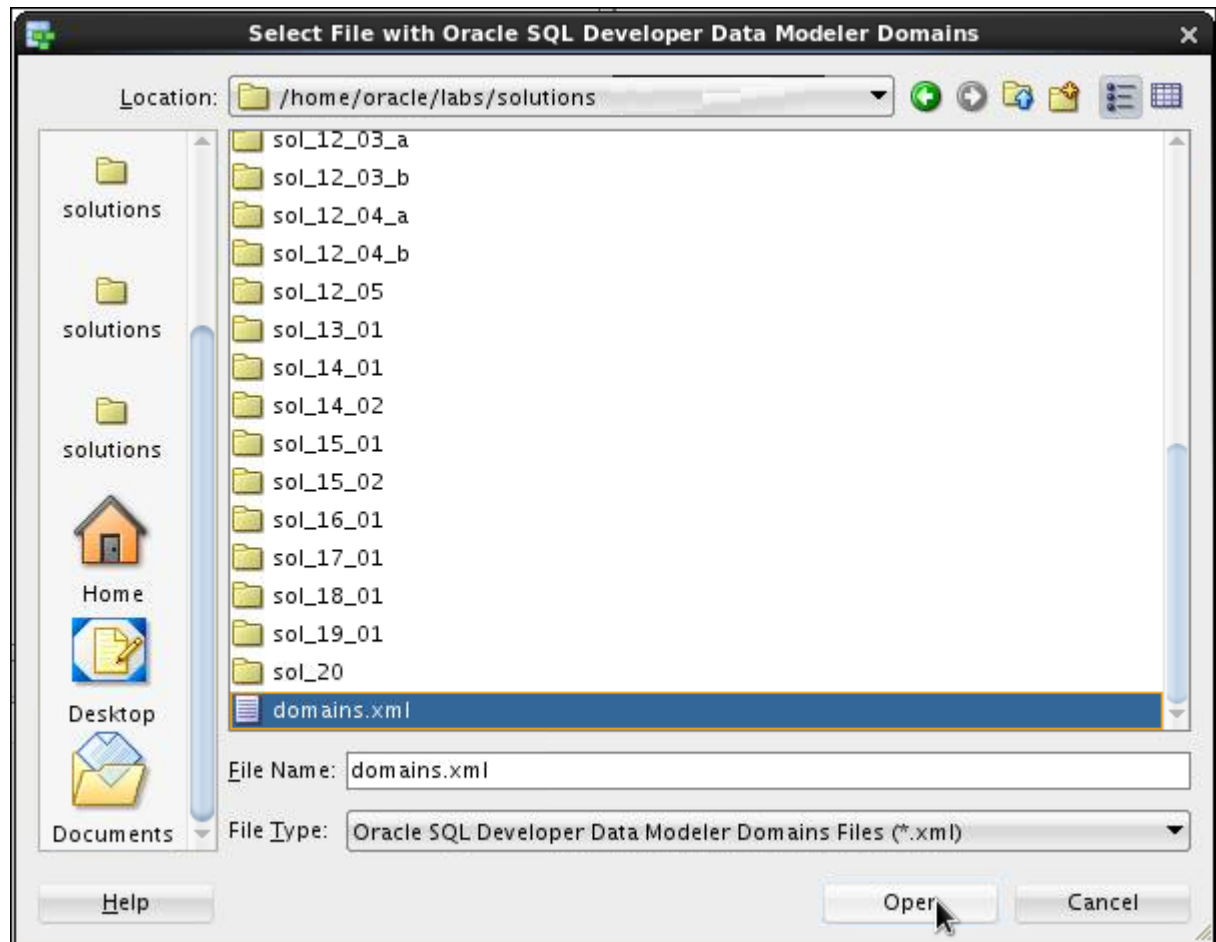
15. You want to create some attributes that use the domains contained in the domains.xml file in the /home/oracle/labs/solutions directory. You need to import this domain file. Select **File > Import > Domains**. The **Import of Oracle SQL Developer Data Modeler domains** dialog box is displayed.



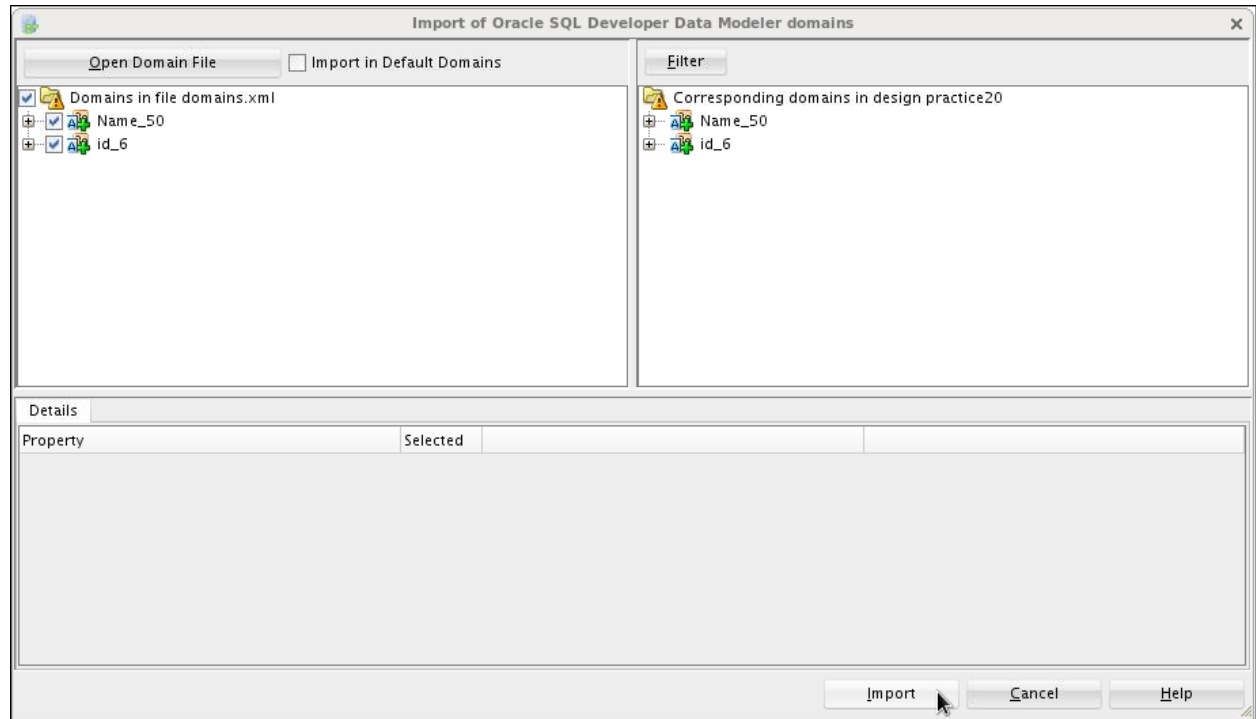
16. Click **Open Domain File**. The **Select File with Oracle SQL Developer Data Modeler Domains** dialog box is displayed.



