A large, light gray, serif capital letter 'I' is centered on the page. The word 'Introduction' is written in a bold, black, sans-serif font across the middle of the 'I'.

Introduction

Lesson Objectives

After completing this lesson, you should be able to do the following:

- Understand the goals of the course
- List the features of Oracle Database 11g
- Discuss the theoretical and physical aspects of a relational database
- Describe Oracle server's implementation of RDBMS and object relational database management system (ORDBMS)
- Identify the development environments that can be used for this course
- Describe the database and schema used in this course

Lesson Agenda

- Course objectives, agenda, and appendixes used in the course
- Overview of Oracle Database 11g and related products
- Overview of relational database management concepts and terminologies
- Introduction to SQL and its development environments
- The HR schema and the tables used in this course
- Oracle Database 11g documentation and additional resources

Course Objectives

After completing this course, you should be able to:

- Identify the major components of Oracle Database 11g
- Retrieve row and column data from tables with the `SELECT` statement
- Create reports of sorted and restricted data
- Employ SQL functions to generate and retrieve customized data
- Run complex queries to retrieve data from multiple tables
- Run data manipulation language (DML) statements to update data in Oracle Database 11g
- Run data definition language (DDL) statements to create and manage schema objects

Course Agenda

- Day 1:
 - Introduction
 - Retrieving Data Using the SQL `SELECT` Statement
 - Restricting and Sorting Data
 - Using Single-Row Functions to Customize Output
 - Using Conversion Functions and Conditional Expressions
- Day 2:
 - Reporting Aggregated Data Using the Group Functions
 - Displaying Data from Multiple Tables
 - Using Subqueries to Solve Queries
 - Using the Set Operators

Course Agenda

- Day 3:
 - Manipulating Data
 - Using DDL Statements to Create and Manage Tables
 - Creating Other Schema Objects

Appendixes Used in the Course

- Appendix A: Practice Solutions
- Appendix B: Table Descriptions
- Appendix C: Oracle Join Syntax
- Appendix D: Using SQL*Plus
- Appendix E: Using SQL Developer
- Additional Practices
- Additional Practices Solutions

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Oracle Database 11g: Focus Areas



**Infrastructure
Grids**

**Information
Management**

**Application
Development**

Oracle Database 11g



Oracle Database 11g



Oracle Fusion Middleware

Portfolio of leading, standards-based, and customer-proven software products that spans a range of tools and services from J2EE and developer tools, through integration services, business intelligence, collaboration, and content management



Oracle Enterprise Manager Grid Control 10g

- Efficient Oracle Fusion Middleware management
- Simplifying application and infrastructure life cycle management
- Improved database administration and application management capabilities



Oracle BI Publisher

- Provides a central architecture for authoring, managing, and delivering information in secure and multiple formats
- Reduces complexity and time to develop, test, and deploy all kinds of reports
 - Financial Reports, Invoices, Sales or Purchase orders, XML, and EDI/EFT(eText documents)
- Enables flexible customizations
 - For example, a Microsoft Word document report can be generated in multiple formats such as PDF, HTML, Excel, RTF, and so on.



