Using Oracle Data Modeler v4.1.5

Oracle Data Modeler (ODM) is a database modeling tool that is used to create logical and/or physical models of your database using several notation styles.

This document assumes that you have access to the UMUC AWS DaaS lab platform and that you understand basic Microsoft Windows functionality.

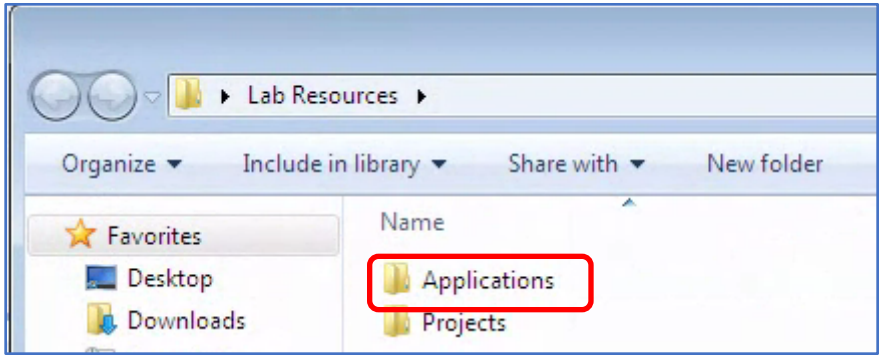
Read the documentation carefully then follow the steps shown in this tutorial to create a basic data model which you will turn in to verify that you're able to access and utilize ODM correctly. Use the course "Discussion" area to pose any questions you have on using ODM.

Access Oracle Data Modeler

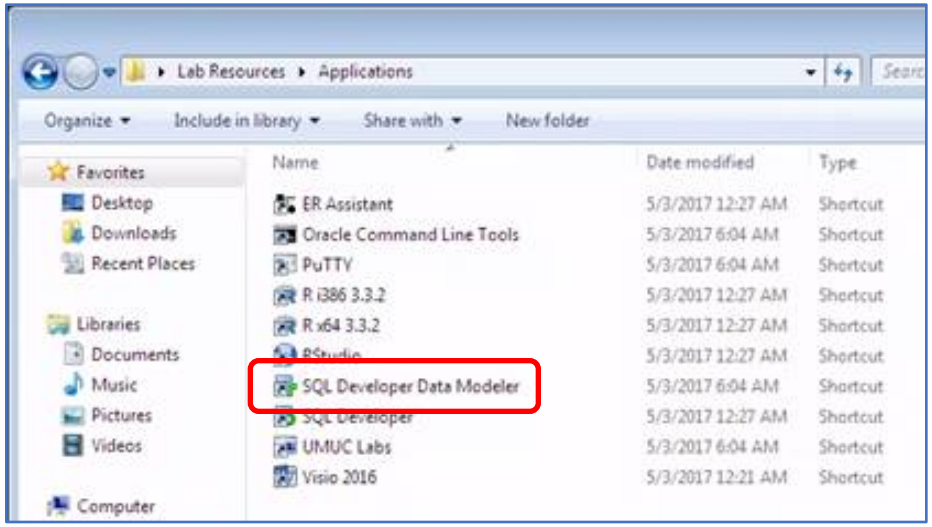
In the UMUC AWS DaaS environment, you can launch ODM from the **Lab Resources** -> **Applications** folders.

1. Double click on **Lab Resources**

2. Double click on **Applications**

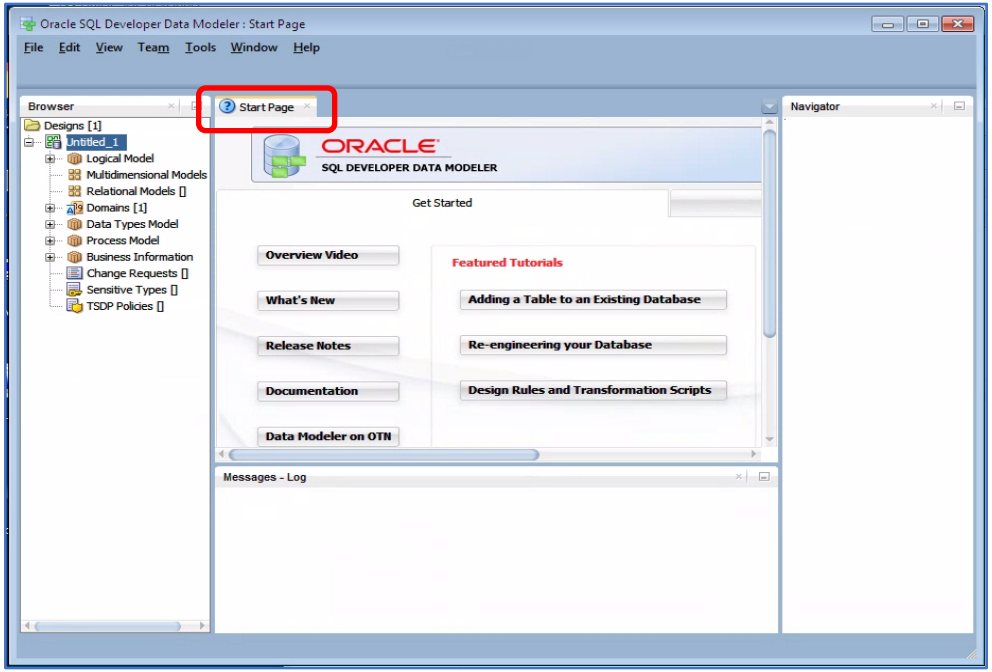


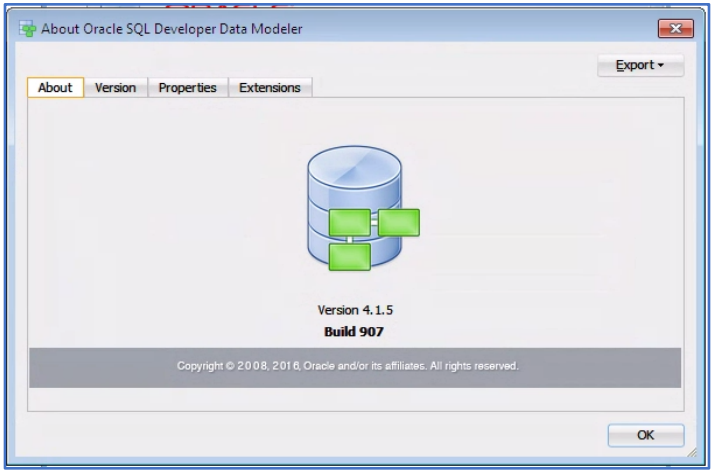
3. Double click on **SQL Developer Data Modeler**



Access Oracle Data Modeler

The **Oracle SQL Developer Data Modeler – Start Page** will be displayed. The **Start Page** contains reference links to documentation provided by Oracle.



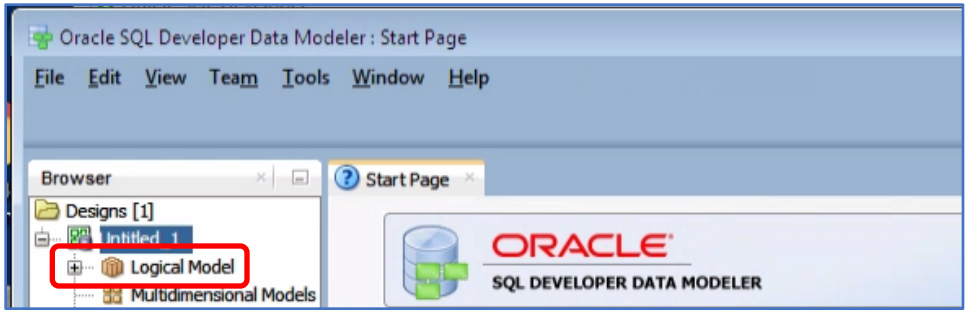


4. Click on **Help -> About** to see the version of ODM you're working with. You should see "Version 4.1.5"

Create the "Employee" Logical Database Model

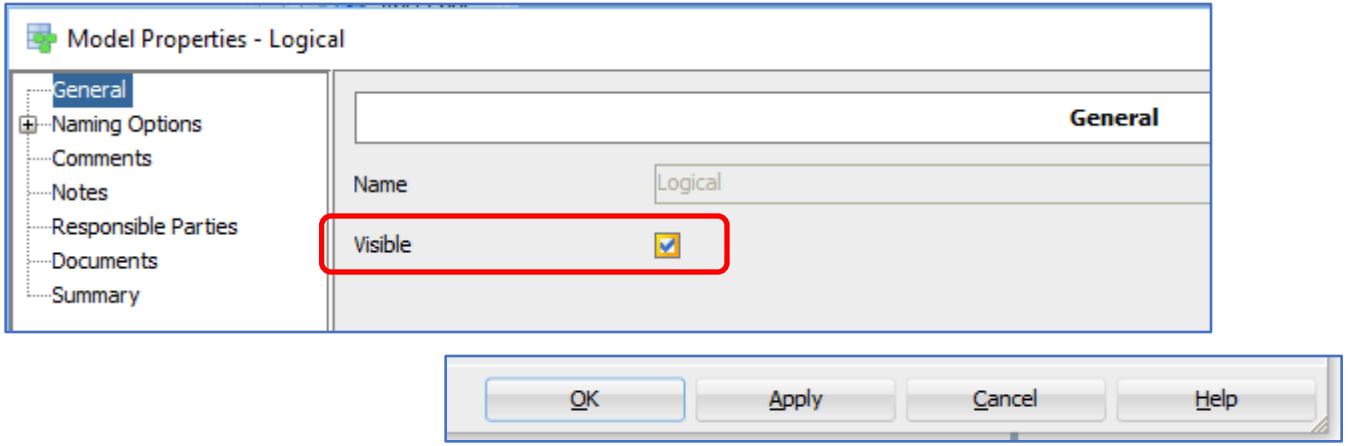
5. On **Start Page, Browser** pane:

- **Designs** folder
- **Untitled_1** section
- Double click on **Logical Model**



6. Ensure **General** is highlighted:

- Check **Visible**
- Click **OK** at the bottom right of the **Model Properties – Logical window**



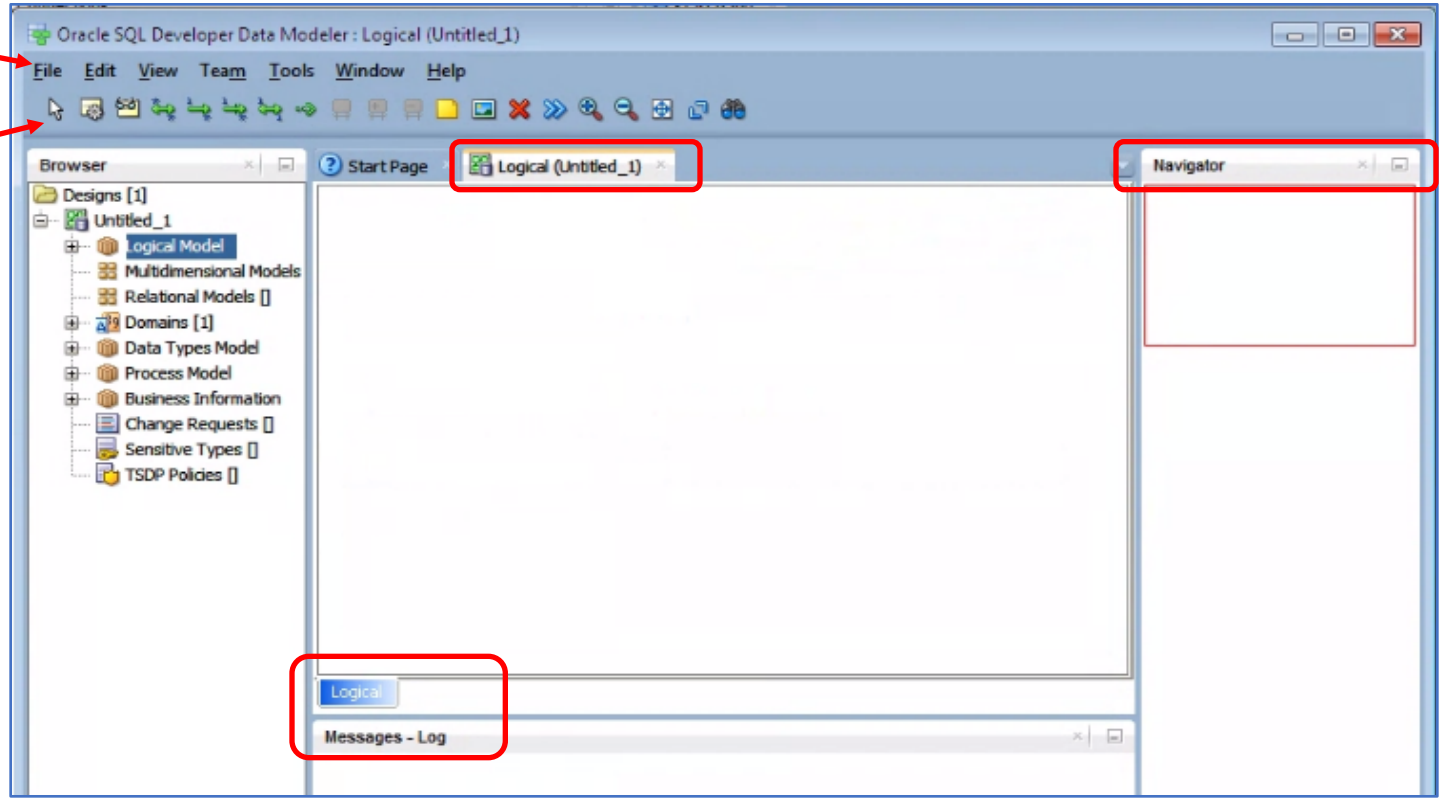
Create the "Employee" Logical Database Model

6. You should now see a tab for **Logical (Untitled_1)**

- "Navigator" pane is to the far right
- "Messages – Log" pane is at the bottom center

Tool Menu Bar

Short-cut keys (or icons)

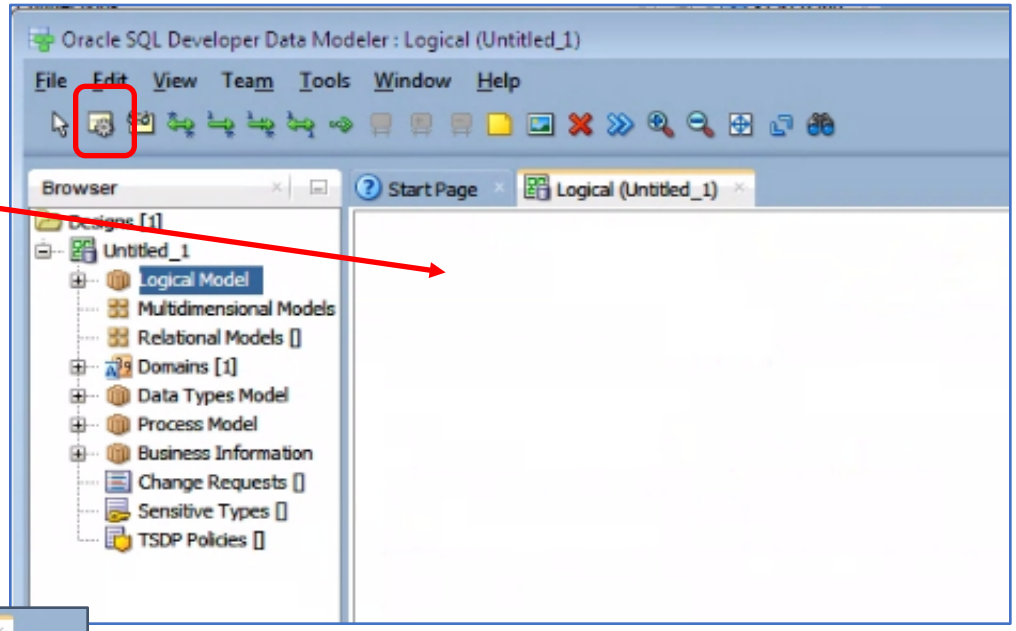


Create the "Employee" Entity

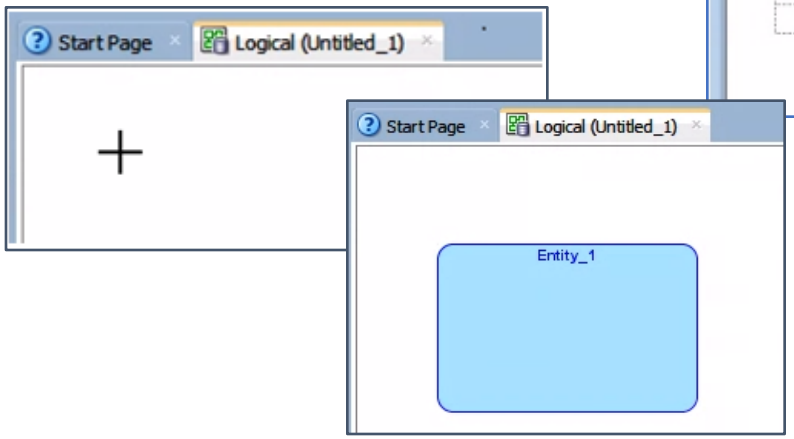
"Entities" are the tables in your database. The logical diagram can contain one or more entities belonging to your database. We'll create 3 entities for this tutorial starting with the "Employee" entity.

7. To create an entity on a logical database diagram:

- Click on the **Entity** icon, bottom row of icons, 2nd from the left
- Click anywhere in the **Logical (Untitled_1)** tab area



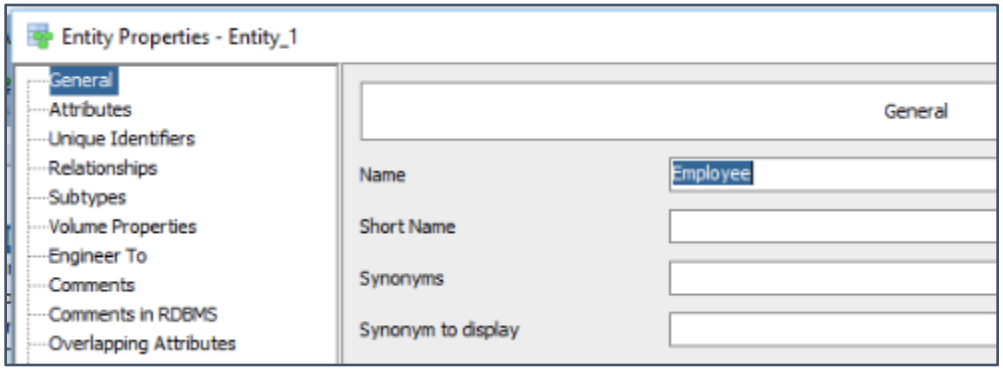
NOTE that you may see your mouse cursor as a large "plus/+". You may also notice a blue "Entity_1" box in the **Logical (Untitled_1)** tab background.