17. Select the `domains.xml` file in the `/home/oracle/labs/solutions` directory, and then click **Open**.

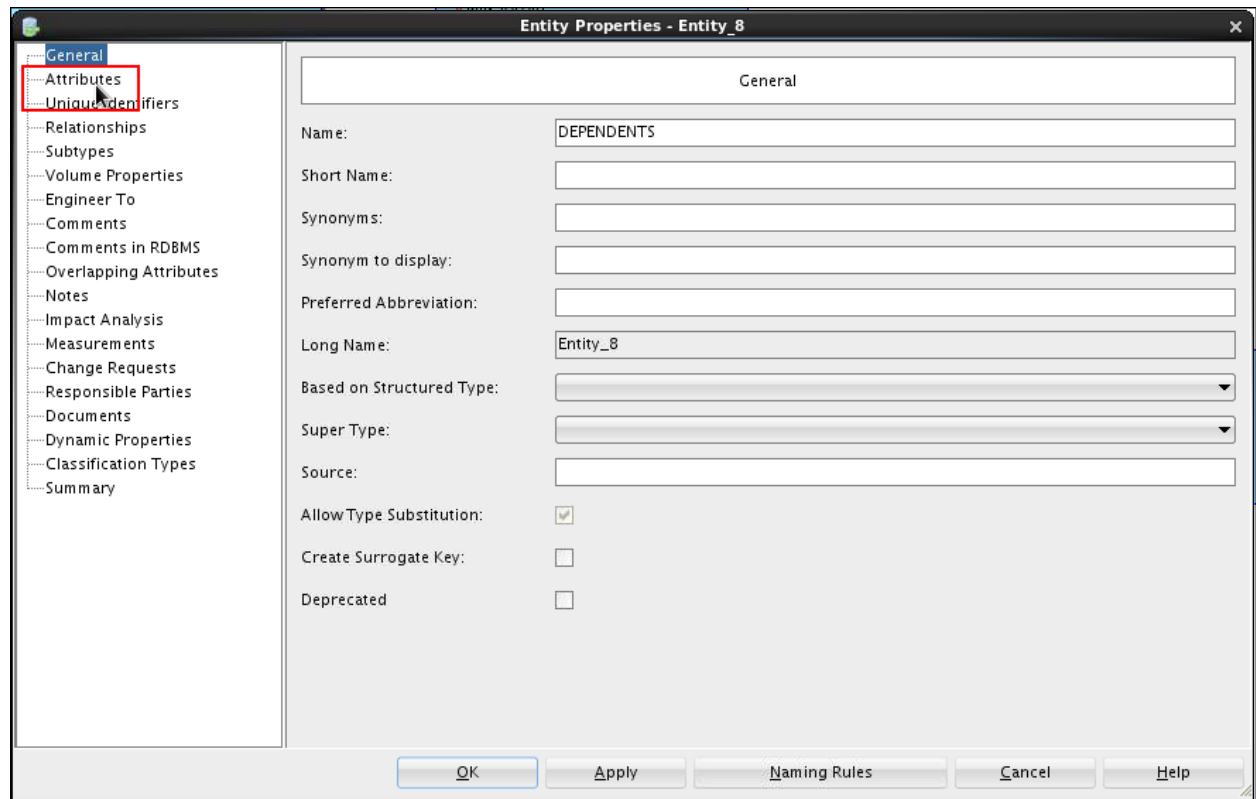



18. The list of domains in the XML file is displayed. Click **Import**.



19. Now you will create a new entity. Click the **New Entity**  icon, and then click in the white space of the diagram.

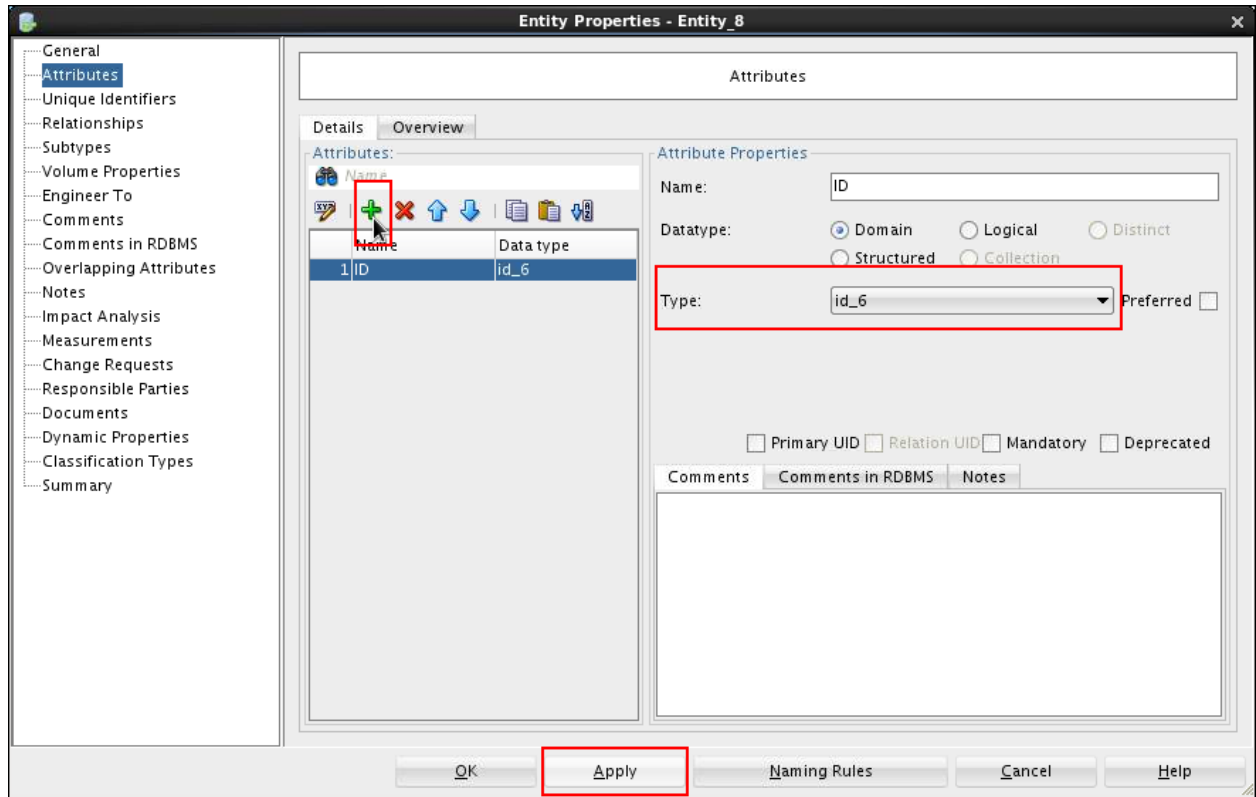
20. Enter **DEPENDENTS** for the **Name**, and then select the **Attributes** property in the left navigator.



21. Click the **Add**  icon in the **Attributes** region.

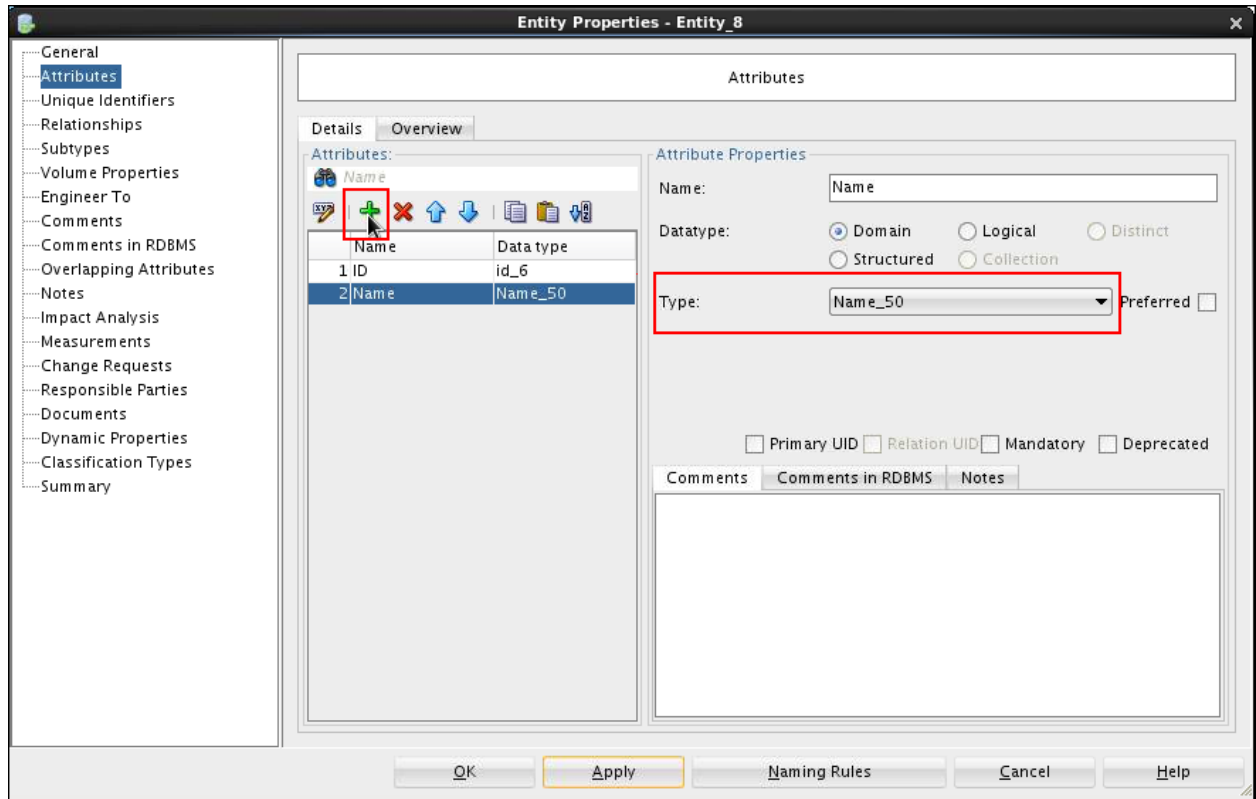
22. Enter ID for the **Name**, select the id_6 domain for **Type**, click **Apply**, and then click the

Add  icon.

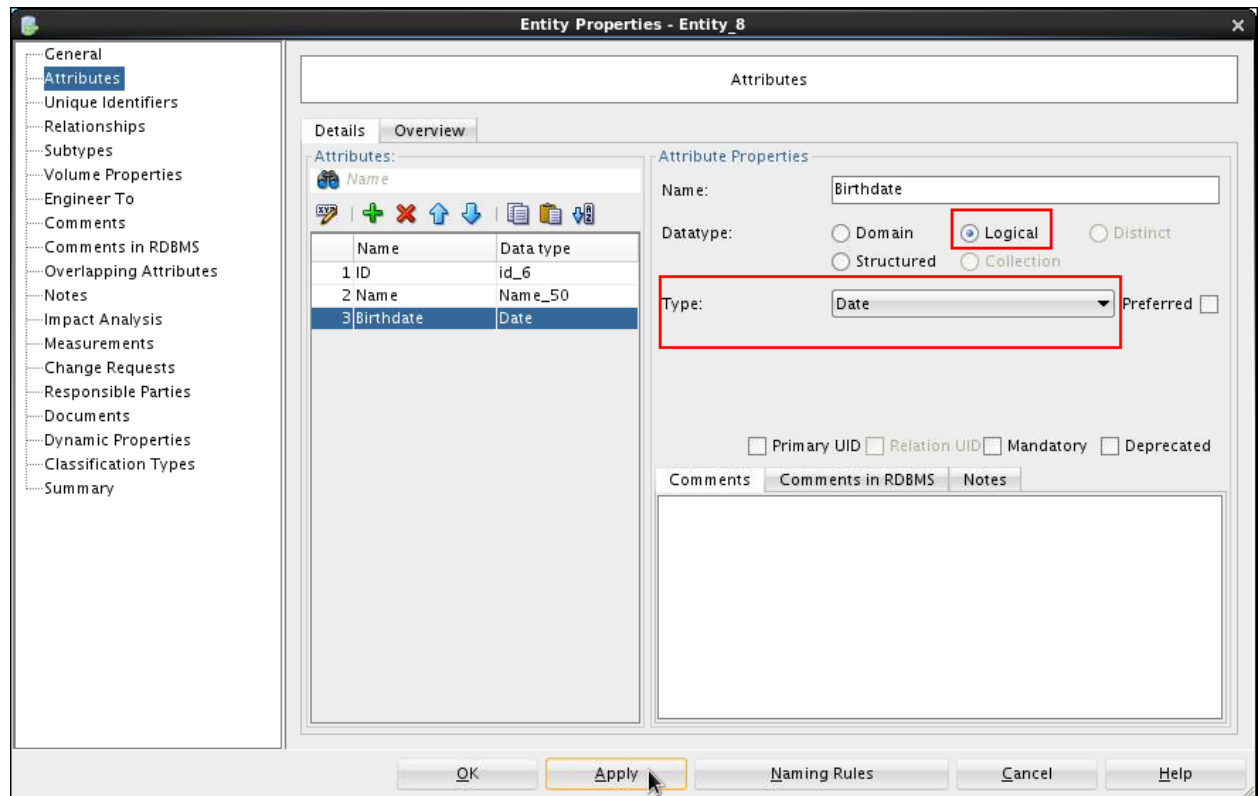


23. Enter Name for **Name**, select the Name_50 domain for Type, click **Apply**, and then click the

Add  icon.

