



Database Foundations

5-1

Mapping Entities and Attributes



Road Map

You are here



Mapping
Entities and
Attributes

Mapping
Primary and
Foreign Keys



Objectives

This lesson covers the following objectives:

- Describe why you need to create a relational model
- Explain the naming conventions used in a relational database



Objectives

This lesson covers the following objectives:

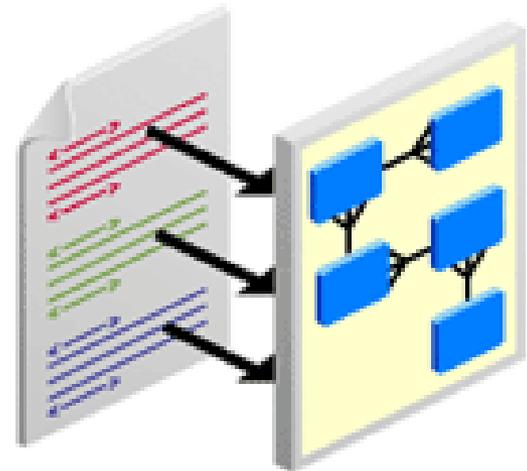
- Use Oracle SQL Developer Data Modeler to apply naming standards by creating:
 - Glossary
 - Name abbreviations
 - Design rules
 - Custom rules
 - Transformations
- Map simple entities to tables
- Map attributes to column names



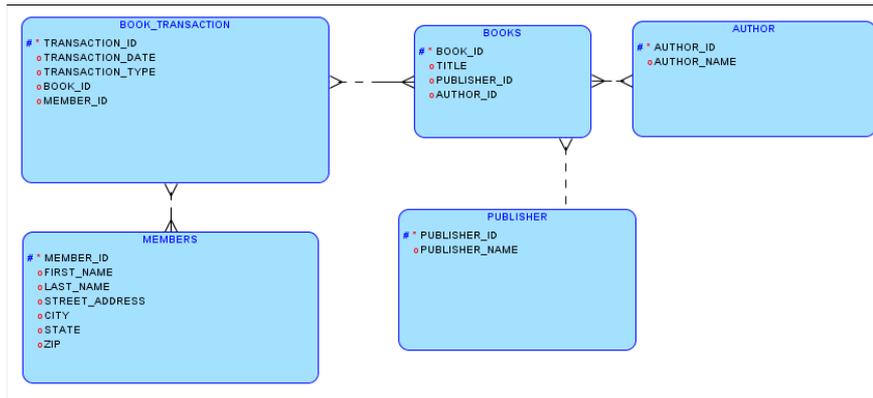
Need for Creating a Relational Model

A relational model:

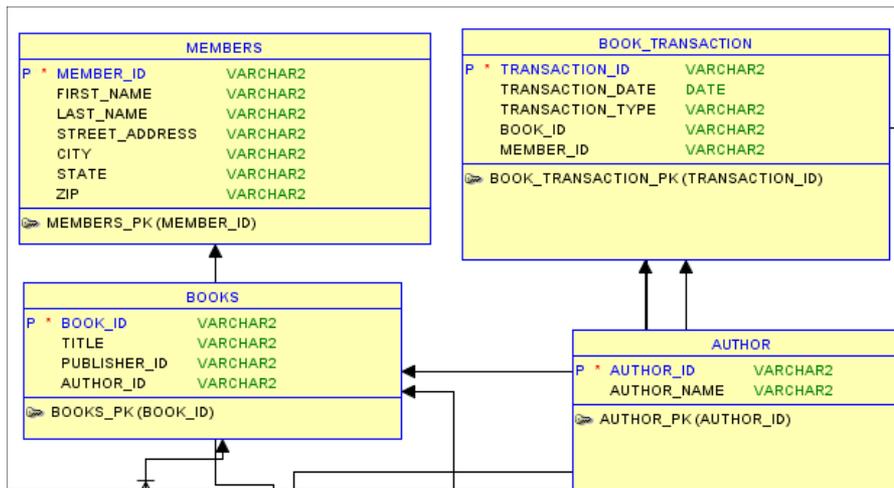
- Is the blue print for the actual database implementation
- Can be used as the basis for implementing any type of DBMS. The ideal model can be adapted to an RDBMS model.



Transformation Process: Logical to Relational Model



← Logical Model



← Relational Model

Tables: A Recap

Table: EMPLOYEES

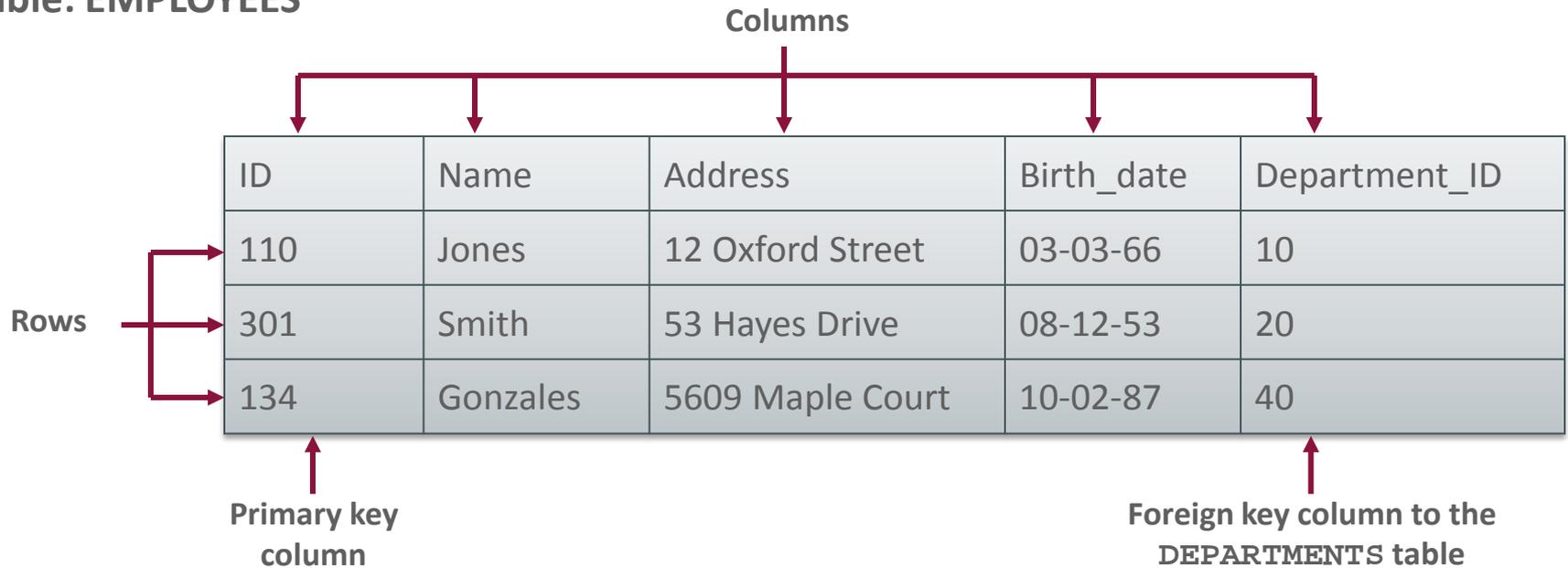


Table in the relational model

Employees	
P *	ID NUMBER (6)
	Name VARCHAR2 (50)
	Address VARCHAR2 (100)
	Birth Date DATE
F *	Department_ID NUMBER (6)
Employees_PK	