Create the "Employee" Entity - Continued

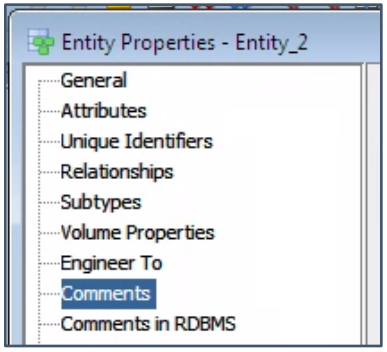
The **Entity Properties** window will be displayed allowing you to configure the "Employee" entity.

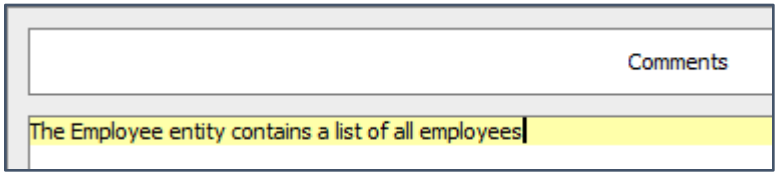
8. On the **Entity Properties** window, under **General -> Name**, enter: Employee

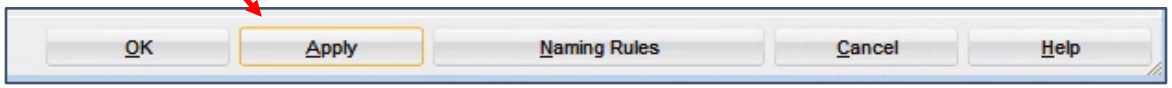


9. Add a comment to describe the "Employee" entity

- Click **Comments**
- Enter the comment shown on the far right screenshot
- Click **Apply** at the bottom of the **Entity Properties** screen



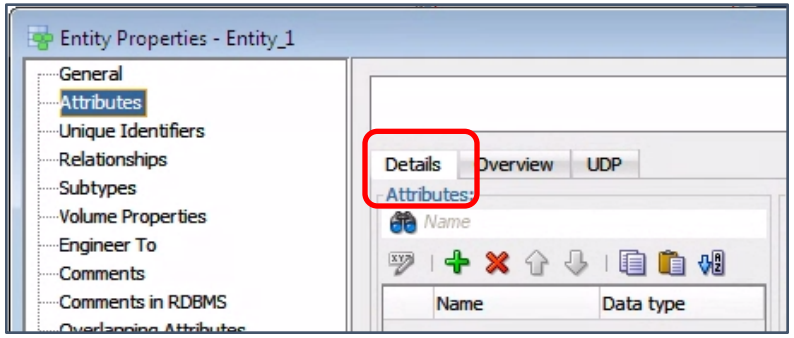




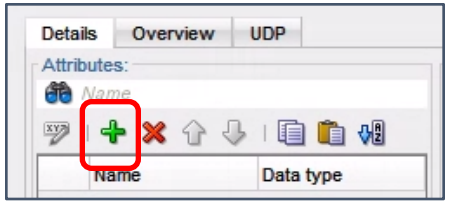
Add "Attributes" to the Employee Entity

"Attributes" are the fields in each entity that hold data for your database. Each attribute has a name, data type and other characteristics that define the attribute.

10. On the **Entity Properties** screen, click **Attributes.** Ensure that the **Details** tab is active

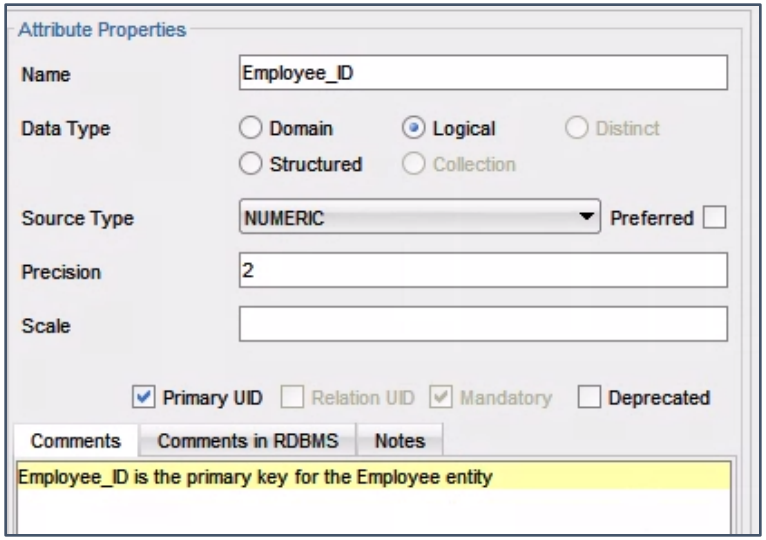


11. Click on "green plus" icon to add an attribute



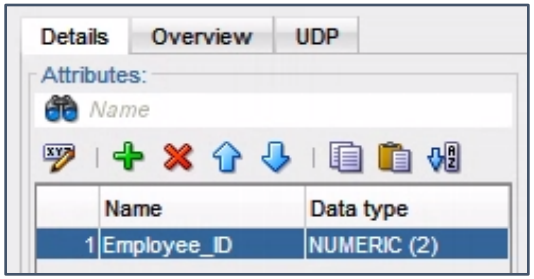
12. Enter **Attribute Properties**

- **Name**: Employee_ID
- **Data Type**: Logical
- **Source Type**: NUMERIC
- **Precision** (total number of digits): 2
- **Scale** (how many digits before/after decimal): leave blank
- **Primary UID:** checked
- **Comments** tab: Enter the comment shown
- Click **Apply** when completed



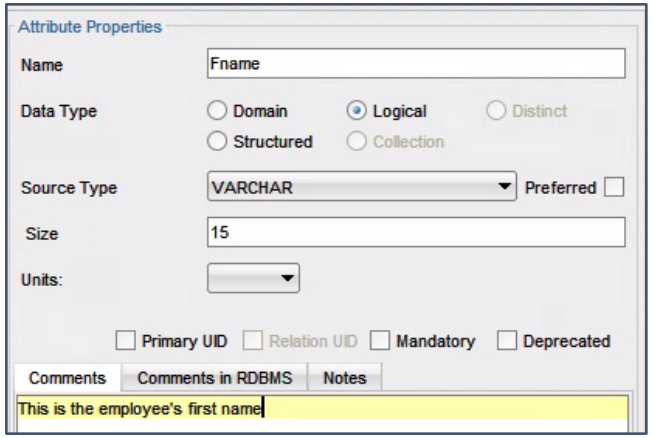
Add "Attributes" to the Employee Entity - Continued

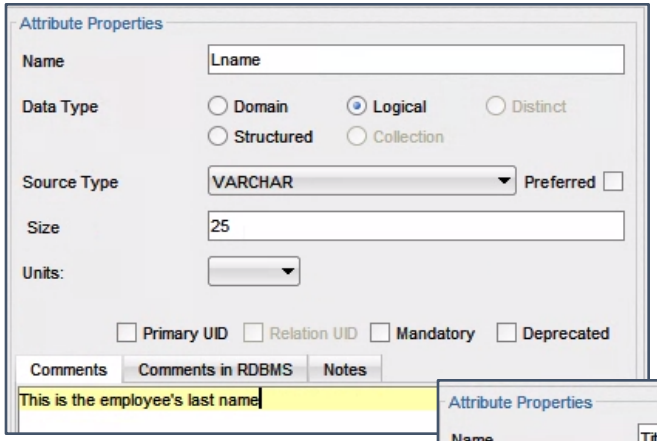
You should see your new attribute under **Details -> Attributes**