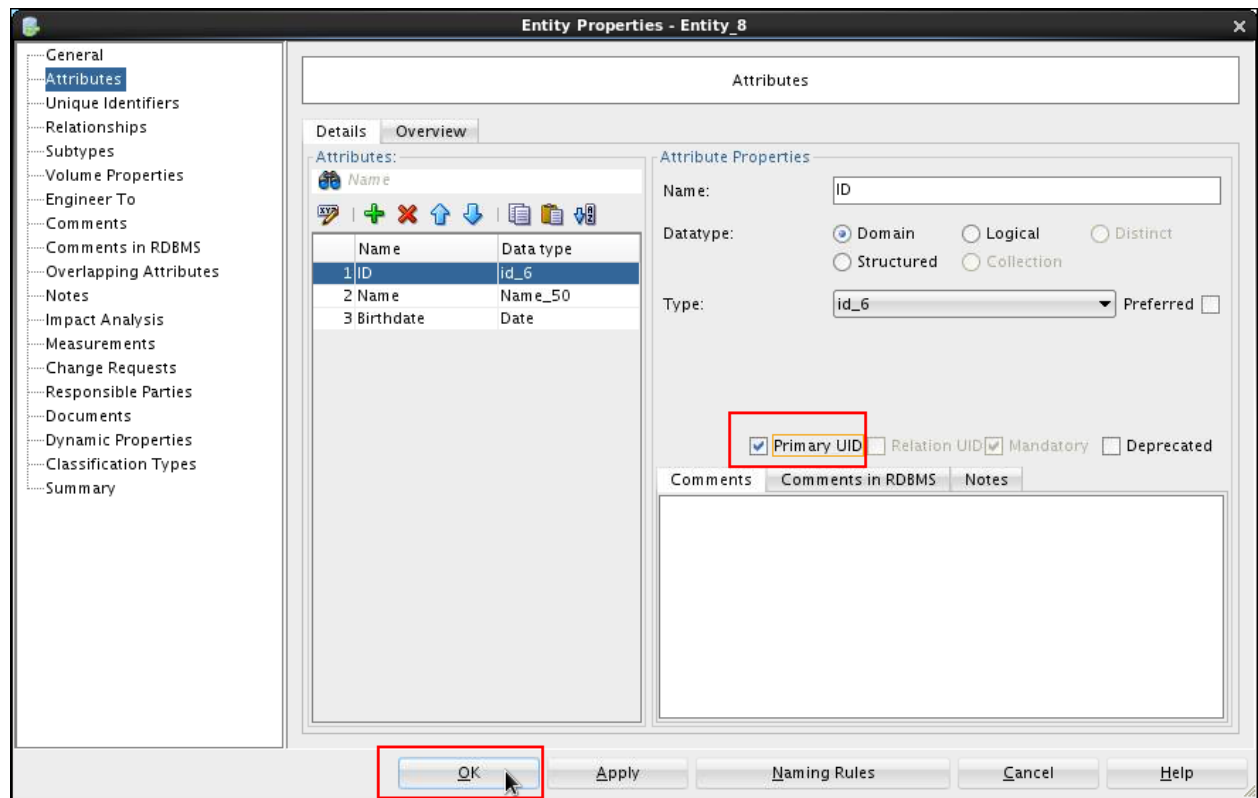



24. Enter Birthdate for **Name**, select **Logical** for **Datatype**, and then select Date for **Type**. Click **Apply**.




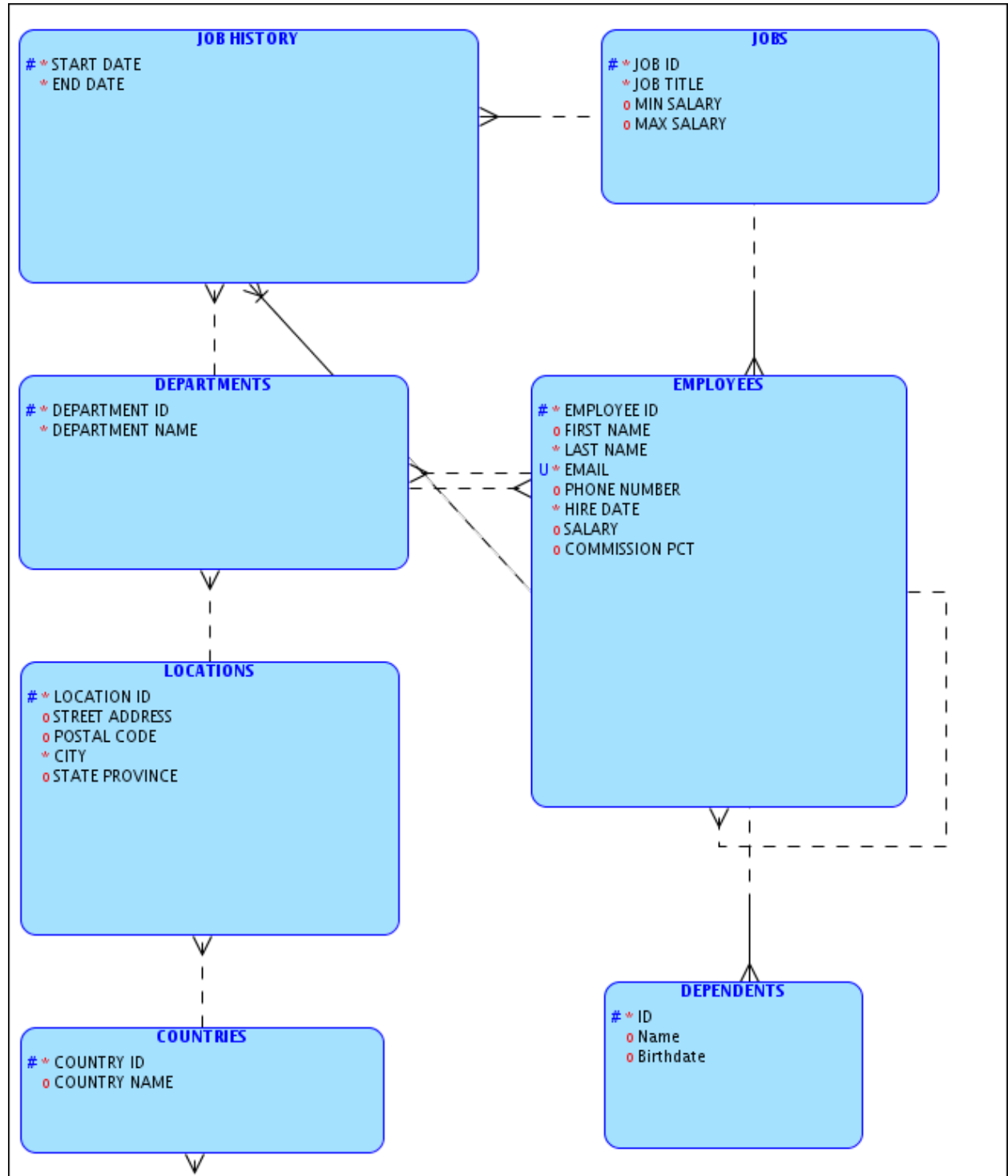
Note: If you have opened too many models and closed without saving, you may get a low perm memory error dialog box. Click **OK** to continue.

25. To specify ID as the Unique Identifier, select ID in the **Attributes** region. Select the **Primary UID** check box, and then click **OK** to create the entity and attributes.

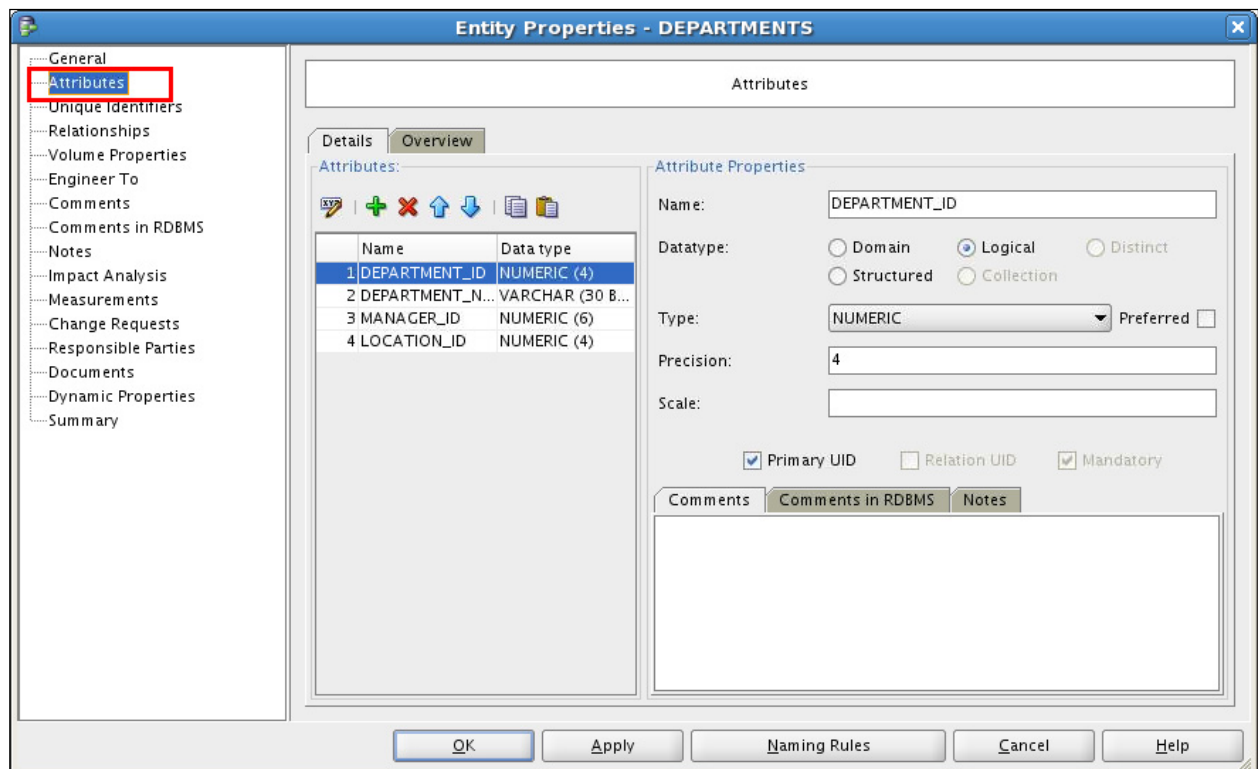


26. You want to create a 1 : N relationship between EMPLOYEES and DEPENDENTS. Select the **New 1: N Relation**  icon, click EMPLOYEES, and then click DEPENDENTS.

27. The 1:N relationship is created. Click **OK** to exit the dialog box. Click the **Select** icon  on the toolbar. You can make some more changes to the logical model.