Terminology Mapping: A Recap

ANALYSIS	DESIGN
Logical model	Relational model
Entity	Table
Attribute	Column
Primary UID	Primary key
Secondary UID	Unique constraint
Relationship	Foreign key
Business constraints	Check constraints

Naming Conventions

Decide on conventions for:

- Table names
- Column names and special characters (% , * , # , - , space , ...)
- Table short names (abbreviations)

Naming Conventions

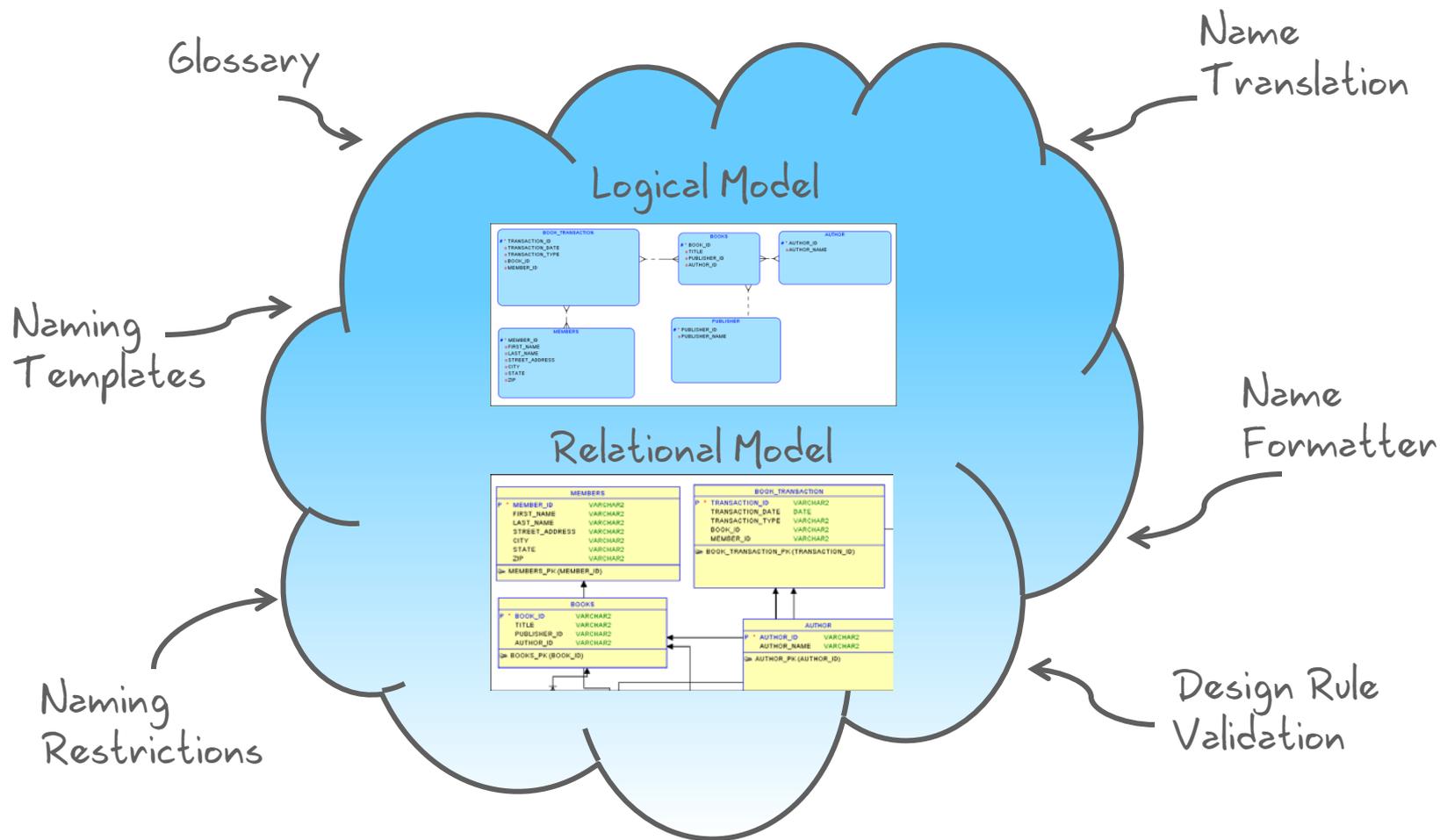
Decide on conventions for:

- Primary and unique key constraint names
- Foreign key constraint names
- Foreign key column names
- Check constraints

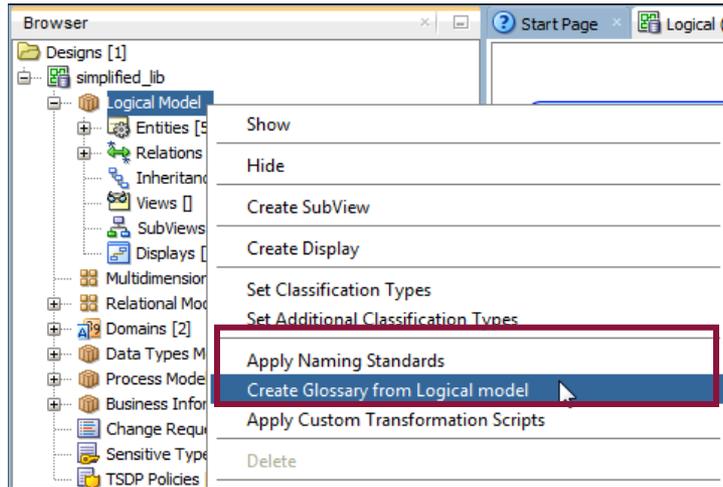
Naming Restrictions with Oracle Database

- Table and column names:
 - Must start with a letter
 - May contain up to 30 alphanumeric characters
 - Must not contain spaces or some special characters
 - Must avoid reserved words
- Table names must be unique within a schema.
- Column names must be unique within a table.

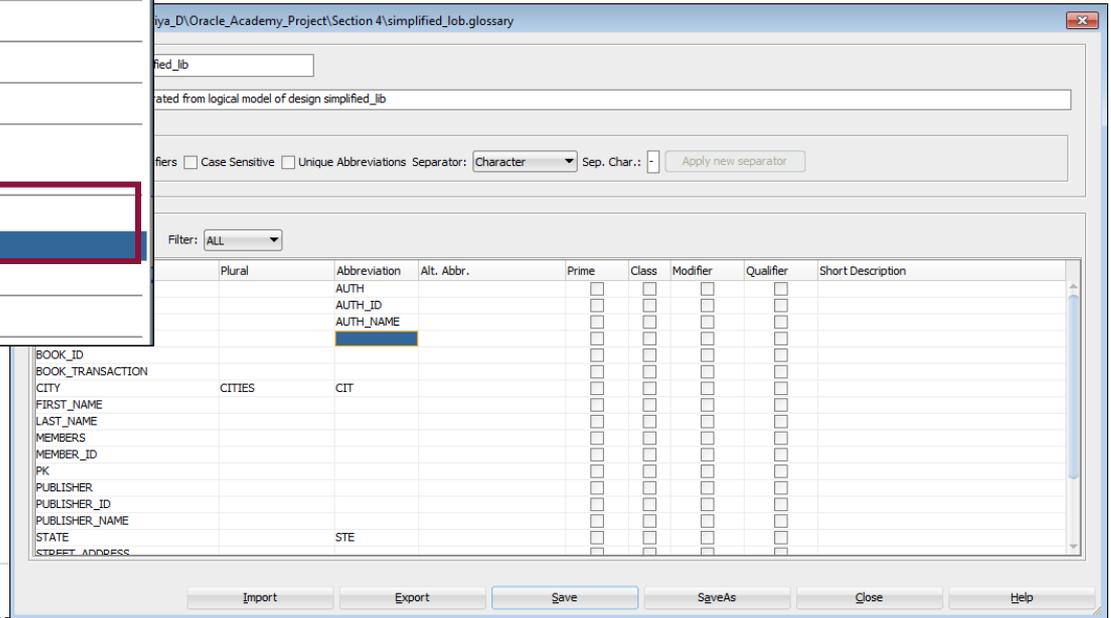
Applying Naming Standards Using Oracle SQL Developer Data Modeler