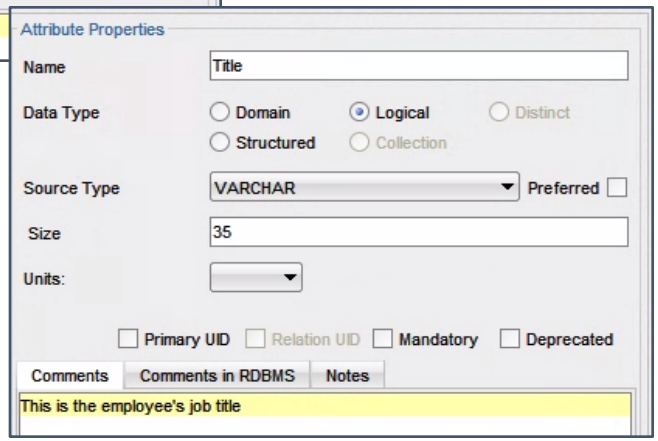


13. Repeat the steps on the previous slide to add the following attributes: Fname, Lname, Title, Salary and HireDate

Click **Apply** after you complete each attribute



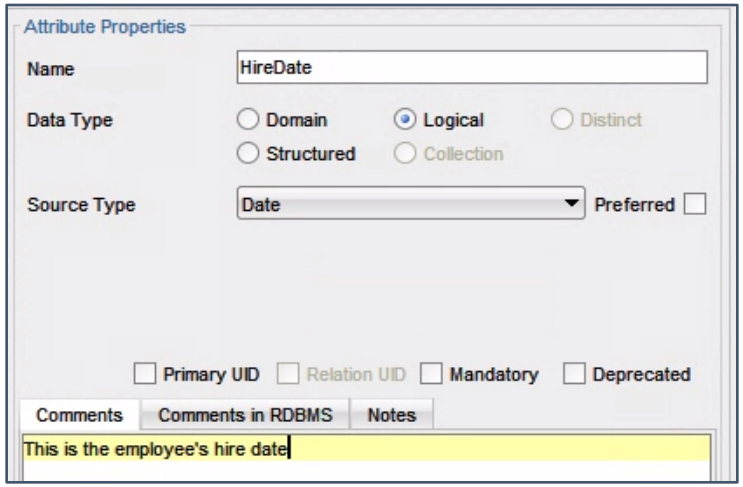


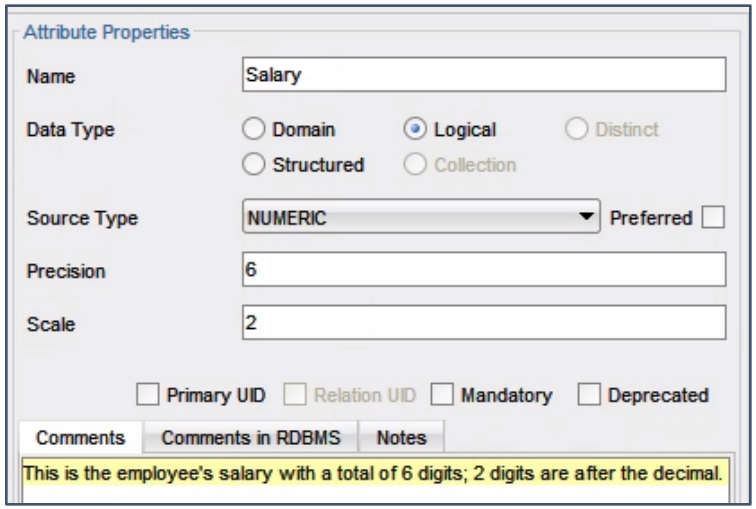


14. Click **Apply** after you complete each attribute

Add “Attributes” to the Employee Entity - Continued

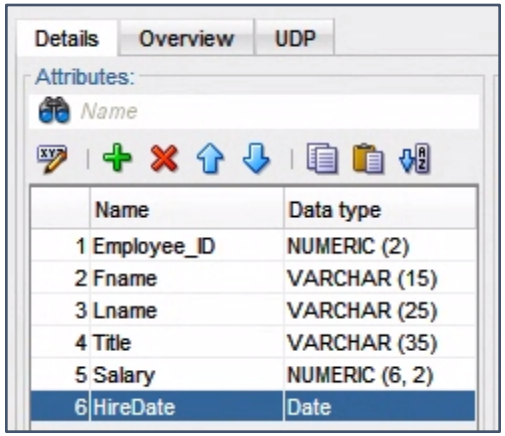
15. Click **Apply** after you complete the “HireDate” attribute





16. Click OK after you finish the “Salary” attribute

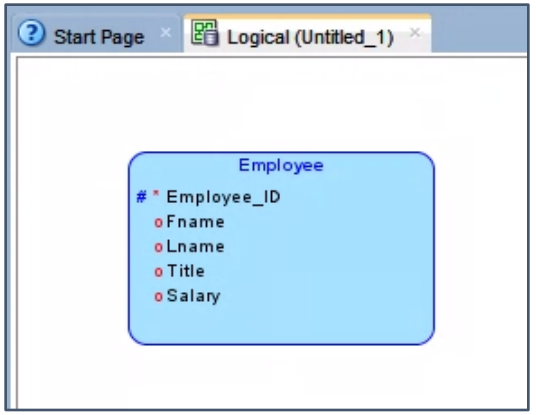
You should now see all 5 attributes under the **Details** tab



Update the Diagram Notation

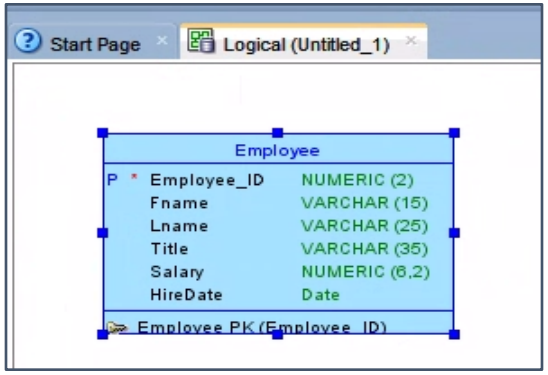
17. Click **Cancel**

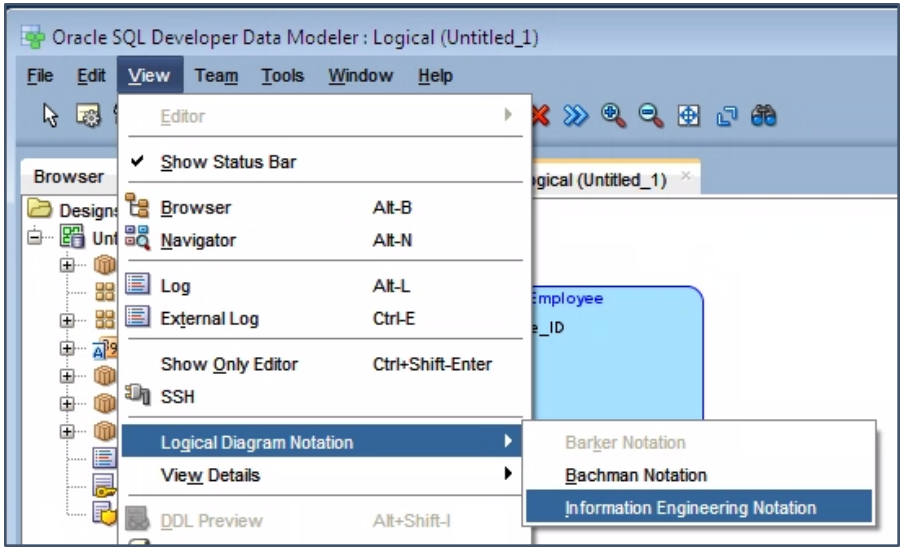
You should now see the "Employee" entity and the 5 attributes you added



18. Click **View – Logical Diagram Notation -> Information Engineering Notation**

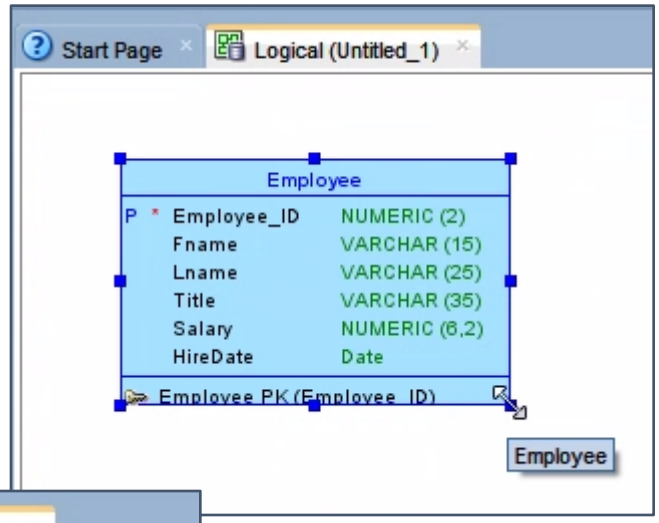
You should now see the "Employee" entity as shown below



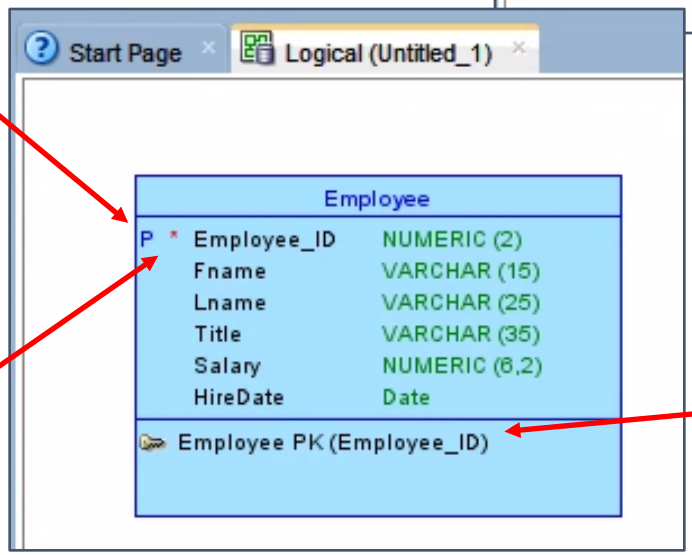


About the “Employee” Entity

19. You can hover your mouse cursor over one of the “handles” (or squares) and drag to resize the entity window



20. "P" indicate that the "Employee_ID" attribute is a "primary key“

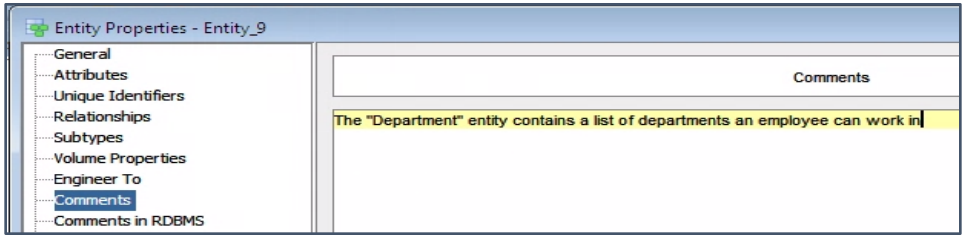


21. Primary key attributes are "required" by default, which is what the red "*" indicates

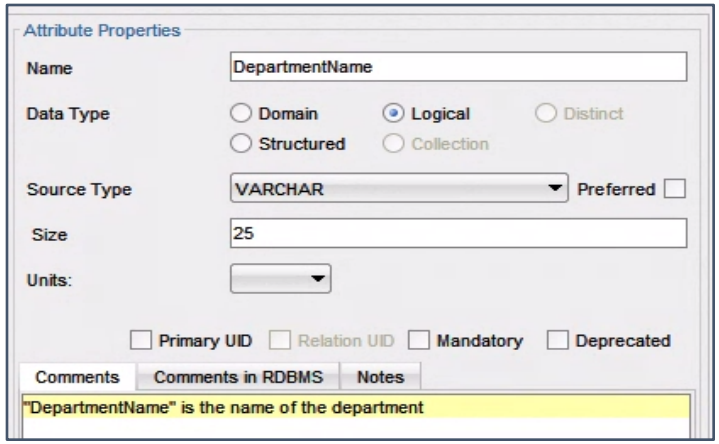
22. The "primary key constraint" definition is in the bottom section of the "Employee" entity information