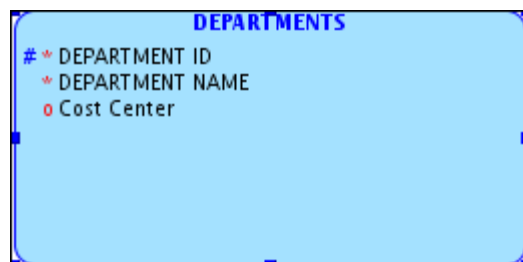
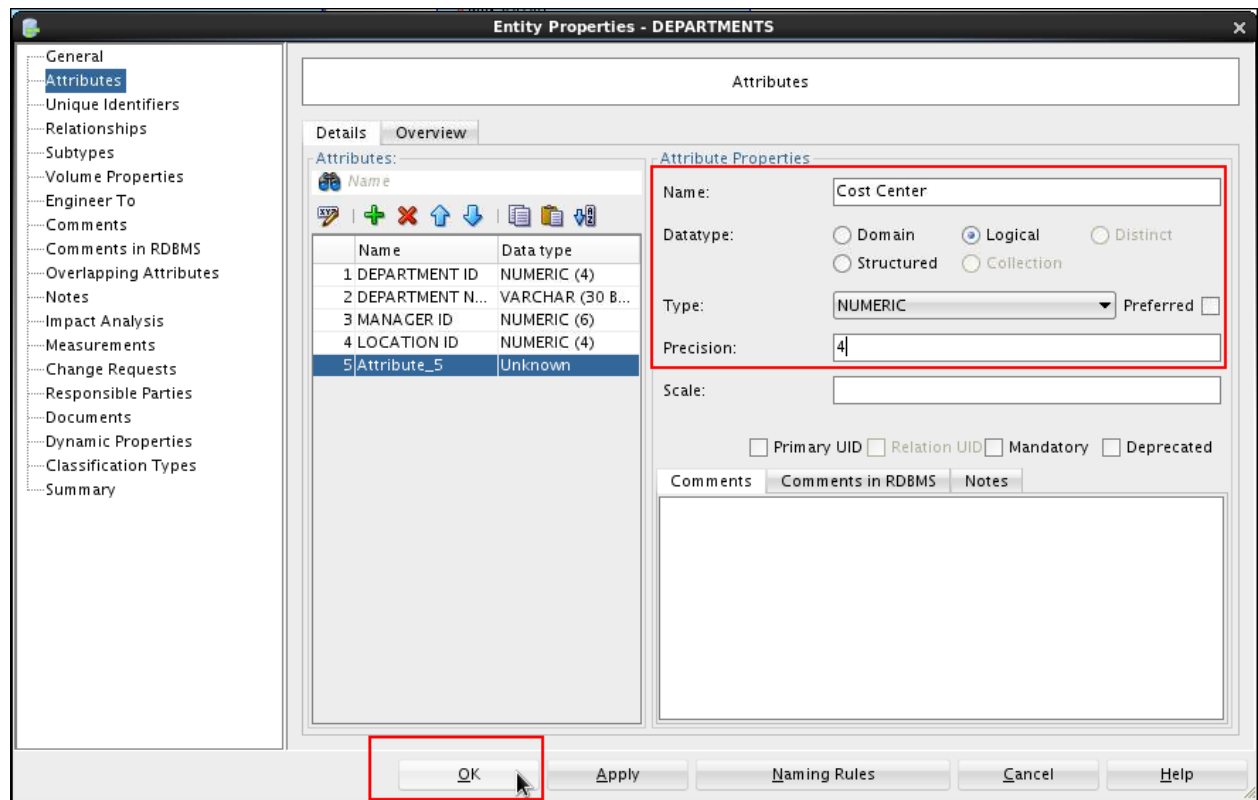


28. Double-click the `DEPARTMENTS` entity. The **Entity Properties** dialog box is displayed. Select the **Attributes** property in the left navigator.

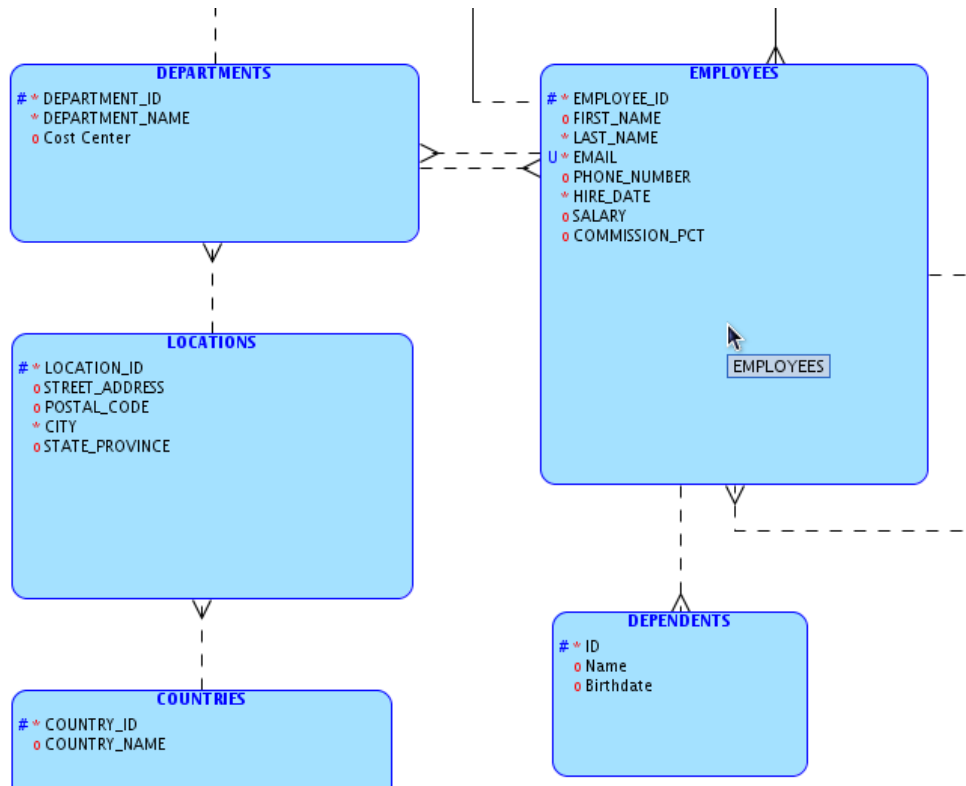


29. Click Add  icon.


30. Enter **Cost Center** for Name, select **Logical** for **Datatype**, select **NUMERIC** for **Type**, and enter **4** for **Precision**. Then click **OK**. The new **Cost Center** attribute is displayed in the **DEPARTMENTS** entity.

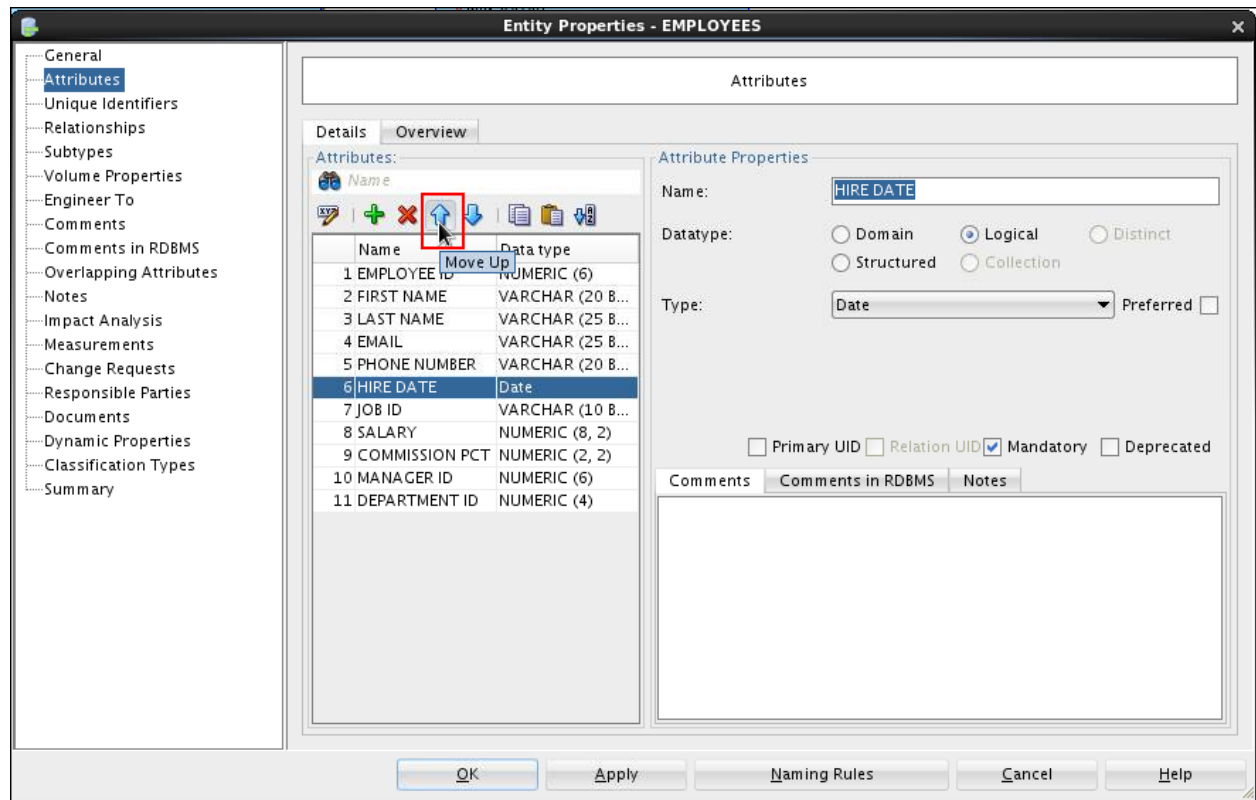


31. Double-click the `EMPLOYEES` entity. The **Entity Properties** dialog box is displayed.

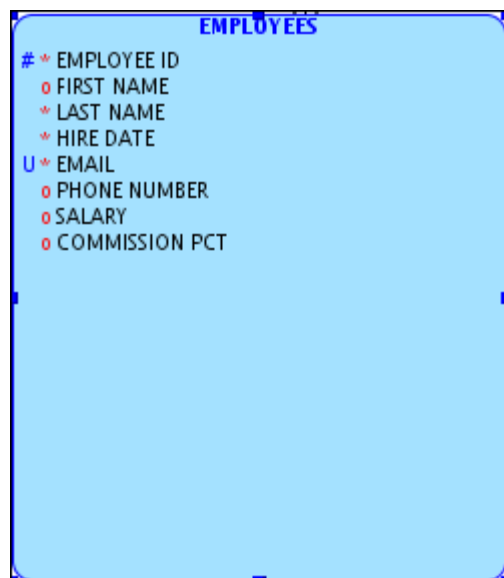
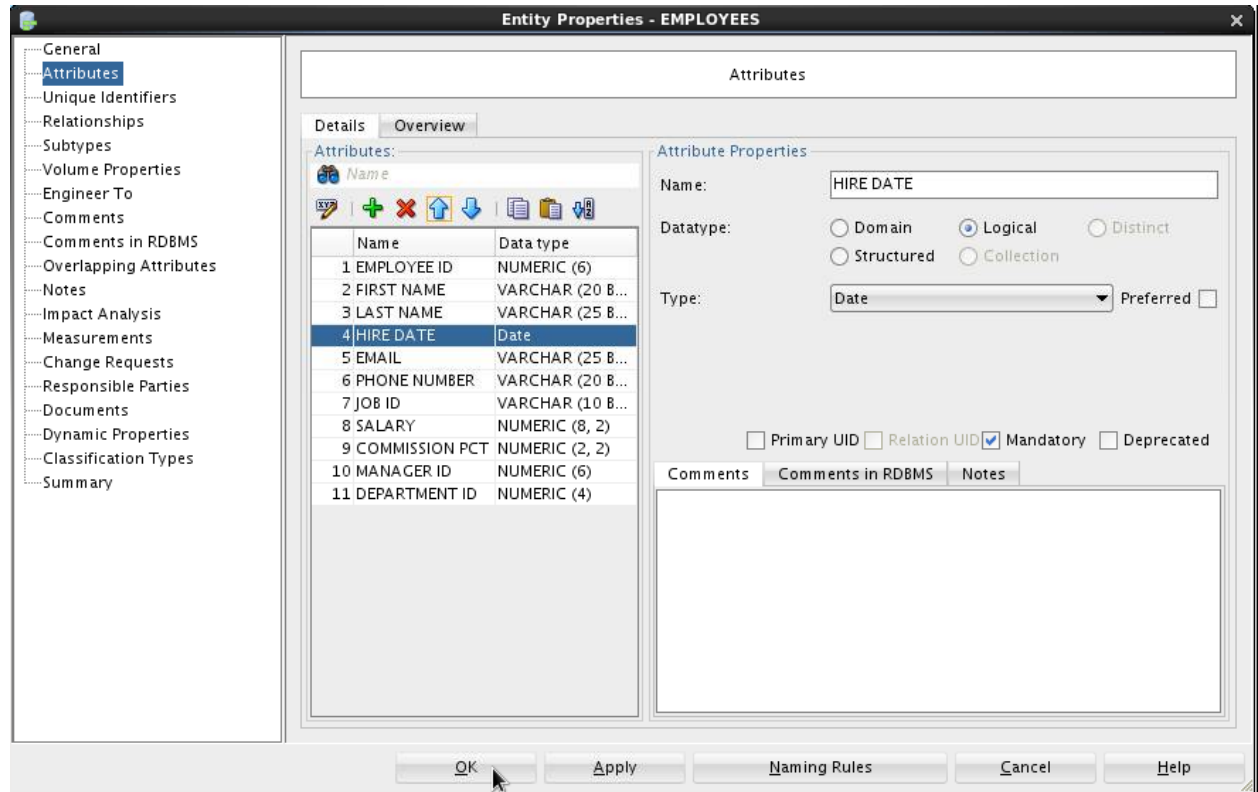