Glossary

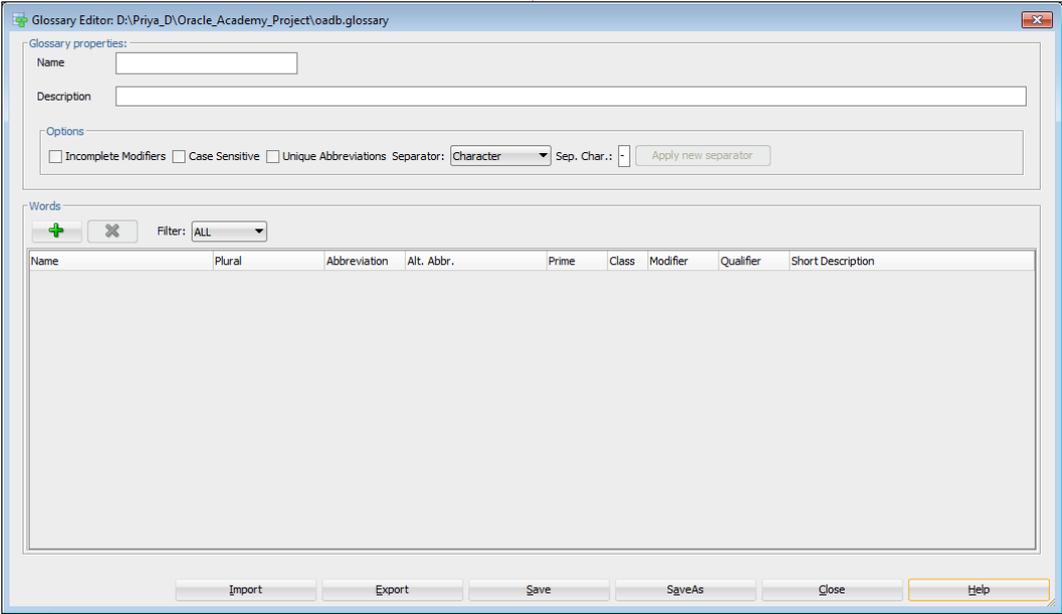
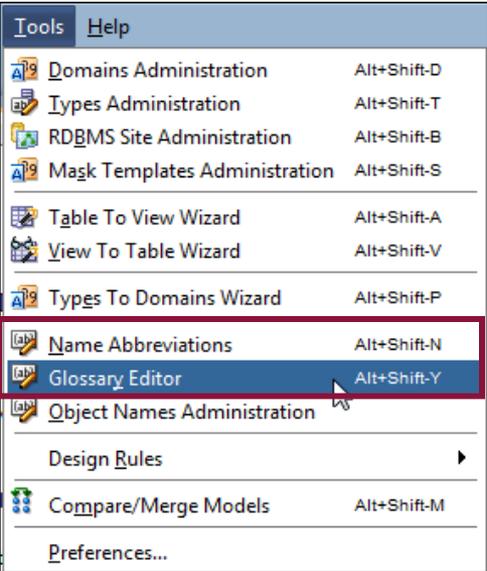


← Creating a Glossary from a Logical Model

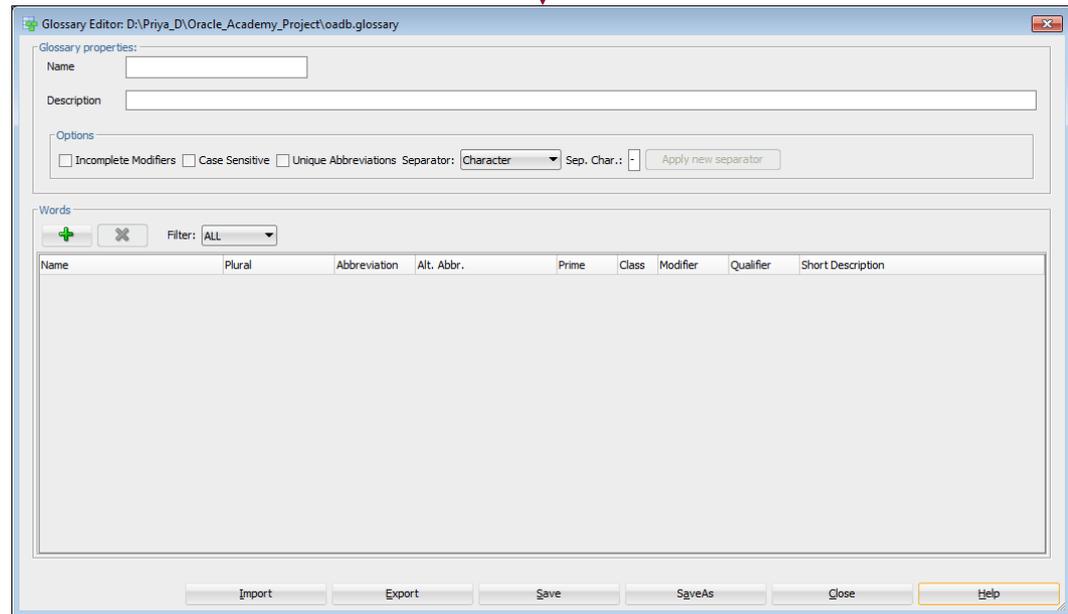
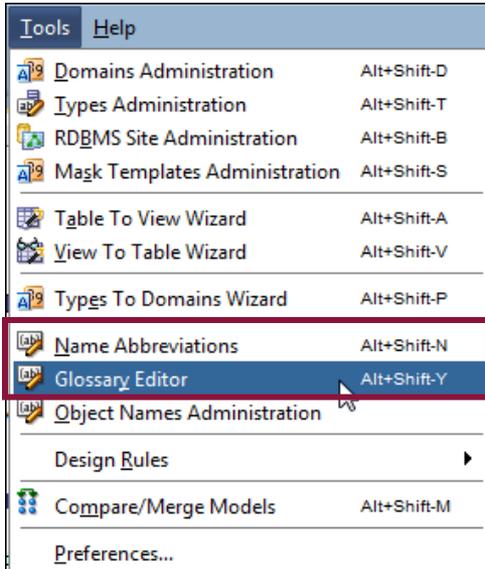


```
<?xml version="1.0" encoding="UTF-8" ?>
<cwd_glossary name="simplified_lib" description="generated from logical model of design simplified_lib" id="563FEDF5-F3A2-A9E8-FDD2-DD0F1FA38E94" >
  <glossaryWord name="AUTHOR" plural="" abbreviation="" alt_abbreviation="" id="EA404A0A-2A51-0E50-352D-8313965B6D8D" import_id="" description="" />
  <glossaryWord name="AUTHOR_ID" plural="" abbreviation="" alt_abbreviation="" id="EC9700BD-C359-B876-C2BC-2FF3E91D8E22" import_id="" description="" />
  <glossaryWord name="AUTHOR_NAME" plural="" abbreviation="" alt_abbreviation="" id="CE9A7717-4963-3A79-5B12-F8E4D81E737B" import_id="" description="" />
  <glossaryWord name="BOOK_ID" plural="" abbreviation="" alt_abbreviation="" id="..." import_id="" description="" />
  <glossaryWord name="BOOK_TRANSACTION" plural="" abbreviation="" alt_abbreviation="" id="..." import_id="" description="" />
  <glossaryWord name="CITY" plural="CITIES" abbreviation="CIT" alt_abbreviation="" id="..." import_id="" description="" />
  <glossaryWord name="FIRST_NAME" plural="" abbreviation="" alt_abbreviation="" id="..." import_id="" description="" />
  <glossaryWord name="LAST_NAME" plural="" abbreviation="" alt_abbreviation="" id="..." import_id="" description="" />
  <glossaryWord name="MEMBERS" plural="" abbreviation="" alt_abbreviation="" id="..." import_id="" description="" />
  <glossaryWord name="MEMBER_ID" plural="" abbreviation="" alt_abbreviation="" id="..." import_id="" description="" />
  <glossaryWord name="PK" plural="" abbreviation="" alt_abbreviation="" id="..." import_id="" description="" />
  <glossaryWord name="PUBLISHER" plural="" abbreviation="" alt_abbreviation="" id="..." import_id="" description="" />
  <glossaryWord name="PUBLISHER_ID" plural="" abbreviation="" alt_abbreviation="" id="..." import_id="" description="" />
  <glossaryWord name="PUBLISHER_NAME" plural="" abbreviation="" alt_abbreviation="" id="..." import_id="" description="" />
  <glossaryWord name="STATE" plural="" abbreviation="" alt_abbreviation="" id="..." import_id="" description="" />
  <glossaryWord name="STREET_ADDRESS" plural="" abbreviation="" alt_abbreviation="" id="..." import_id="" description="" />
</cwd_glossary>
```