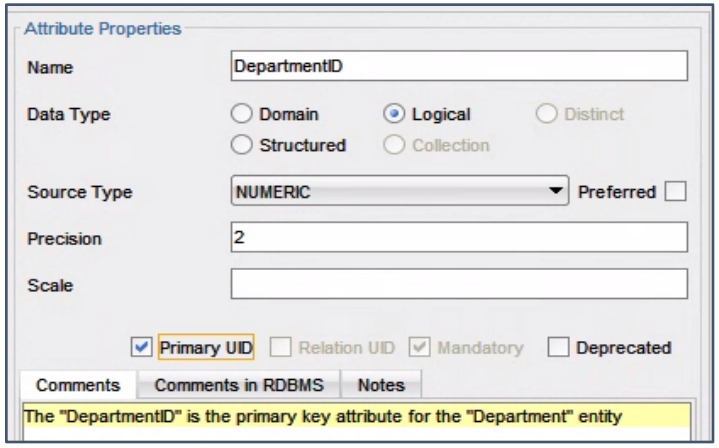
Create the "Department" Entity

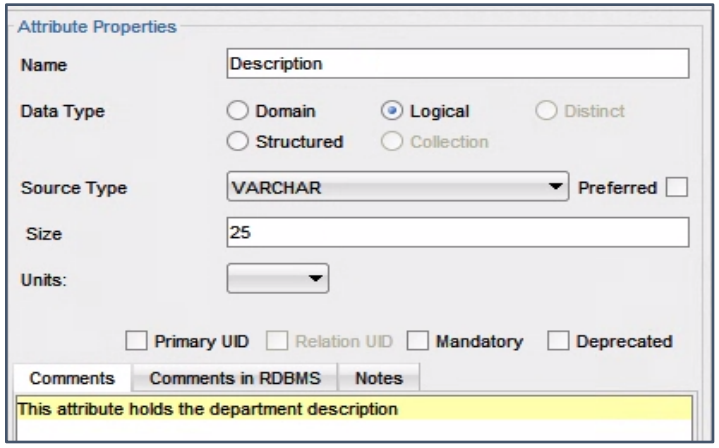
23. Add the "Department" entity



24. Add the "DepartmentID", "DepartmentName" and "Description" attributes



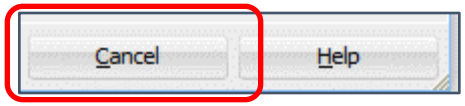


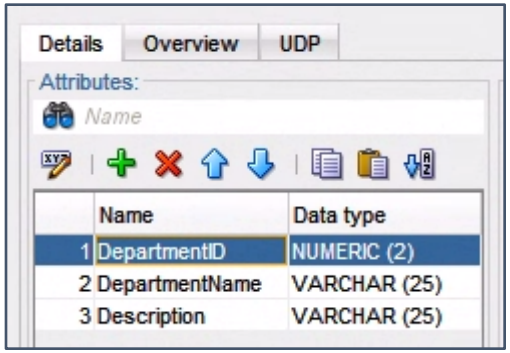


Complete the "Department" Entity

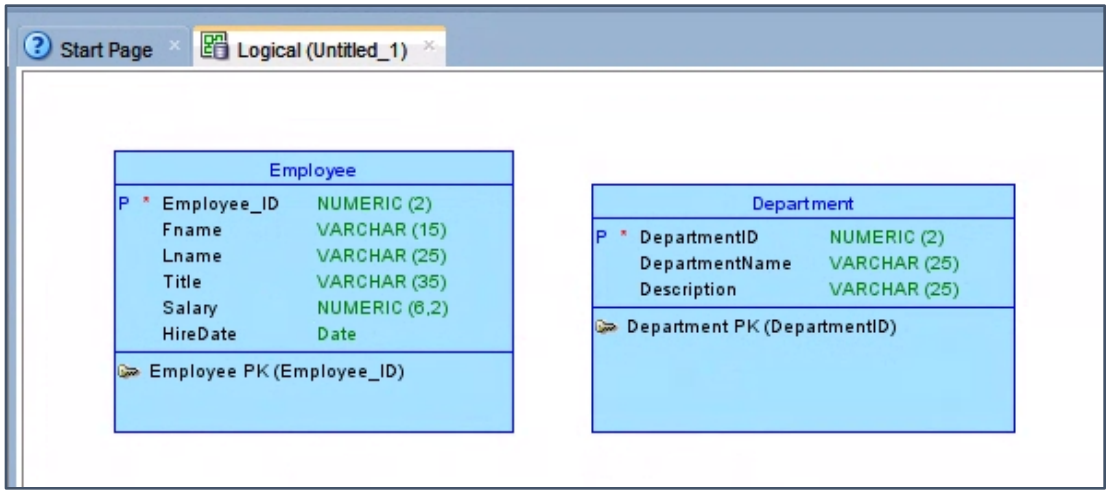
25. Click **Cancel** after you complete the "Description" attribute

The 3 attributes you added should be listed under the **Details** tab





26. You should now see the "Department" entity and the 3 attributes you added



Create a Relationship Between "Employee" and "Department" Entities

Entities are related based on a set of business rules. For this tutorial, the relationship business rules are:

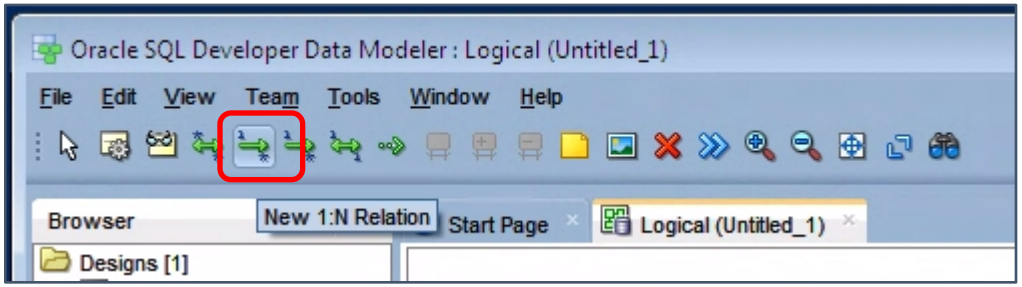
- Each employee must be listed in the "Employee" entity
- Each department in the company must be listed in the "Department" entity
- An employee must work in only one department
- A department may have 0 or more employees

Note that "must" indicates a "required" situation and "may" or "can" are "optional" indicators. The diagram notation must match the verbiage used in the business rules.

We're going to create a "1:N", or "one-to-many", relationship between "Employee" and "Department" that will satisfy the business rules given above.

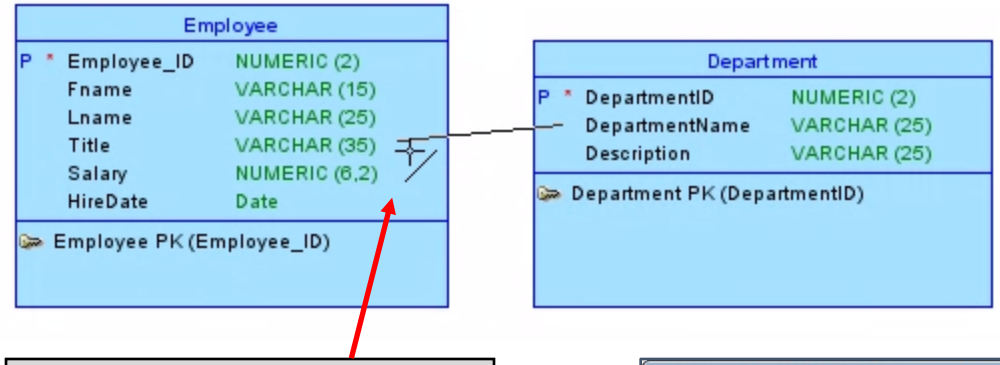
27. The "green arrow" icons on the 2nd row are for creating relationships.

Click on the 2nd one from the left to create a "1:N", or "one-to-many" relationship



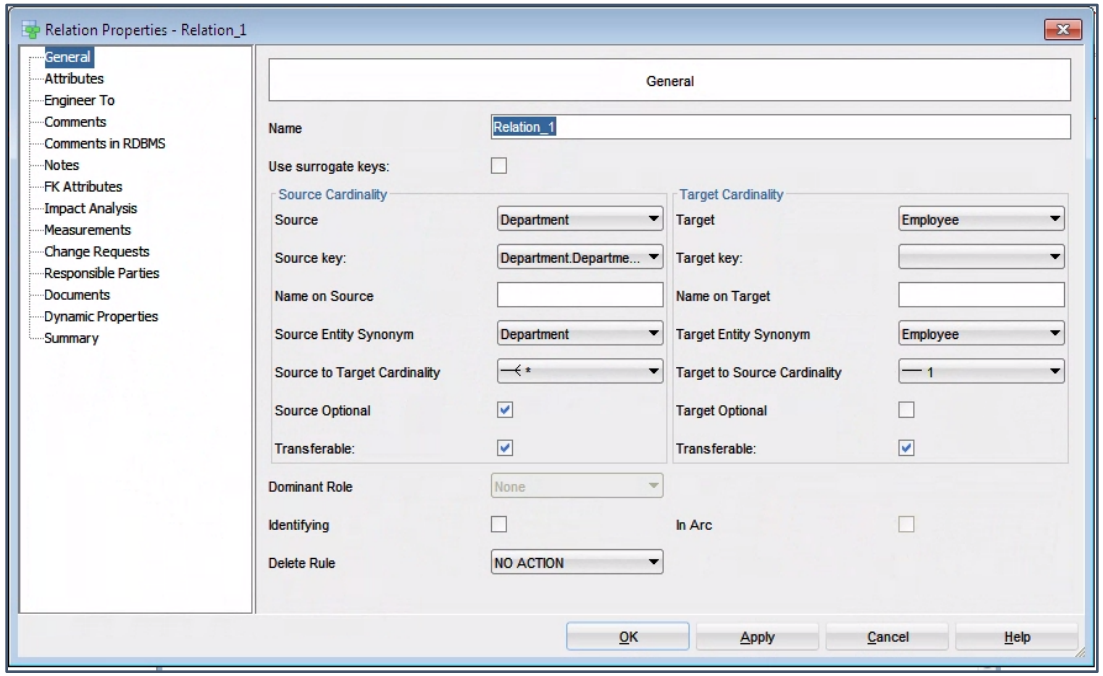
Create a Relationship Between "Employee" and "Department" Entities - Continued

28. Click on **Department** then click on **Employee**



29. Note that your mouse cursor will show a "+", "/" indicator as you hover over each entity

30. Also note that the "Source" entity is clicked on first, then the "Target" entity so that the relationship settings are created for you.