Lesson Agenda

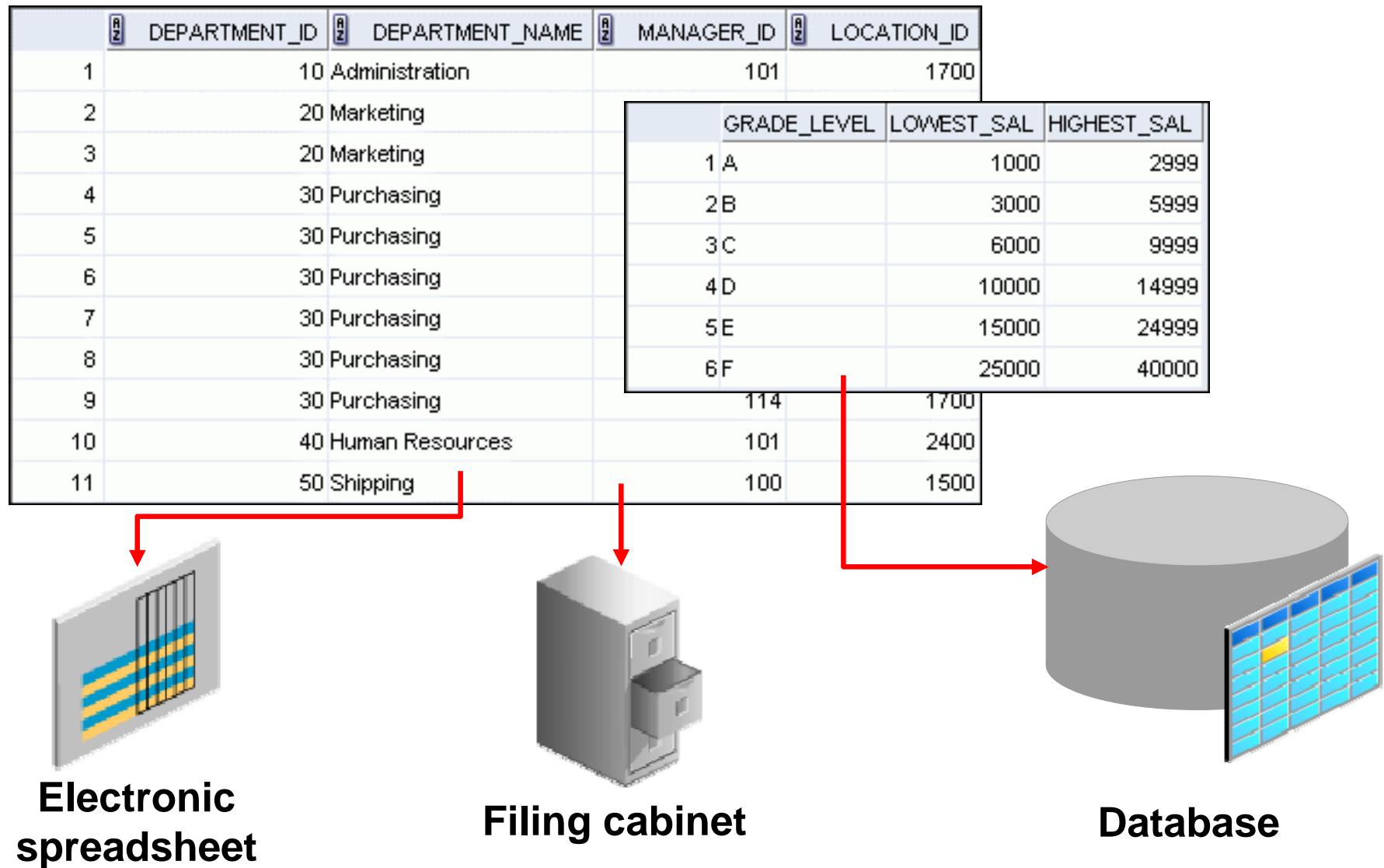
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Relational and Object Relational Database Management Systems

- Relational model and object relational model
- User-defined data types and objects
- Fully compatible with relational database
- Supports multimedia and large objects
- High-quality database server features