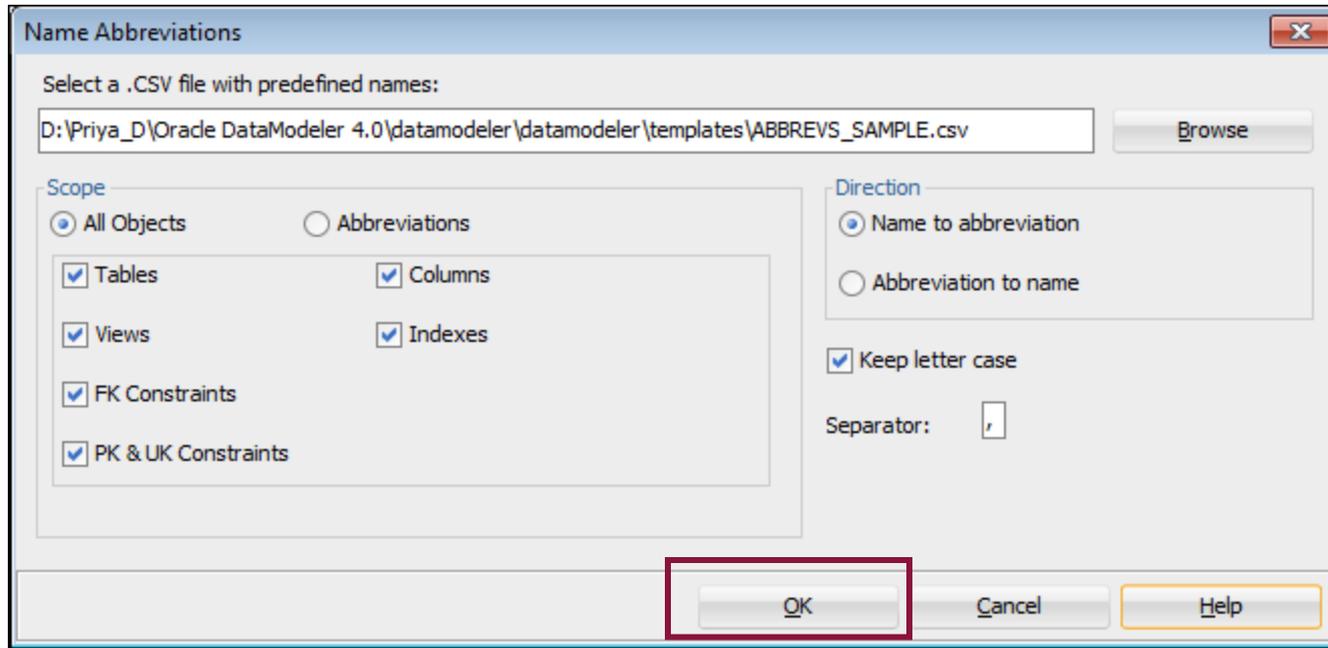
Glossary Editor



Glossary Editor



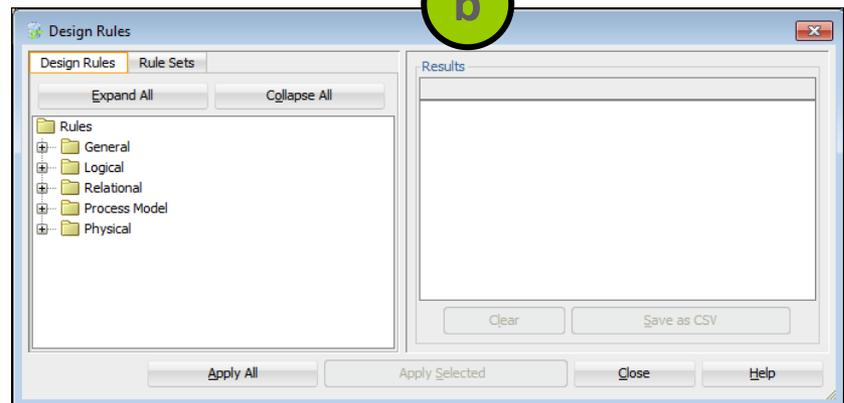
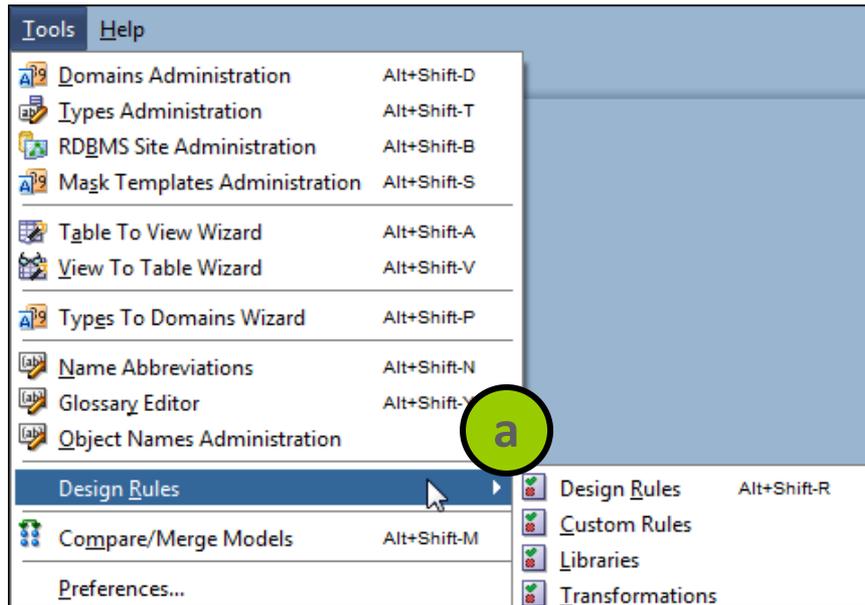
Name Abbreviations