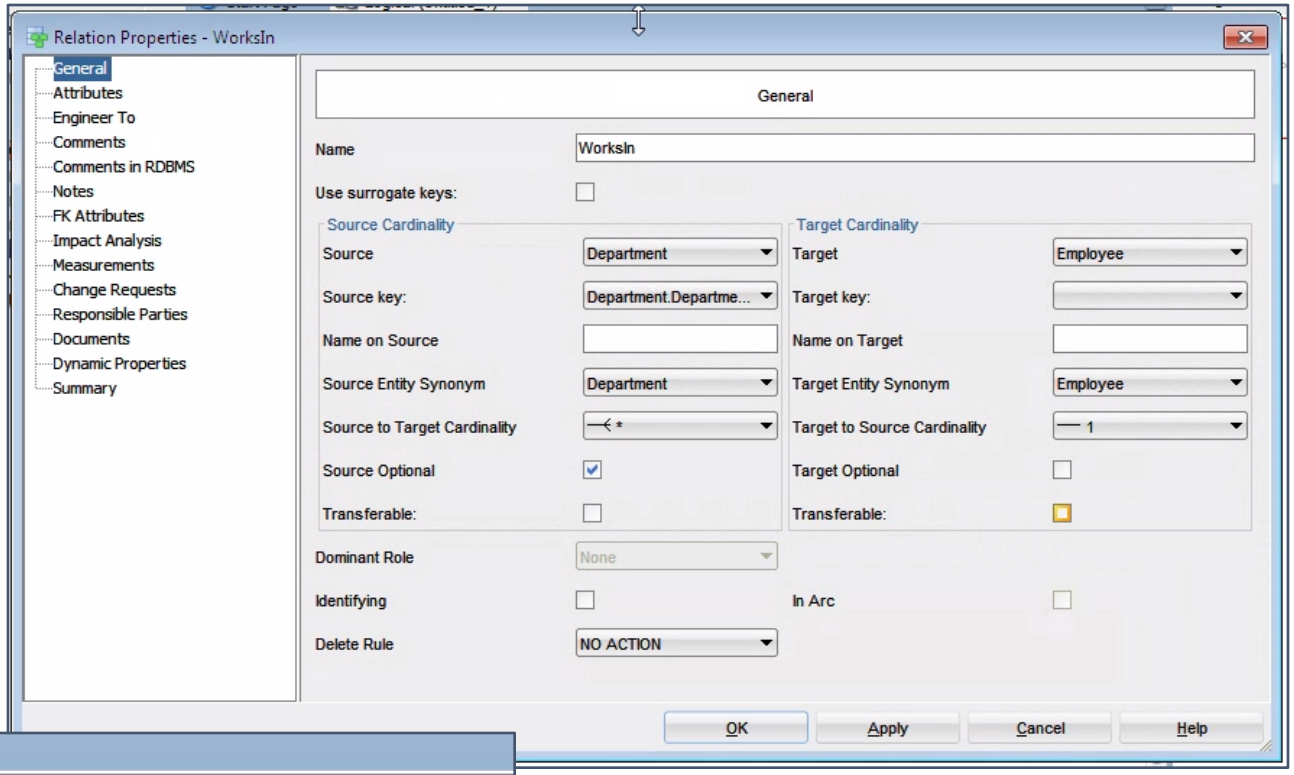
31. The **Relation Properties** screen will be displayed showing the two tables you picked.

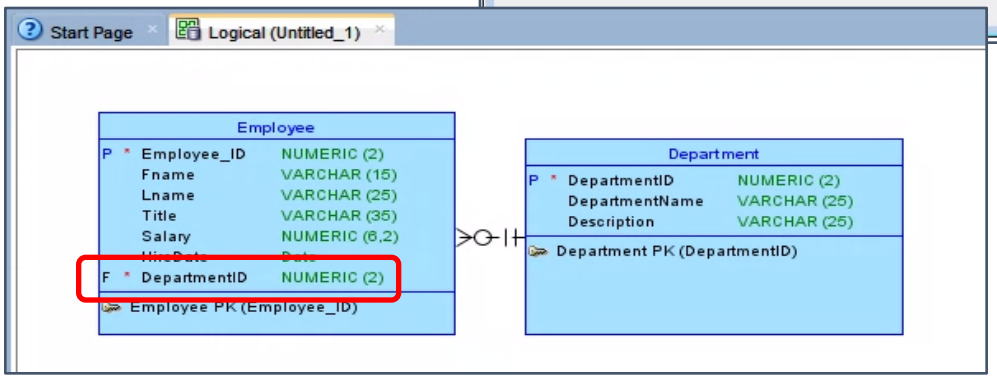
If you clicked the entities in the wrong order, update the **Source** and **Target** entities to what you see in the **Relation Properties** window to the right.

Create a Relationship Between "Employee" and "Department" Entities - Continued

32. Update your **Relation Properties** window as shown

- **Name**: WorksIn
- Both **Transferable** boxes: Unchecked



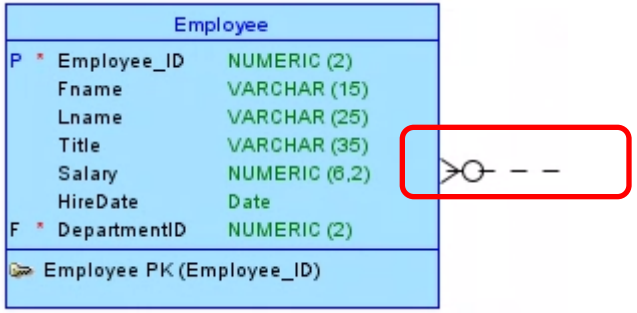


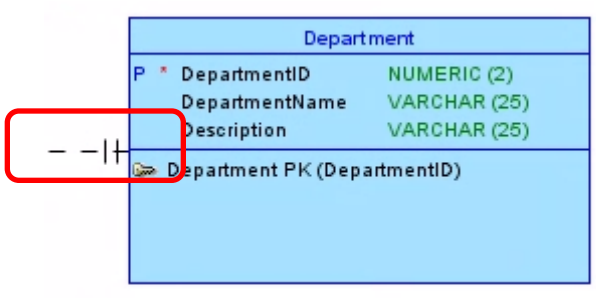
33. You will now see a "foreign key" attribute in **Employee**, noted with an "F" and that it is required, as noted with a red asterisk.

Relationship Diagram Details

34. The "Employee" side of the relationship has "cardinality" of "many" and "participation" of "optional". The foreign key field is "required".

Rules:
- Each Employee must have a department
- A department can be used for 0, 1 or more employees (a department can be in the "Department" entity and not be assigned to an "Employee")

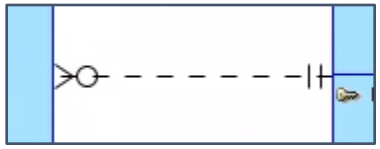




35. The "Department" side of the relationship has "cardinality" of "one" and "participation" of "mandatory".

Rules:
- Each department is only listed once
- Each department must be listed in "Department" before it can be assigned to an Employee

36. Since “Identifying” wasn’t checked in the General settings window for this relationship, a dotted line indicates a "strong" relationship with each entity having its own primary key.