Data Storage on Different Media

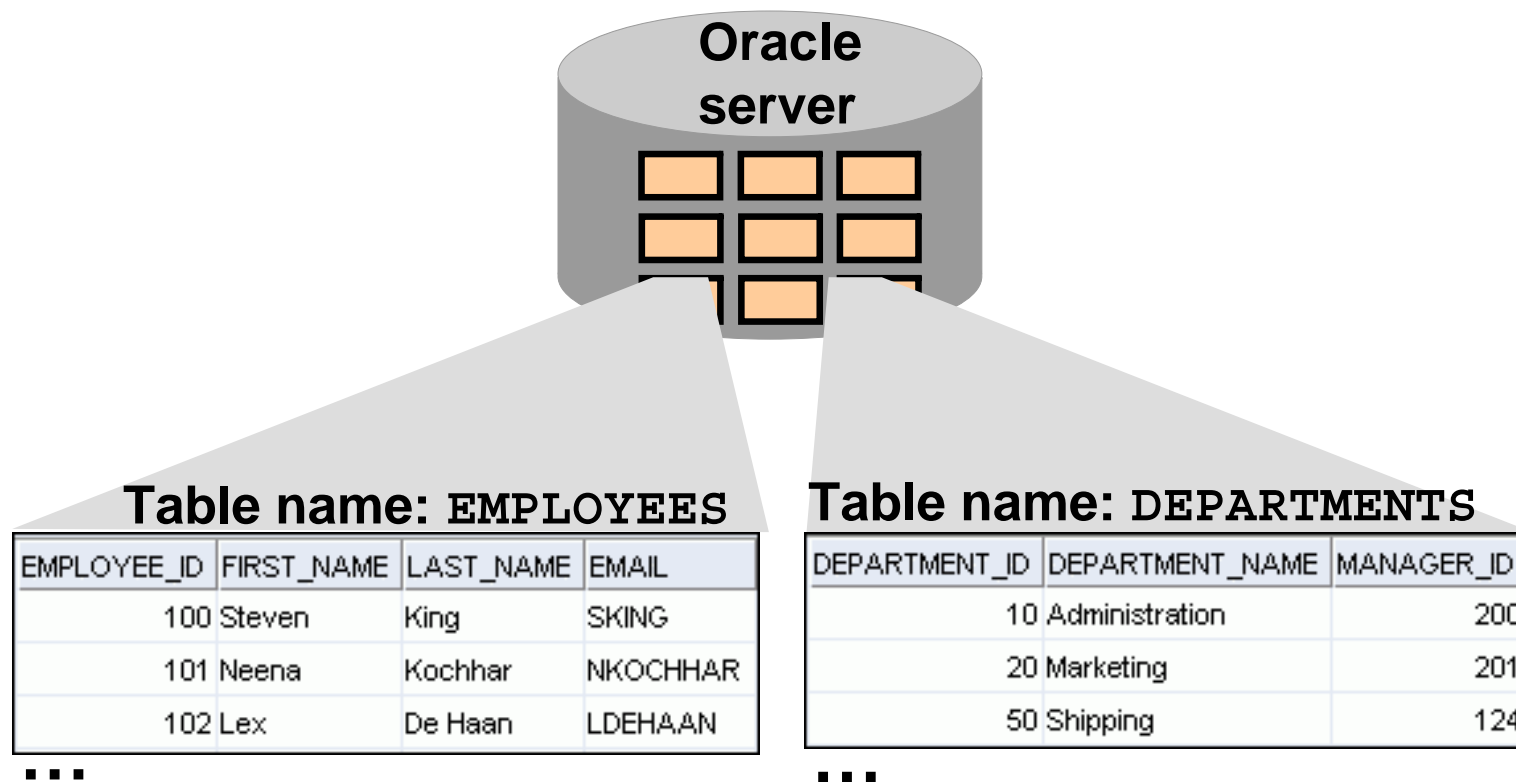


Relational Database Concept

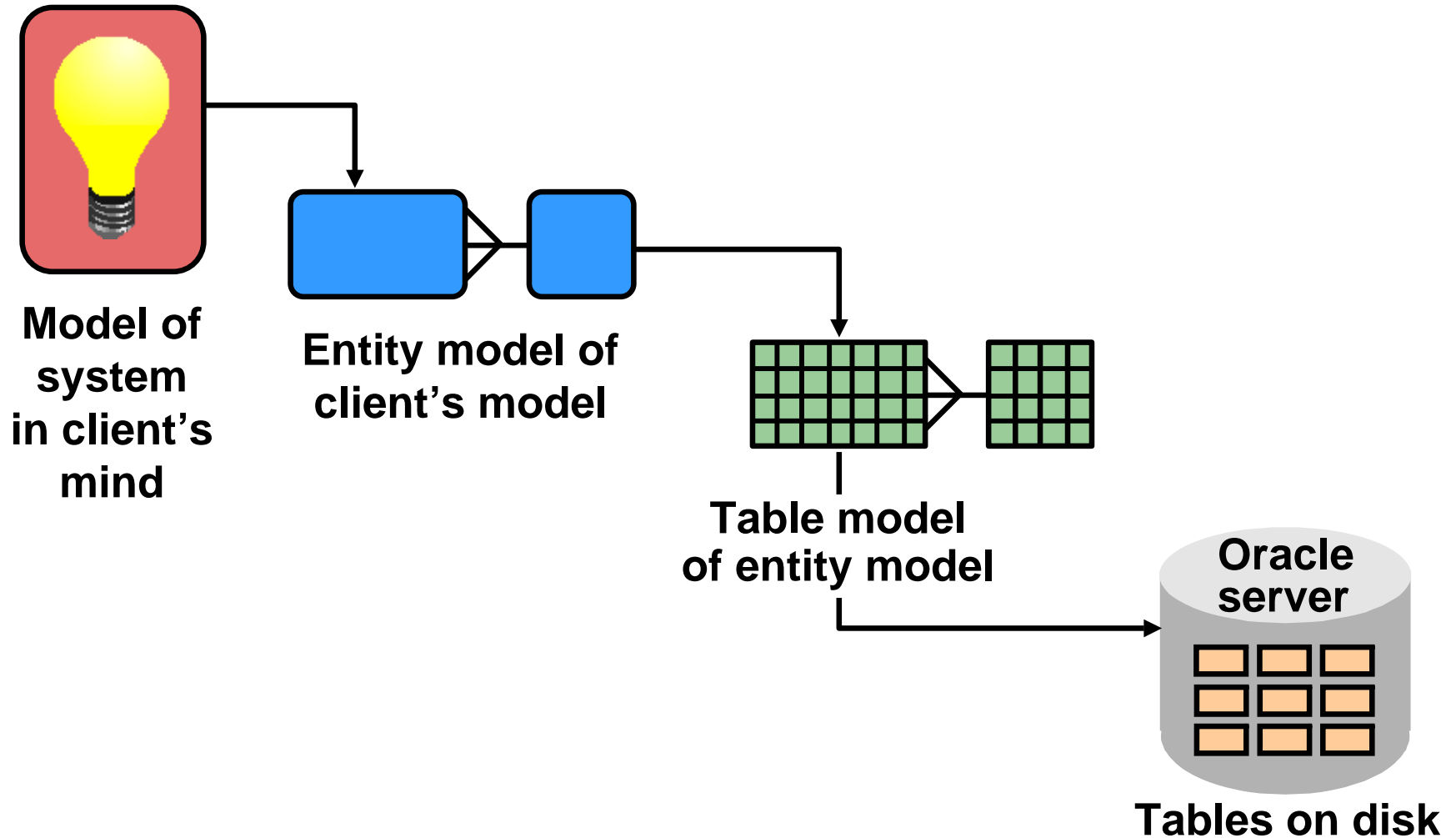
- Dr. E. F. Codd proposed the relational model for database systems in 1970.
- It is the basis for the relational database management system (RDBMS).
- The relational model consists of the following:
 - Collection of objects or relations
 - Set of operators to act on the relations