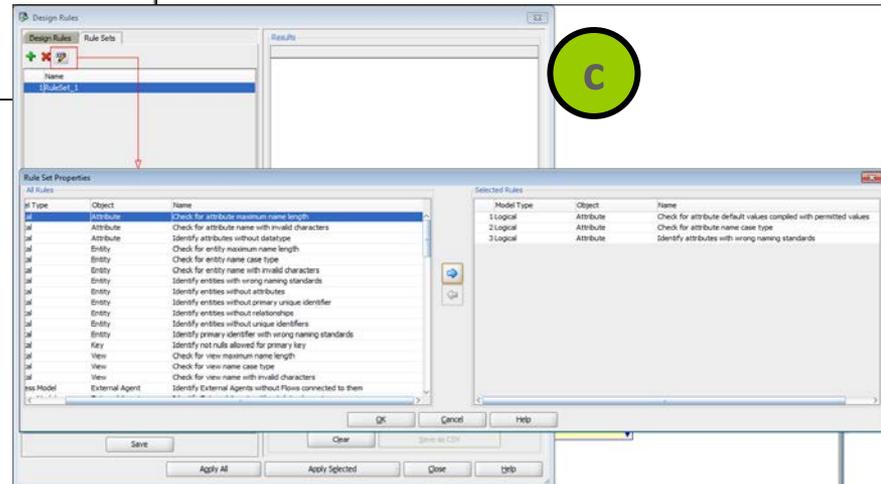
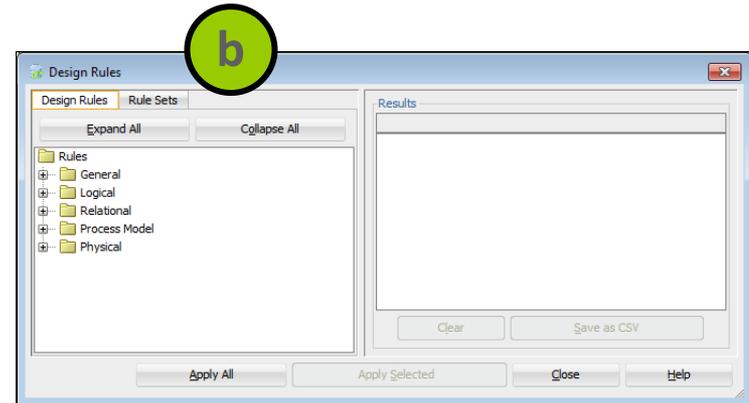
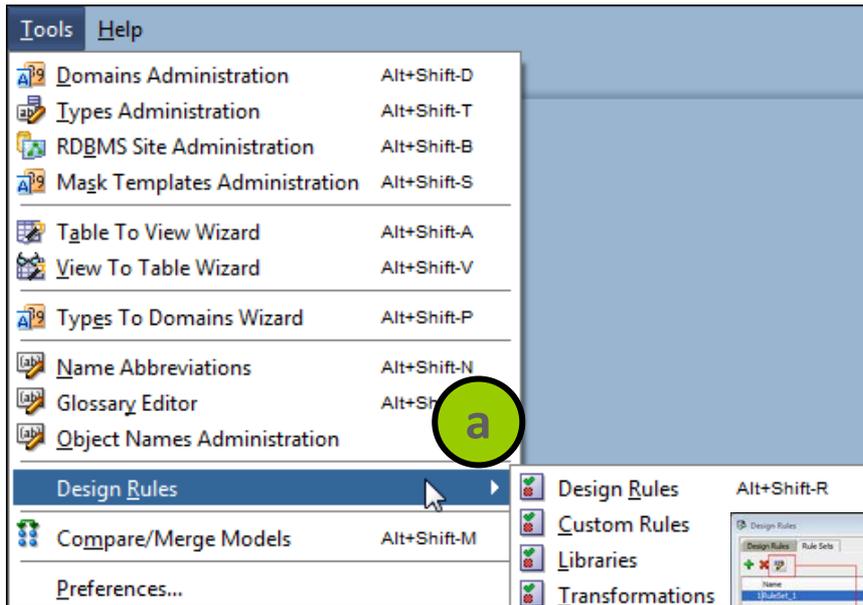
```
CUST, CUSTOMER  
CUST, CUS
```

← Example of a .csv file content

Executing Design Rules



Creating Rule Sets for Design Rules



Custom Design Rules and Transformation

The screenshot displays three overlapping windows in Oracle SQL Developer:

- Custom Design Rules:** Shows a table with one rule: "Complex rule - check comments demo" (Object: Table, Engine: Mozilla Rhino, Type: Warning, Variable: table). Below is a "Rule Script" editor with the following code:

```
1 var ruleMessage;
2 var errType;
3 var table;
4 function checkcomments(object){
5   result = true;
6   ruleMessage="";
7 }
8 if(table.getCommentInRDBMS().equals("")).equals("no comments in RDBMS defined")
9   errType="Problem:";
10 result = false;
11 }
12 if(table.getComment().equals(""))
13   if(ruleMessage.equals("")){
14     ruleMessage="no comments defined";
15   }
```
- Custom Libraries:** Shows a table with three libraries: "my first library" (Engine: Mozilla Rhino), "ruby lib" (Engine: Ruby Engine), and "checkname" (Engine: Mozilla Rhino). Below is a "Functions / Methods" table and a "Script" editor. The "Functions / Methods" table has two entries: "checkcomments" and "NoNullConst_Name_Length". The "Script" editor contains the following code:

```
1 var ruleMessage;
2 var errType;
3 var table;
4 function checkcomments(object){
5   result = true;
6   ruleMessage="";
7   if(table.getCommentInRDBMS().equals("")){
8     ruleMessage="no comments in RDBMS defined";
9     errType="Problem:";
10    result = false;
11  }
12  if(table.getComment().equals("")){
13    if(ruleMessage.equals("")){
14      ruleMessage="no comments defined";
15    }
16  }
```
- Custom Transformations Scripts:** Shows a table with nine transformation scripts. The selected script is "Table template" (Object: relational, Engine: Mozilla Rhino, Model: model). Below is a "Script" editor with the following code:

```
1 var t_name = "table_template";
2 var p_name = "ctemplateID";
3 template = model.getTableSet().getByName(t_name);
4 if(template!=null){
5   tcolumns = template.getElements();
6   tables = model.getTableSet().toArray();
7   for (var t = 0; t<tables.length;t++){
8     table = tables[t];
9     // compare name ignoring the case
10    if(!table.getName().equalsIgnoreCase(t_name)){
11      for (var i = 0; i < tcolumns.length; i++) {
12        column = tcolumns[i];
13        col = table.getColumnByProperty(p_name, column.getObjectID());
14        if(col==null){
```

Custom Design Rules and Transformation

The screenshot displays three overlapping windows in Oracle SQL Developer:

- Custom Design Rules:** Shows a table with columns Name, Object, Engine, Type, and Variable. A rule named 'Complex rule - check comments demo' is listed. Below, the 'Rule Script' editor shows a JavaScript function 'checkcomments' that checks for comments in RDBMS tables and sets error messages.
- Custom Transformations Scripts:** Shows a table with columns Name, Object, and Engine. A script named 'Table template' is selected. The 'Script' editor shows a JavaScript function that iterates through table columns and compares them to a template.
- Custom Libraries:** Shows a table with columns Name and Engine. A library named 'my first library' is listed. Below, the 'Functions / Methods' editor shows a list of methods, including 'checkcomments' and 'NoNullConst_Name_Length'.