32. Select the **Attributes** property in the left navigator.

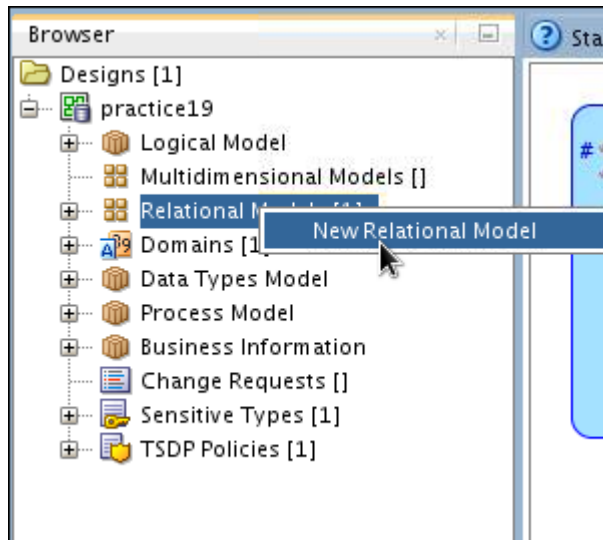
33. Select the HIRE_DATE attribute, and click the Move Up  icon two times so that the HIRE_DATE attribute appears before the EMAIL attribute.



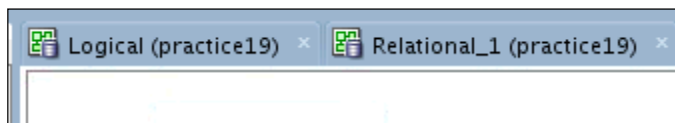
34. Click **OK**.



35. Now, you will forward engineer the changes to a new relational model and then compare the relational model to what is in the database. Right-click the **Relational Model** node in the **Object Browser**, and then select **New Relational Model** from the pop-up menu.