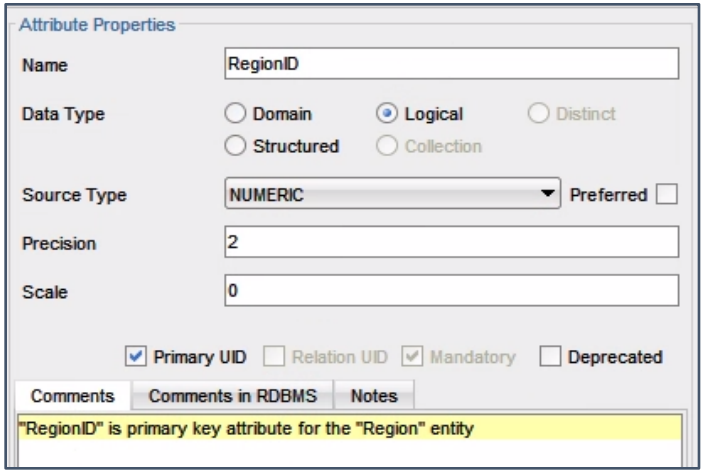


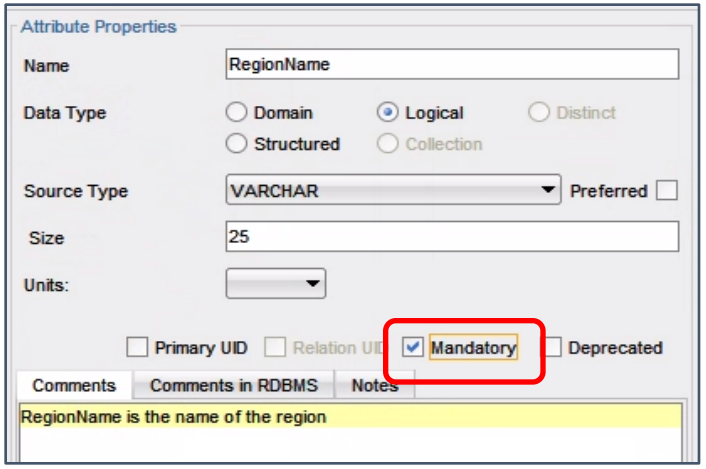
Create the "Region" Entity

37. Add a "Region" entity and "RegionID" and "RegionName" attributes using the following details:

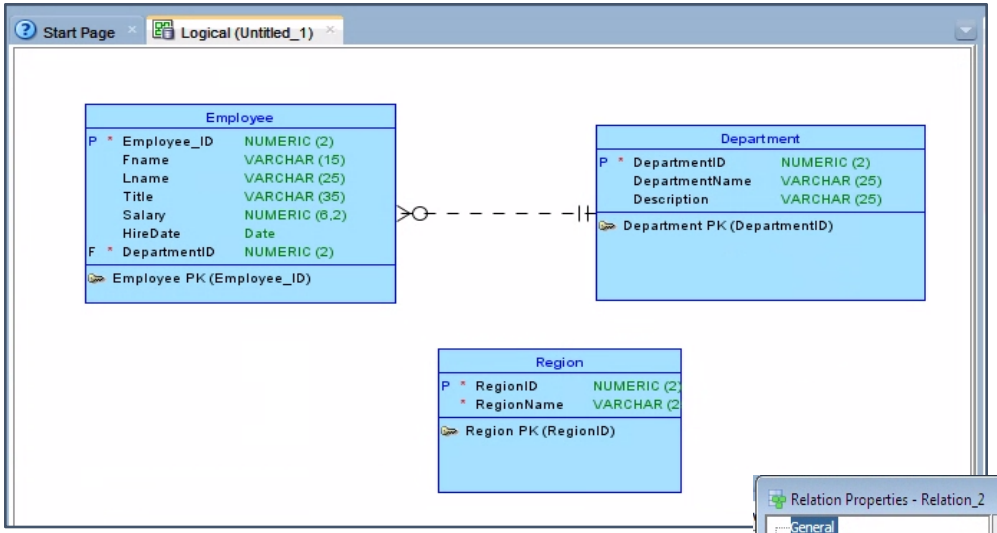
Entity Properties
General -> **Name**: Region
Comments -> The "Region" entity holds a list of region names

NOTE: Make "RegionName" a "Mandatory" field by checking the box





Create a Relationship Between "Department" and "Region" Entities



38. You should now have a diagram that looks like the screenshot to the left.

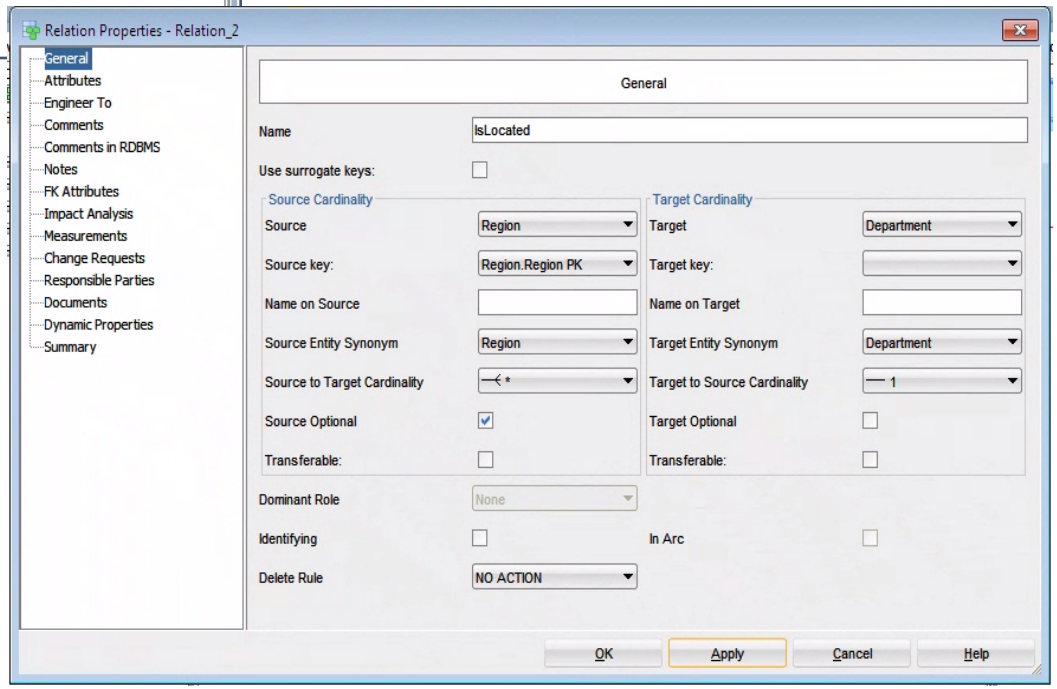
Note that there is a red asterisk (*) next to "RegionName" as it is a "required" attribute.

39. Create a relationship called "isLocated" with the configuration shown to the right

Relationship business rules:

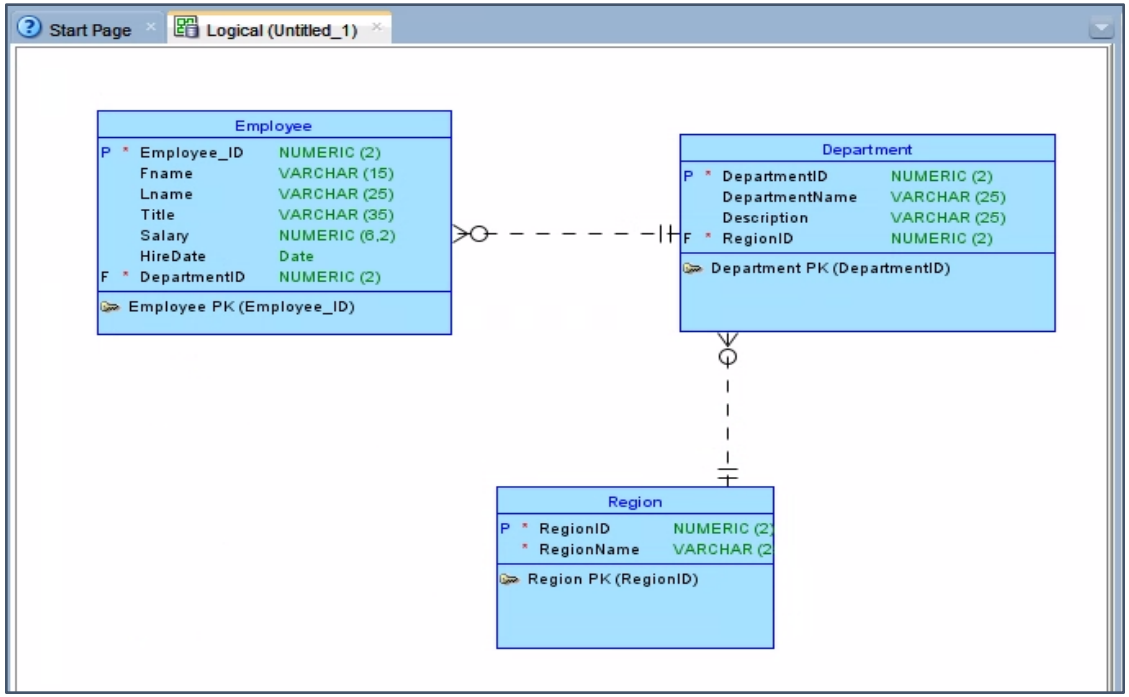
- A region is only listed once in the "Region" entity
- A department must be associated with one "Region"
- A region can be assigned to more than one department

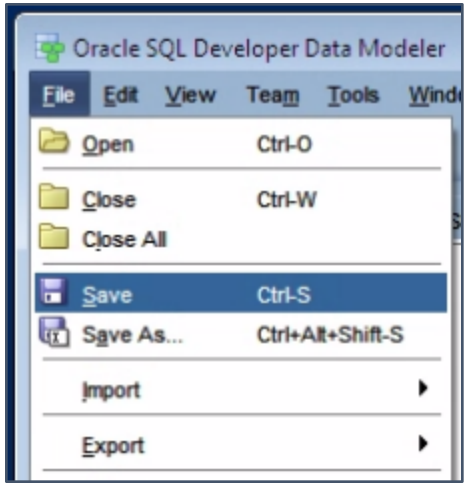
Note that the last rule indicates an "optional" condition where a region is listed in the "Region" entity but may not be assigned any departments