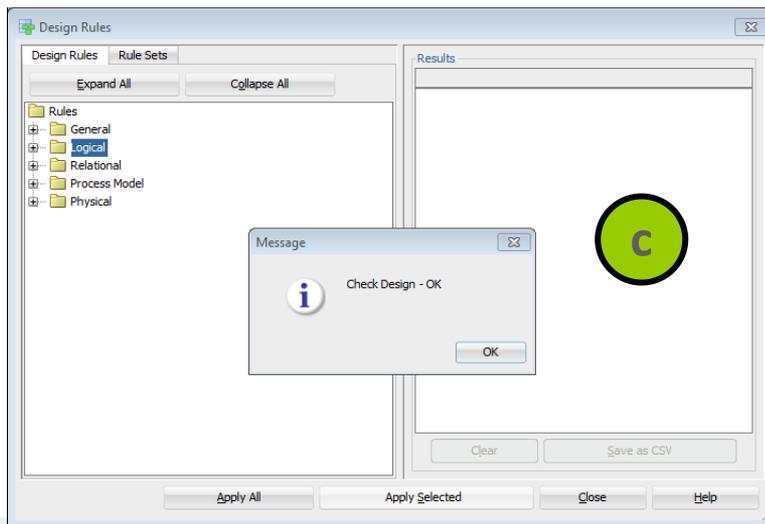
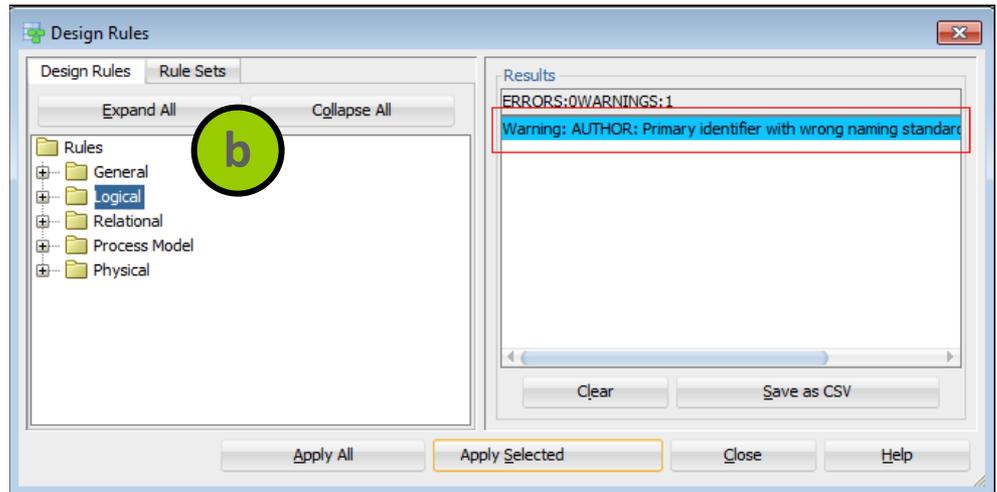
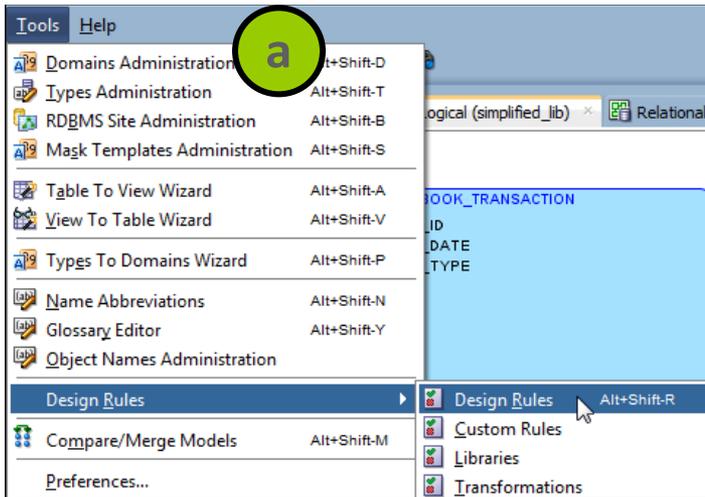
Case Scenario: Design Rules

Let me see if the ERD for the Simplified Library Management System is complying with the database design rules.

If the ERD is not complying with the design rules, can I fix it?