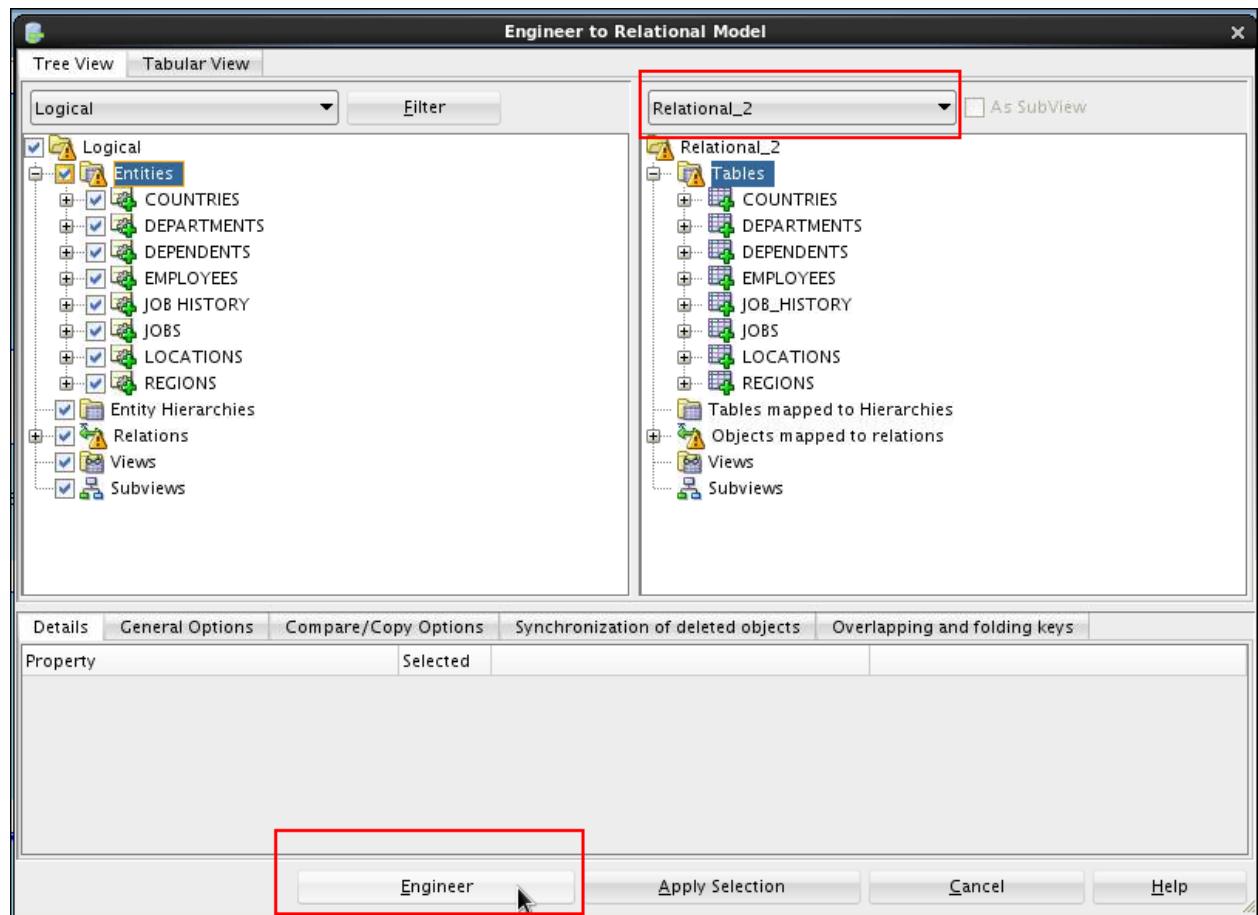


36. Click the **Logical** tab to return to your entity relationship diagram.

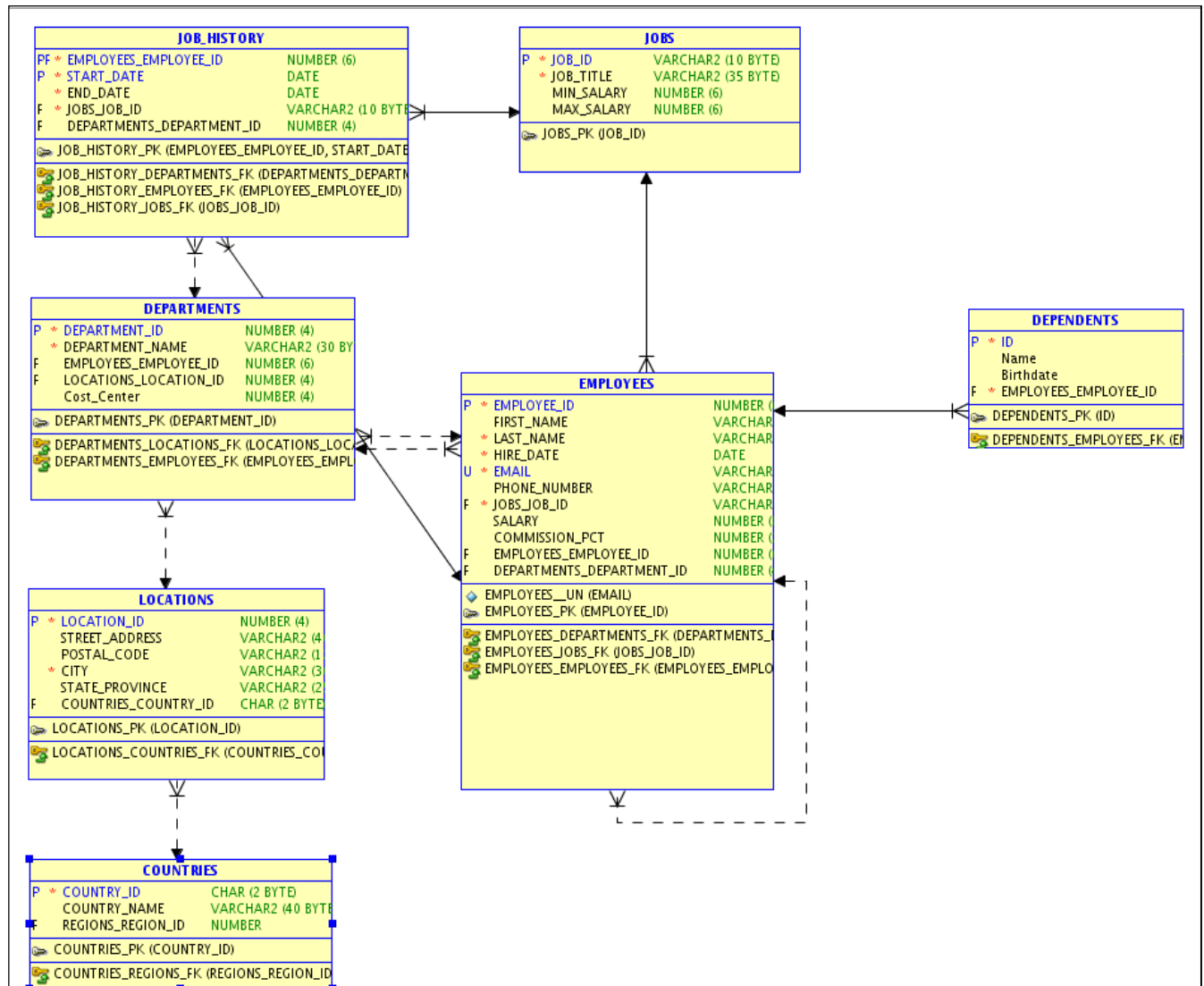


37. Click the **Engineer to Relational Model**  icon.

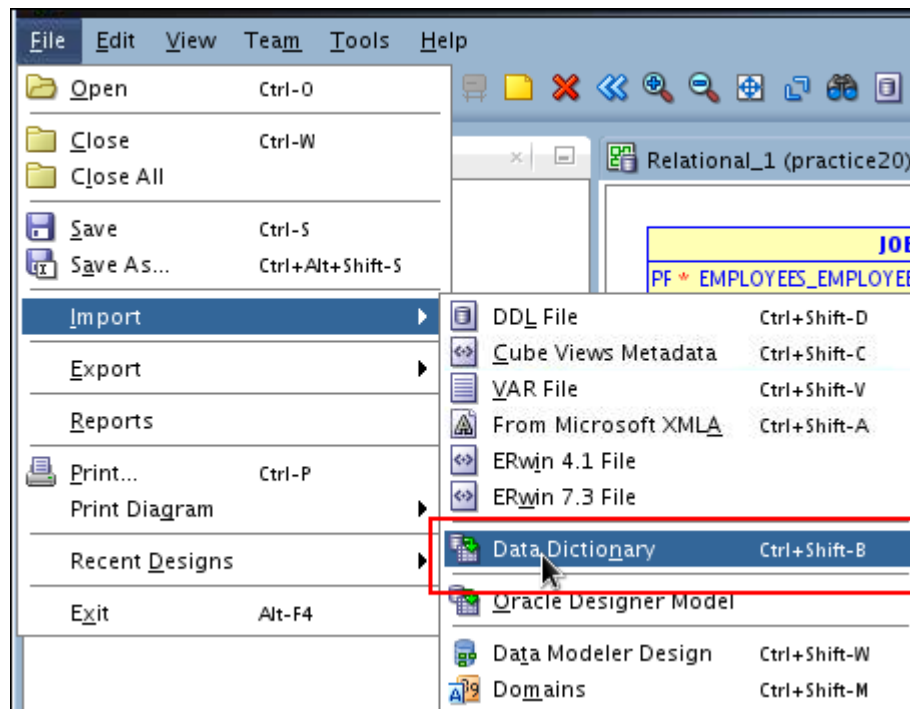
38. Make sure that `Relational_2` is selected at the top right. You can expand some of the nodes to see what will be created in the new relational model. Click **Engineer**.



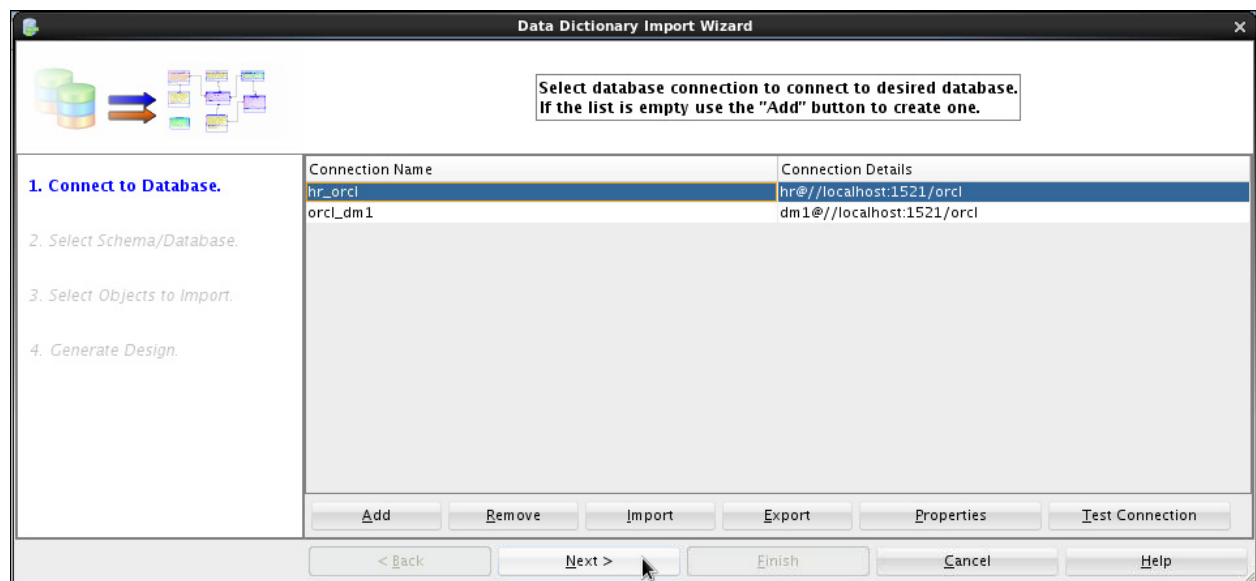
39. Your relational model was created with your modifications.



40. You want to compare this model with what is in the database. To do that, you import from the data dictionary. Select **File > Import > Data Dictionary**.

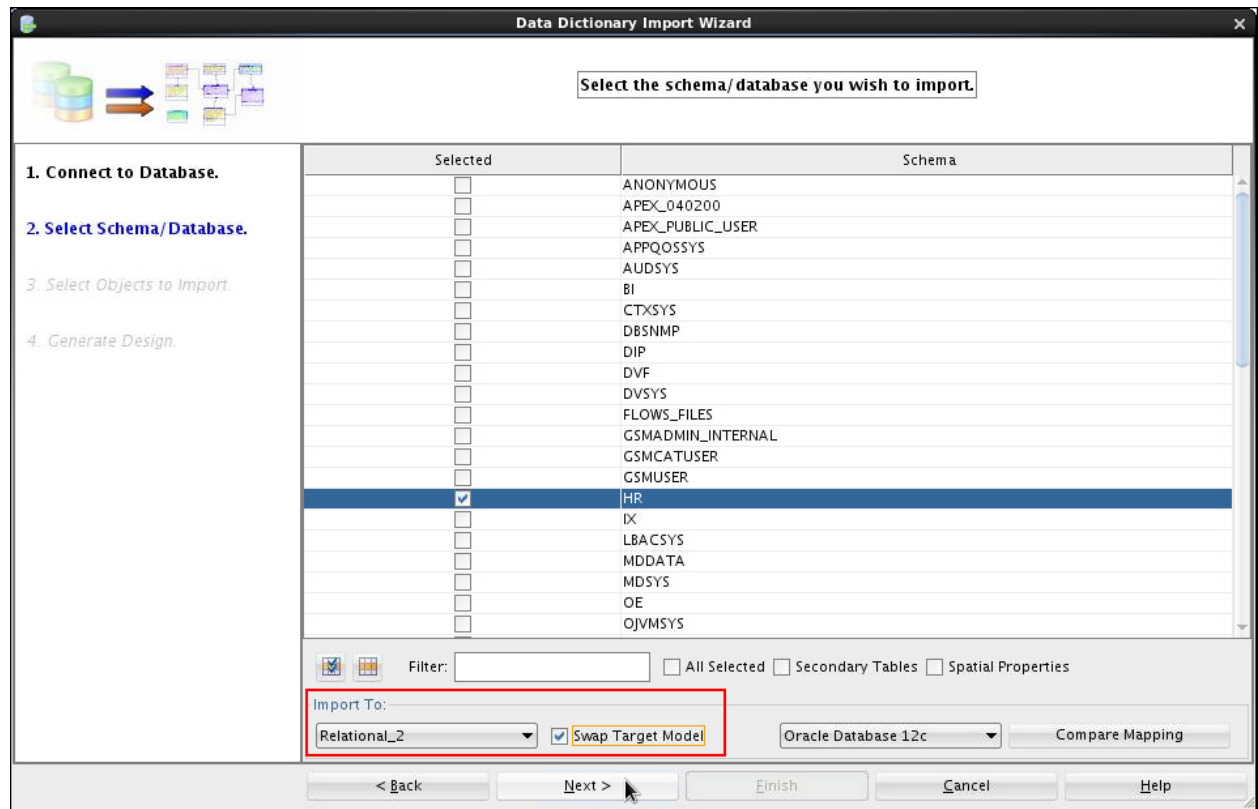



41. Select the `hr_orcl` database connection that you created earlier in this practice, and then click **Next**.

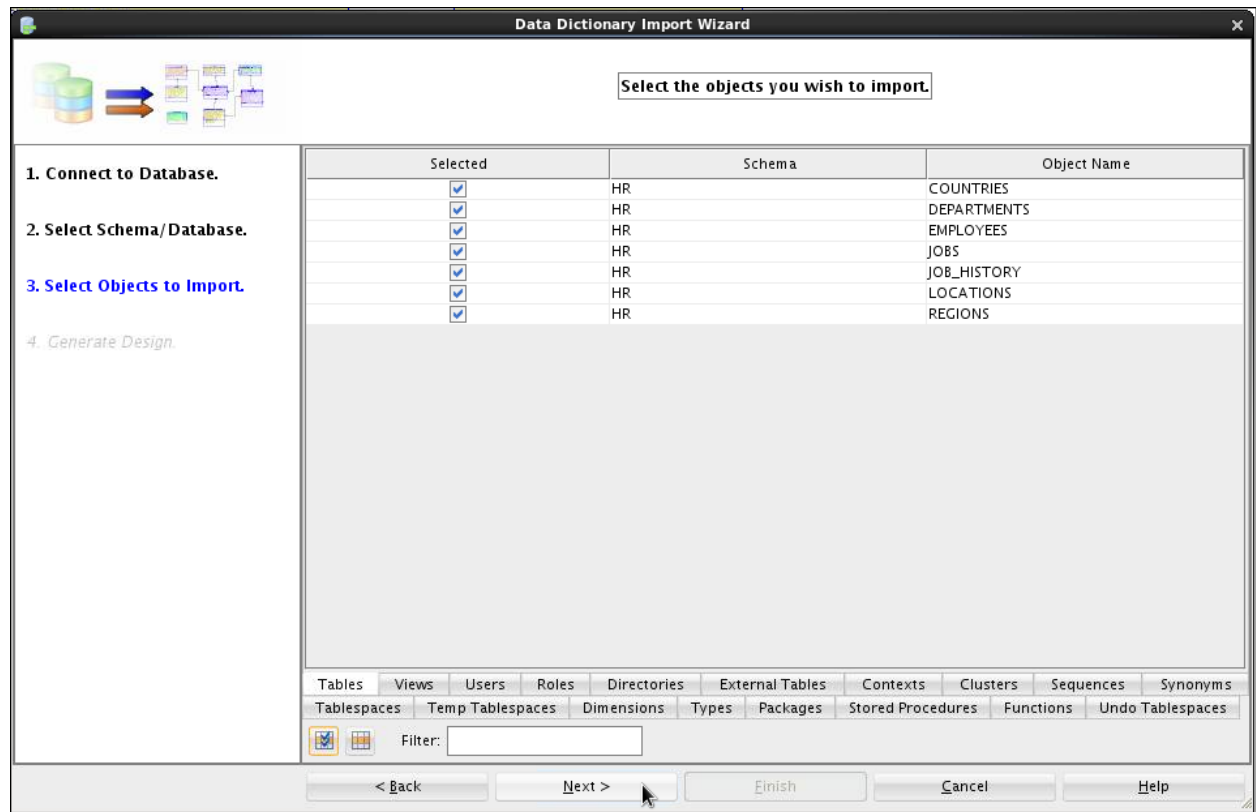


Note: If you created other database connections earlier in this course, those connections will also be displayed.