View and Save the Logical Model

40. Your logical model should now look similar to the screenshot shown here



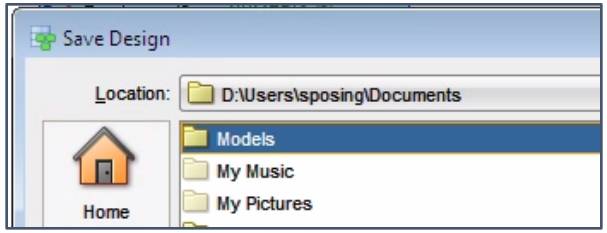


41. Go to **File** -> **Save** to save your logical model

View and Save the Logical Model - Continued

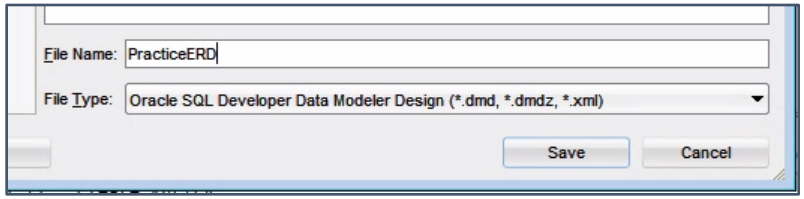
42. Click **Documents**, then double click **Models**

Note that I made a "Models" folder to save my Data Modeler files

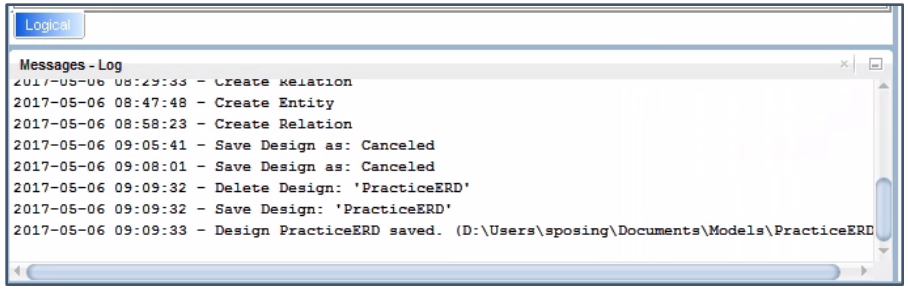


43. Type in file name: "PracticeERD"

Click **Save**

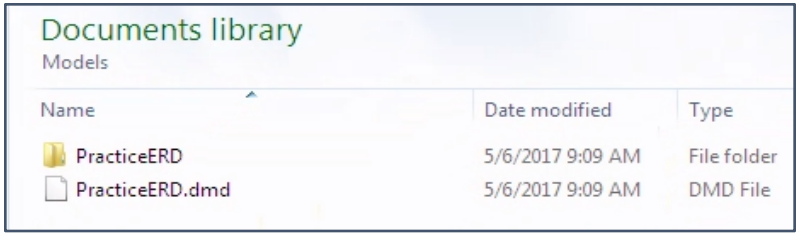


44. You should see the "Save" action in the "Messages – Log" pane at the bottom of the Data Modeler tool



45. Data Modeler saves your designs as a "DMD" file and a folder of the same name. The folder contains additional information about your design.

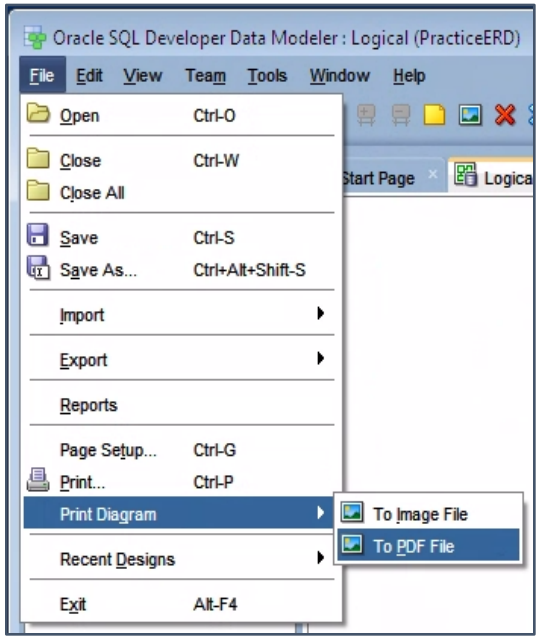
Note that these files CANNOT be sent to someone else to view your model. You must use the "Export" function to create a DMD file and folder to share with someone else. (See tutorial "Export ODM Models")



Print the Logical Model as PDF

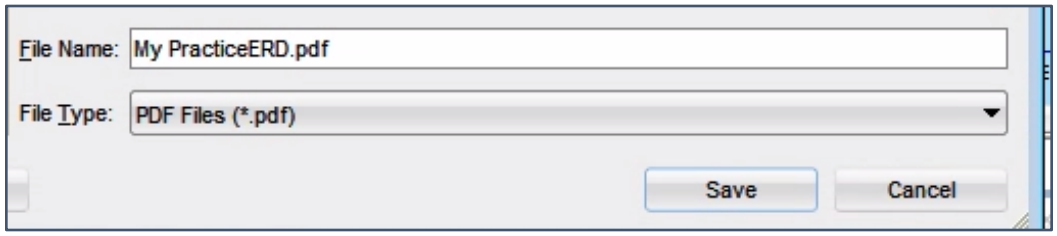
46. You can print the design as a "PDF" file in order to turn it in for this tutorial.

Click **File -> Print Diagram -> To PDF File**



47. Give your file a name

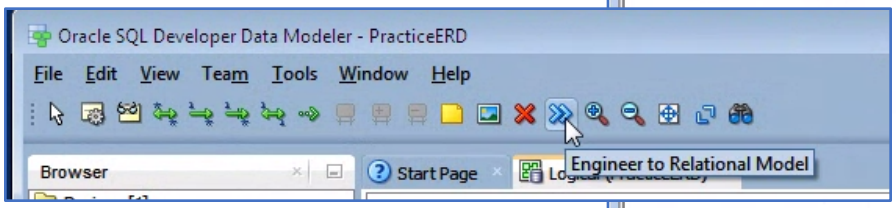
Click **Save**

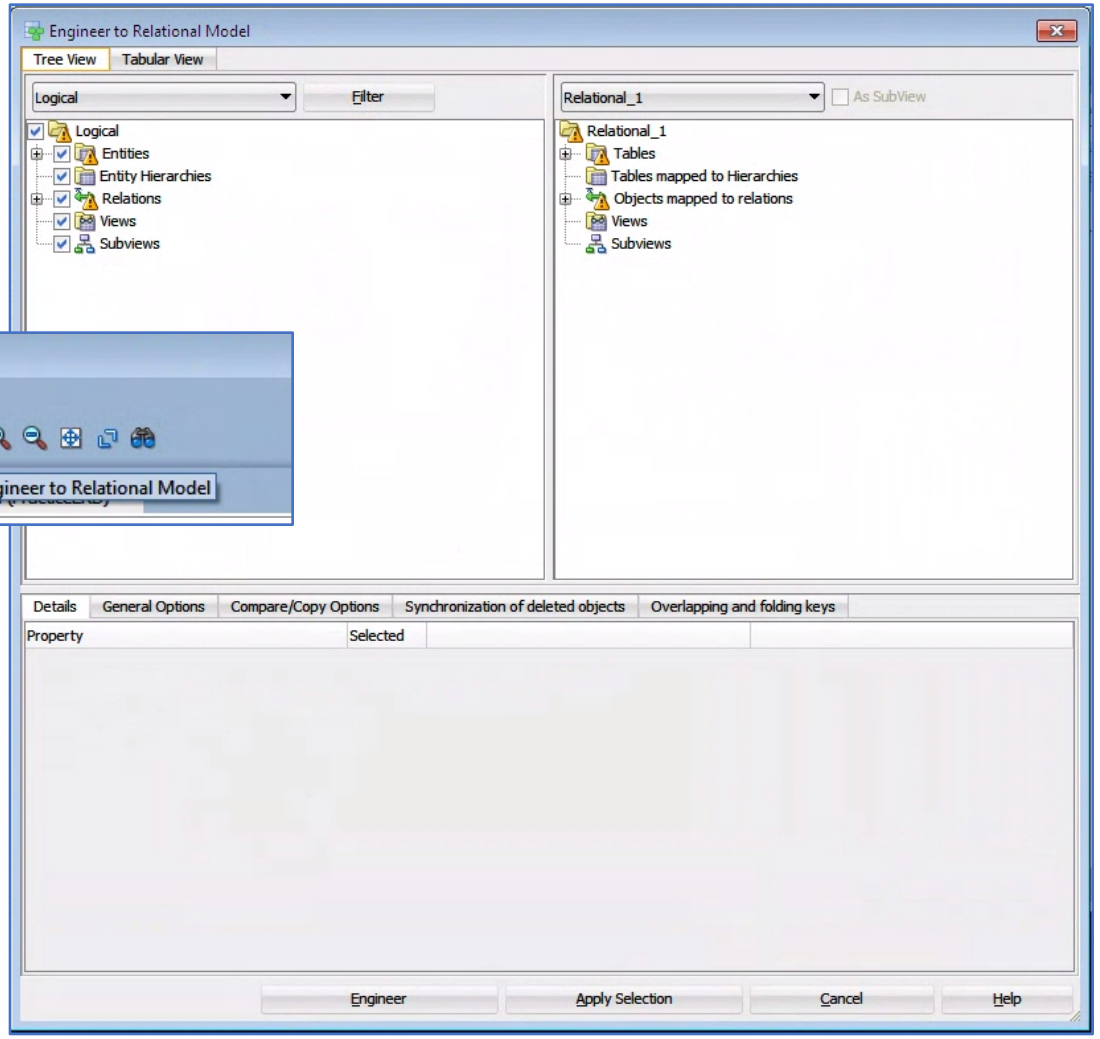


Convert Logical Model to Relational Model

48. You can engineer a relational model from your logical one.

With your logical model open, click double, blue, right arrow icon in the toolbar





49. Ensure that all of your logical model items are checked

Click **Engineer**

Convert Logical Model to Relational Model - Continued

50. Your Relational model should now be displayed and look something like what's shown below. You'll notice that the foreign key references are listed on this model.