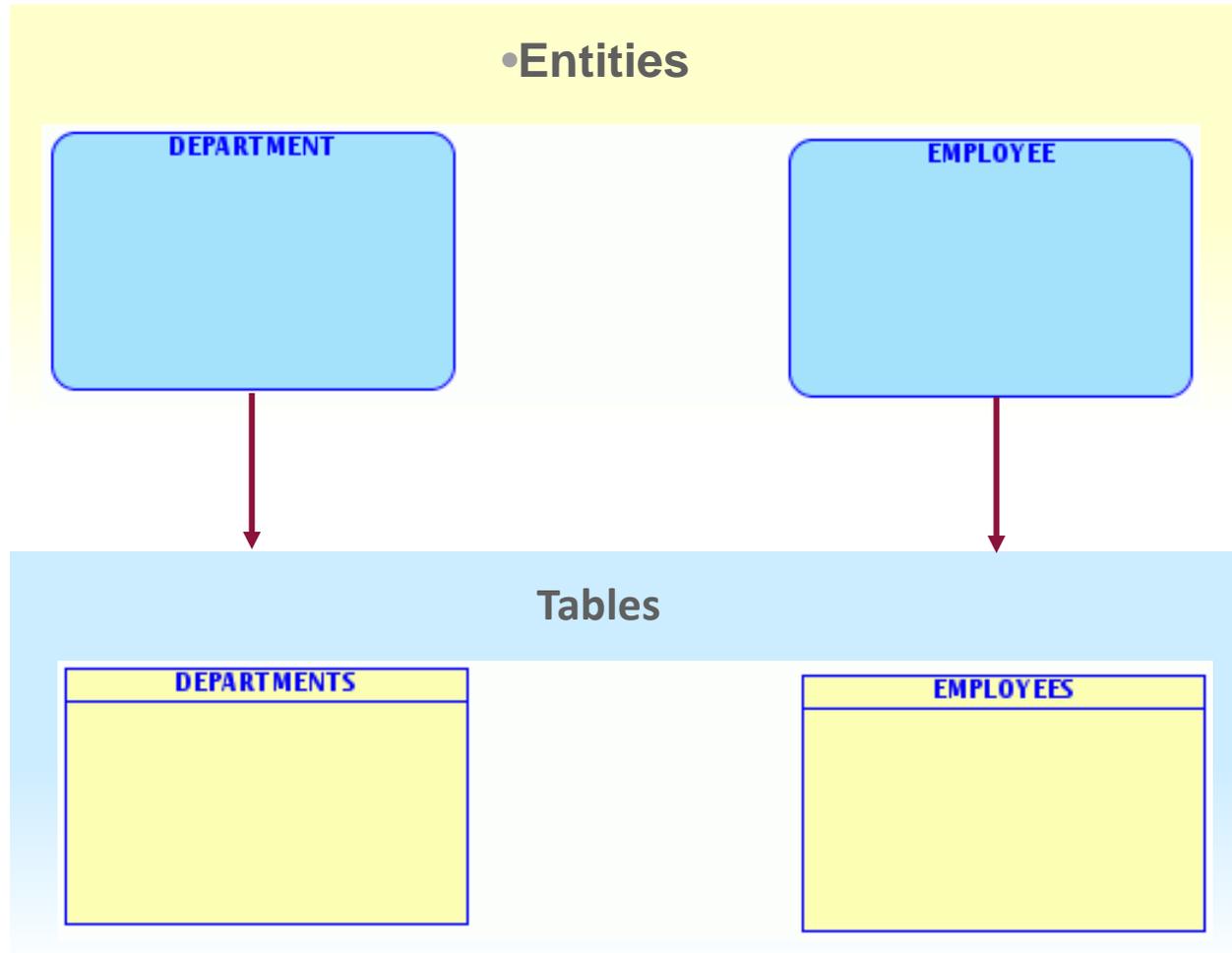


Case Scenario: Applying Design Rules



The warning is fixed,
and now the design is
OK.

Mapping Simple Entities to Tables



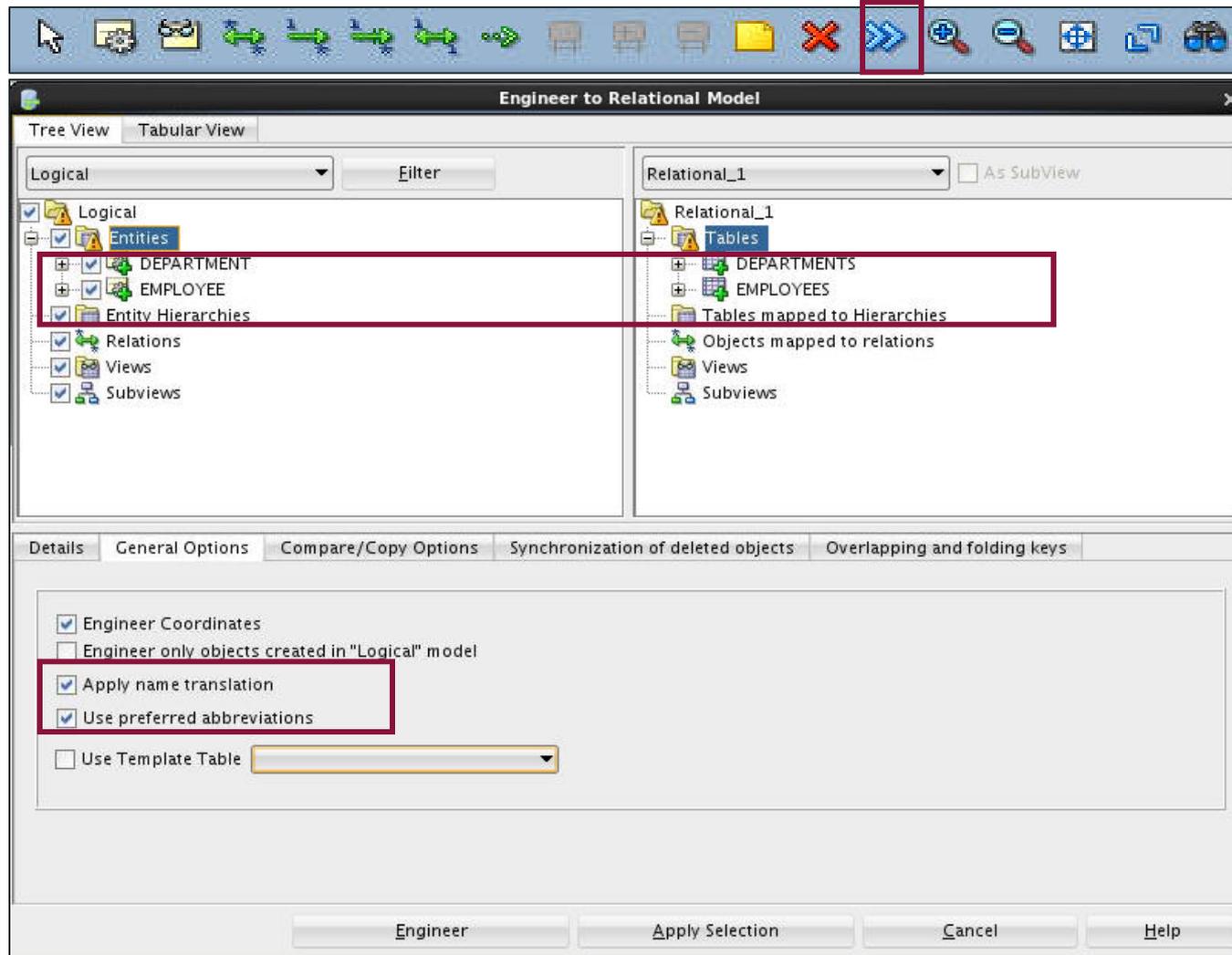
Naming Entities

The screenshot shows the 'Entity Properties - Entity_1' dialog box with the 'General' tab selected. The left sidebar lists various property categories, with 'General' highlighted. The main area contains the following fields:

- Name: DEPARTMENT
- Short Name: DEPT (highlighted with a red box and a green circle labeled 'a')
- Synonyms: (empty)
- Synonym to display: (empty)
- Preferred Abbreviation: DEPARTMENTS (highlighted with a red box and a green circle labeled 'b')
- Long Name: Entity_1 (highlighted with a green circle labeled 'c')
- Based on Structured Type: (dropdown menu)
- Super Type: (dropdown menu)
- Source: (empty)
- Allow Type Substitution:
- Create Surrogate Key:
- Deprecated:

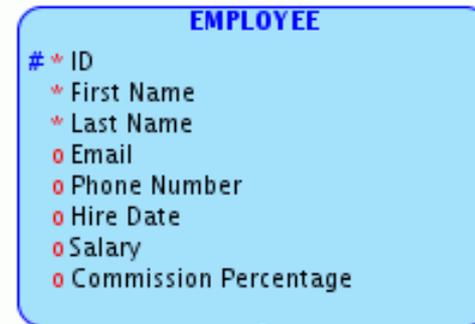
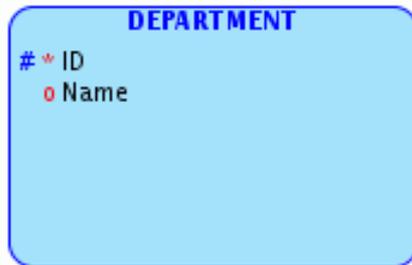
At the bottom of the dialog are buttons for 'OK', 'Apply', 'Naming Rules', 'Cancel', and 'Help'.