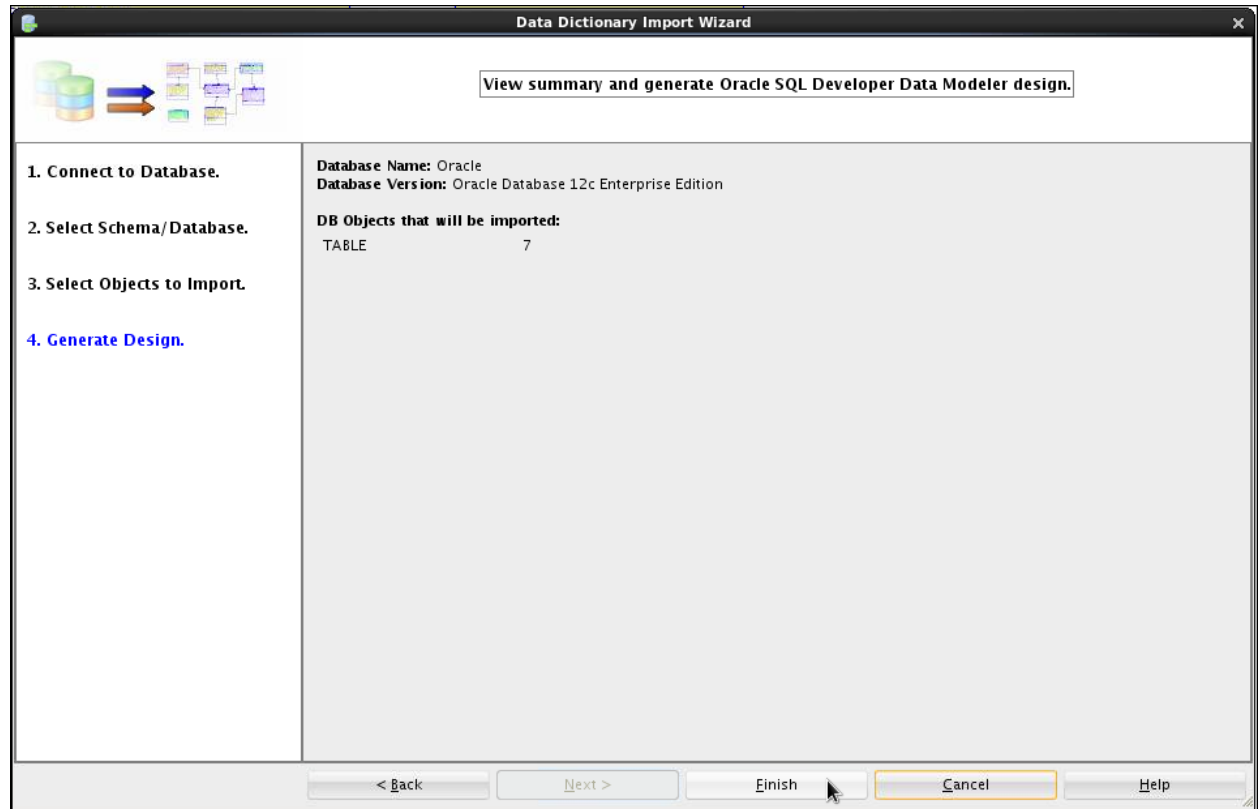
42. Select the HR schema. ***This step is important:*** In order to compare the relational model against the database, select `Relational_2` for **Import To**, click the **Swap Target Model** check box, and then click **Next**.



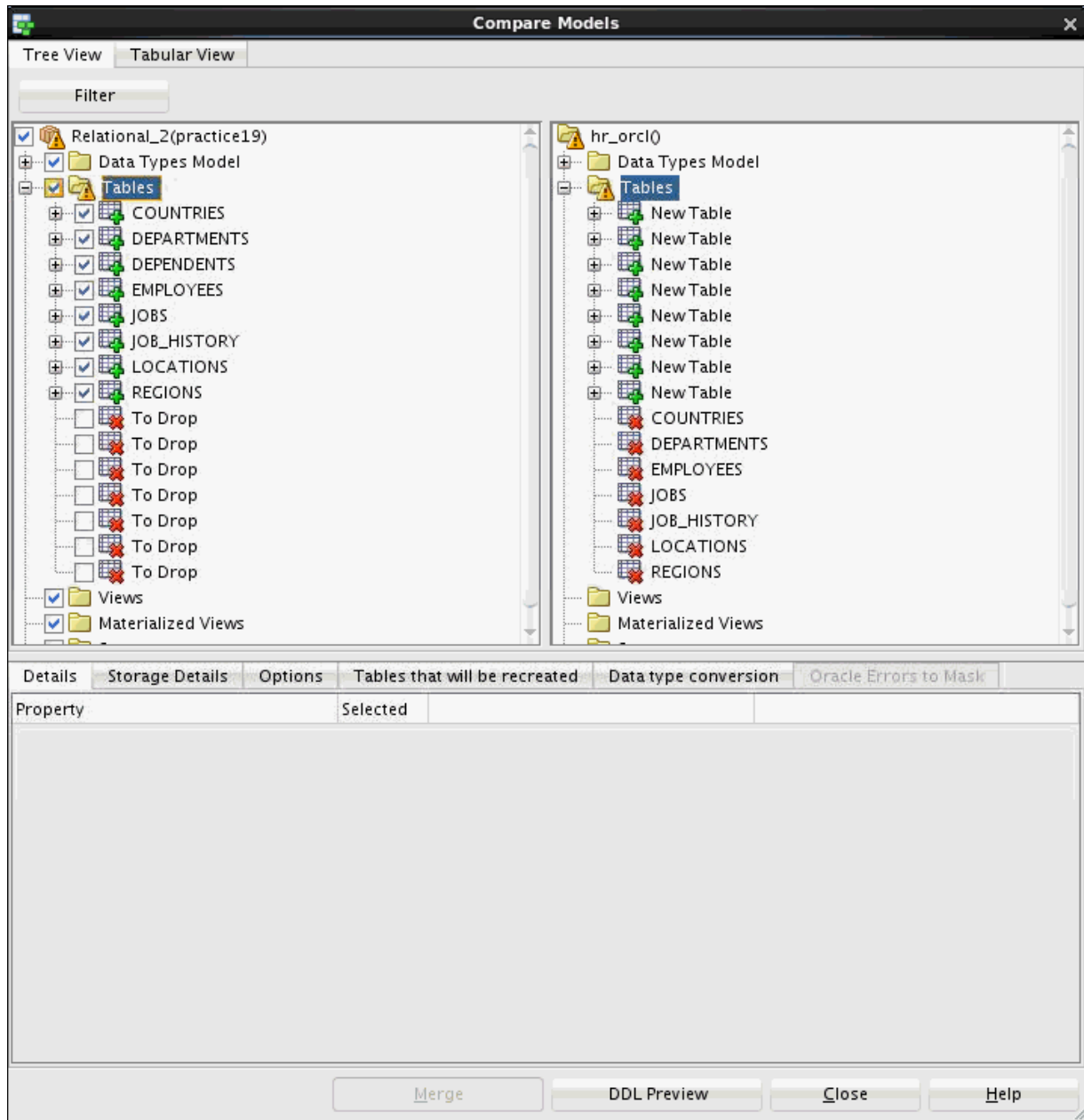
43. Click the **Select All**  icon to select all the tables, if not already selected, and then click **Next**.



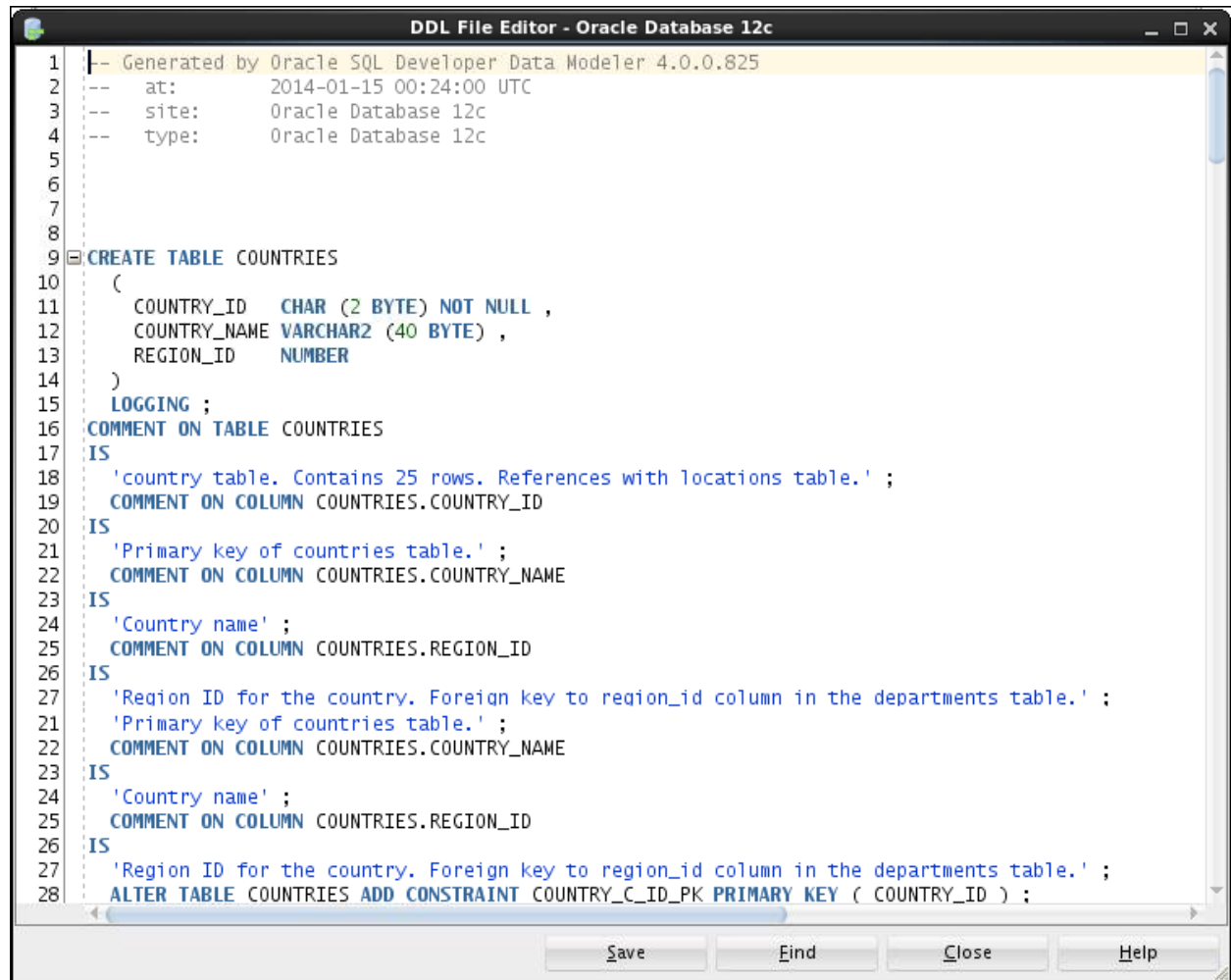
44. The summary of what will be imported is displayed. Click **Finish**.