Engineering Entities



Mapping Attributes to Columns

•Entities



Tables

DEPARTMENTS	
* ID	NUMBER (6)
Name	VARCHAR2 (30)

EMPLOYEES	
* ID	NUMBER (6)
* First_Name	VARCHAR2 (20)
* Last_Name	VARCHAR2 (25)
Email	VARCHAR2 (25)
Phone_Number	VARCHAR2 (20)
Hire_Date	DATE
SAL	NUMBER (10,2)
Commission_Percentage	NUMBER (2)

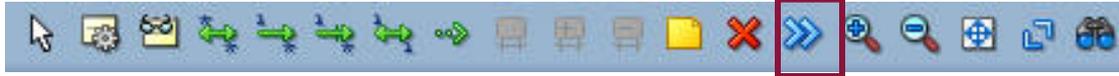
Mapping Attributes to Columns: Column Names

The screenshot shows the 'Attribute Properties - Salary' dialog box. The 'General' tab is selected in the left-hand tree view. The main area contains the following fields and values:

- Name: Salary
- Synonym: (empty)
- Preferred Abbreviation: SAL
- Long Name: EMPLOYEE.Salary
- Allow Nulls:
- Datatype: MONEY (10, 2)
- Entity: EMPLOYEE
- Source Name: (empty)
- Source Type: (empty dropdown)
- Formula Description: (empty)
- Scope: (empty dropdown)
- Type Substitution: ALL
- Sensitive Type: (empty dropdown)
- Sensitive Data Description: (empty)
- Deprecated:

Buttons at the bottom: OK, Apply, Cancel, Help.

Engineering Attributes



Engineer to Relational Model

Tree View | Tabular View

Logical | Filter

Relational_1 | As SubView

Logical

- Entities
 - DEPARTMENT
 - EMPLOYEE
 - Attributes
 - ID
 - First Name
 - Last Name
 - Email
 - Phone Number
 - Hire Date
 - Salary**
 - Commission Percentage
 - Candidate Keys
 - Entity Hierarchies
 - Relations
 - Views
 - Subviews

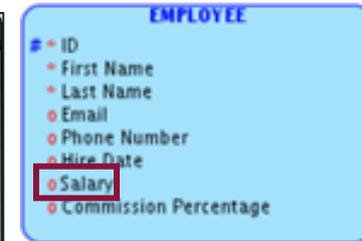
Relational_1

- Tables
 - DEPARTMENTS
 - EMPLOYEES
 - Columns
 - ID
 - First_Name
 - Last_Name
 - Email
 - Phone_Number
 - Hire_Date
 - SAL**
 - Commission_Percentage
 - PK and UK Constraints
 - Tables mapped to Hierarchies
 - Objects mapped to relations
 - Views
 - Subviews

Details | General Options | Compare/Copy Options | Synchronization of deleted objects | Overlapping and folding keys

Property | Selected

Engineer | Apply Selection | Cancel | Help



EMPLOYEES

ID	NUMBER (6)
First_Name	VARCHAR2 (20)
Last_Name	VARCHAR2 (25)
Email	VARCHAR2 (25)
Phone_Number	VARCHAR2 (20)
Hire_Date	DATE
SAL	NUMBER (10,2)
Commission_Percentage	NUMBER (2)

Reviewing the Glossary

Glossary Editor: /home/oracle/labs/hr.glossary

Glossary properties:

Name:

Description:

Options:

Incomplete Modifiers Case Sensitive Unique Abbreviations Separator: Sep. Char.:

Words

Filter:

Name	Plural	Abbreviation	Alt. Abbr.	Prime	Class	Modifier	Qualifier	Short Description
ADDRESS		ADDR		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
ASSIGNED		ASSGND		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
CODE		CODE		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
COMMISSION		COMM		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
COUNTRY		CTRY		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Calendar		CAL		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Customer		CUST		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
DATE		DATE		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
DEPARTMENT		DEPT		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Department Name		DNAME		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Description		DESC		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Duration		DUR		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
EMAIL		EMAIL		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
EMPLOYEE		EMP		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
END		END		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Effective Date		EFF		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Employee Name		ENAME		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
FIRST		FIRST		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Fiscal		FIS		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
HIRE		HIRE		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Highest		HI		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Adding the Glossary as the Naming Standard

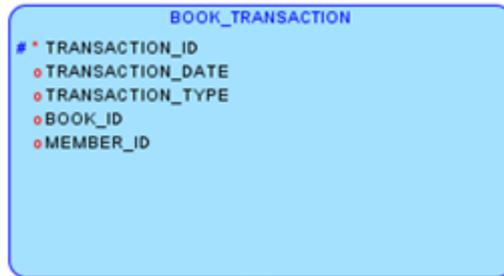
The image shows two screenshots from Oracle SQL Developer. The left screenshot shows the 'Browser' window with the 'Properties' menu open for the 'simplified_lib' design. A green circle 'a' highlights the 'Properties' menu item. The right screenshot shows the 'Design Properties - simplified_lib' dialog box with the 'Naming Standard' tab selected. A green circle 'b' highlights the 'Naming Standard' tab in the left sidebar, and a green circle 'c' highlights the 'Glossary' section. The 'Glossary' section contains a table with one entry:

Name	Description	File
simplified_lib	generated from logical mod...	D:\Priya_D\Oracle_Academ...

Buttons for 'OK', 'Apply', 'Cancel', and 'Help' are visible at the bottom of the dialog box.

Mapping Attributes to Columns with the Glossary

•Entities



Tables After Glossary Is Applied

BOOK_TRNS	
P	TRNS_ID VARCHAR2
	TRNS_DATE DATE
	TRNS_TYPE VARCHAR2
	BOOK_ID VARCHAR2
	MEMBER_ID VARCHAR2
	BOOK_TRNS_PK (TRNS_ID)

ATHR	
P	ATHR_ID VARCHAR2
	ATHR_NAME VARCHAR2
	ATHR_PK (ATHR_ID)

Applying Name Abbreviations

a

TRANSACTION, TRNS
AUTHOR, ATHR
PUBLISHER, PUBLR

b

c

```

Oracle SQL Developer Data Modeler Names Abbreviations Log.
Date and Time: 2014-11-13 18:03:36 IST
Design Name: simplified_lib

Standardized Objects:
Tables: 3
Columns: 10
Indexes: 0
Views: 0

<<<< TABLES >>>>
AUTHOR --> ATHR
BOOK_TRANSACTION --> BOOK_TRNS
PUBLISHER --> PUBLR

<<<< COLUMNS >>>>
AUTHOR_AUTHOR_ID (Relation_8) --> ATHR_ATHR_ID
AUTHOR_ID (ATHR) --> ATHR_ID
AUTHOR_NAME (ATHR) --> ATHR_NAME
BOOK_TRANSACTION_TRANSACTION_ID (Relation_10) --> BOOK_TRNS_TRNS_ID
PUBLISHER_ID (PUBLR) --> PUBLR_ID
PUBLISHER_NAME (PUBLR) --> PUBLR_NAME
PUBLISHER_PUBLISHER_ID (Relation_9) --> PUBLR_PUBLR_ID
TRANSACTION_DATE (BOOK_TRNS) --> TRNS_DATE
TRANSACTION_ID (BOOK_TRNS) --> TRNS_ID
TRANSACTION_TYPE (BOOK_TRNS) --> TRNS_TYPE

<<<< PRIMARY KEYS & UNIQUE KEYS >>>>
AUTHOR_PK (ATHR) --> ATHR_PK
BOOK_TRANSACTION_PK (BOOK_TRNS) --> BOOK_TRNS_PK
PUBLISHER_PK (PUBLR) --> PUBLR_PK
    
```

Summary

In this lesson, you should have learned how to:

- Describe why you need to create a relational model
- Explain the naming conventions used in a relational database



Summary

In this lesson, you should have learned how to:

- Use Oracle SQL Developer Data Modeler to apply naming standards by creating:
 - Glossary
 - Name abbreviations
 - Design rules
 - Custom rules
 - Transformations
- Map simple entities to tables
- Map attributes to column names