45. The **Compare Models** dialog box is displayed. Notice that you are comparing Relational_2 on the left with hr_orcl, the database on the right. Expand some of the nodes to see what will happen if you generated the DDL. Notice that a new column is added to the DEPARTMENTS table, the new DEPENDENTS table is added and the columns in the EMPLOYEES table are reordered. To see the DDL, click **DDL Preview**.



46. Notice that the DDL contains CREATE statements. Click **Find**.

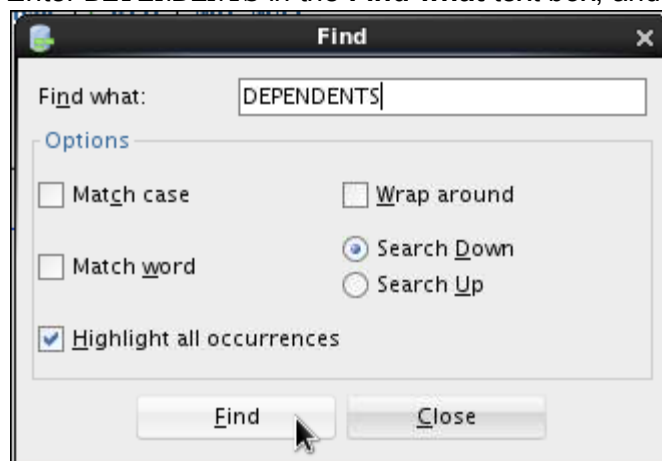


The image shows a window titled "DDL File Editor - Oracle Database 12c". The window contains a text editor with the following SQL code:

```
1  -- Generated by Oracle SQL Developer Data Modeler 4.0.0.825
2  -- at:      2014-01-15 00:24:00 UTC
3  -- site:    Oracle Database 12c
4  -- type:    Oracle Database 12c
5
6
7
8
9  CREATE TABLE COUNTRIES
10  (
11    COUNTRY_ID  CHAR (2 BYTE) NOT NULL ,
12    COUNTRY_NAME VARCHAR2 (40 BYTE) ,
13    REGION_ID   NUMBER
14  )
15  LOGGING ;
16  COMMENT ON TABLE COUNTRIES
17  IS
18  'country table. Contains 25 rows. References with locations table.' ;
19  COMMENT ON COLUMN COUNTRIES.COUNTRY_ID
20  IS
21  'Primary key of countries table.' ;
22  COMMENT ON COLUMN COUNTRIES.COUNTRY_NAME
23  IS
24  'Country name' ;
25  COMMENT ON COLUMN COUNTRIES.REGION_ID
26  IS
27  'Region ID for the country. Foreign key to region_id column in the departments table.' ;
28  'Primary key of countries table.' ;
29  COMMENT ON COLUMN COUNTRIES.COUNTRY_NAME
30  IS
31  'Country name' ;
32  COMMENT ON COLUMN COUNTRIES.REGION_ID
33  IS
34  'Region ID for the country. Foreign key to region_id column in the departments table.' ;
35  ALTER TABLE COUNTRIES ADD CONSTRAINT COUNTRY_C_ID_PK PRIMARY KEY ( COUNTRY_ID ) ;
```

At the bottom of the window, there are four buttons: **Save**, **Find**, **Close**, and **Help**.

47. Enter DEPENDENTS in the **Find what** text box, and then click **Find**.

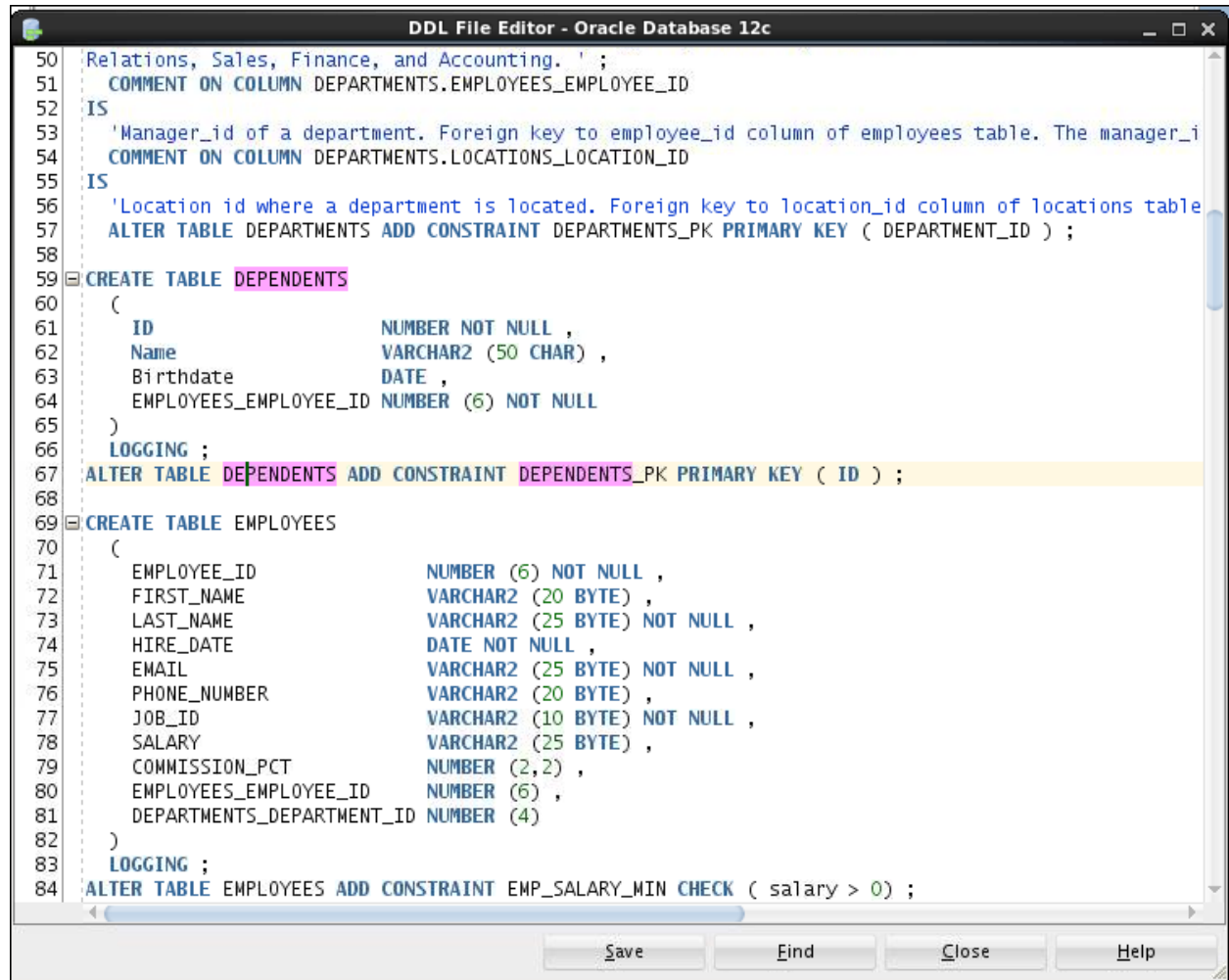


The image shows a "Find" dialog box. The "Find what:" text box contains the text "DEPENDENTS". Below the text box, there are several options:

- ☐ Match case
- ☐ Match word
- ☒ Highlight all occurrences
- ☐ Wrap around
- ☒ Search Down
- ☐ Search Up

At the bottom of the dialog box, there are two buttons: **Find** and **Close**. A mouse cursor is pointing at the **Find** button.

48. The DDL for the new table is displayed. When done reviewing, click **Close**.



```
50 Relations, Sales, Finance, and Accounting. ' ;
51 COMMENT ON COLUMN DEPARTMENTS.EMPLOYEES_EMPLOYEE_ID
52 IS
53 'Manager_id of a department. Foreign key to employee_id column of employees table. The manager_i
54 COMMENT ON COLUMN DEPARTMENTS.LOCATIONS_LOCATION_ID
55 IS
56 'Location id where a department is located. Foreign key to location_id column of locations table
57 ALTER TABLE DEPARTMENTS ADD CONSTRAINT DEPARTMENTS_PK PRIMARY KEY ( DEPARTMENT_ID ) ;
58
59 CREATE TABLE DEPENDENTS
60 (
61     ID                NUMBER NOT NULL ,
62     Name              VARCHAR2 (50 CHAR) ,
63     Birthdate         DATE ,
64     EMPLOYEES_EMPLOYEE_ID NUMBER (6) NOT NULL
65 )
66 LOGGING ;
67 ALTER TABLE DEPENDENTS ADD CONSTRAINT DEPENDENTS_PK PRIMARY KEY ( ID ) ;
68
69 CREATE TABLE EMPLOYEES
70 (
71     EMPLOYEE_ID       NUMBER (6) NOT NULL ,
72     FIRST_NAME         VARCHAR2 (20 BYTE) ,
73     LAST_NAME          VARCHAR2 (25 BYTE) NOT NULL ,
74     HIRE_DATE          DATE NOT NULL ,
75     EMAIL              VARCHAR2 (25 BYTE) NOT NULL ,
76     PHONE_NUMBER       VARCHAR2 (20 BYTE) ,
77     JOB_ID             VARCHAR2 (10 BYTE) NOT NULL ,
78     SALARY              VARCHAR2 (25 BYTE) ,
79     COMMISSION_PCT     NUMBER (2,2) ,
80     EMPLOYEES_EMPLOYEE_ID NUMBER (6) ,
81     DEPARTMENTS_DEPARTMENT_ID NUMBER (4)
82 )
83 LOGGING ;
84 ALTER TABLE EMPLOYEES ADD CONSTRAINT EMP_SALARY_MIN CHECK ( salary > 0 ) ;
```

Save Find Close Help

49. Click **Close** in the **Compare Models** dialog box to cancel the comparison.