 - Data integrity for accuracy and consistency

Definition of a Relational Database

A relational database is a collection of relations or two-dimensional tables.

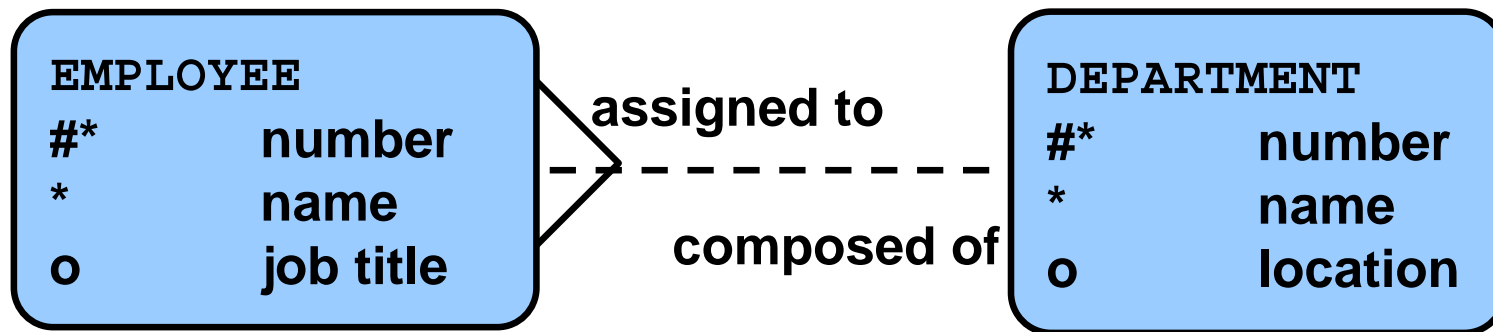


Data Models



Entity Relationship Model

- Create an entity relationship diagram from business specifications or narratives:



- Scenario:
 - “... Assign one or more employees to a department ...”
 - “... Some departments do not yet have assigned employees ...”

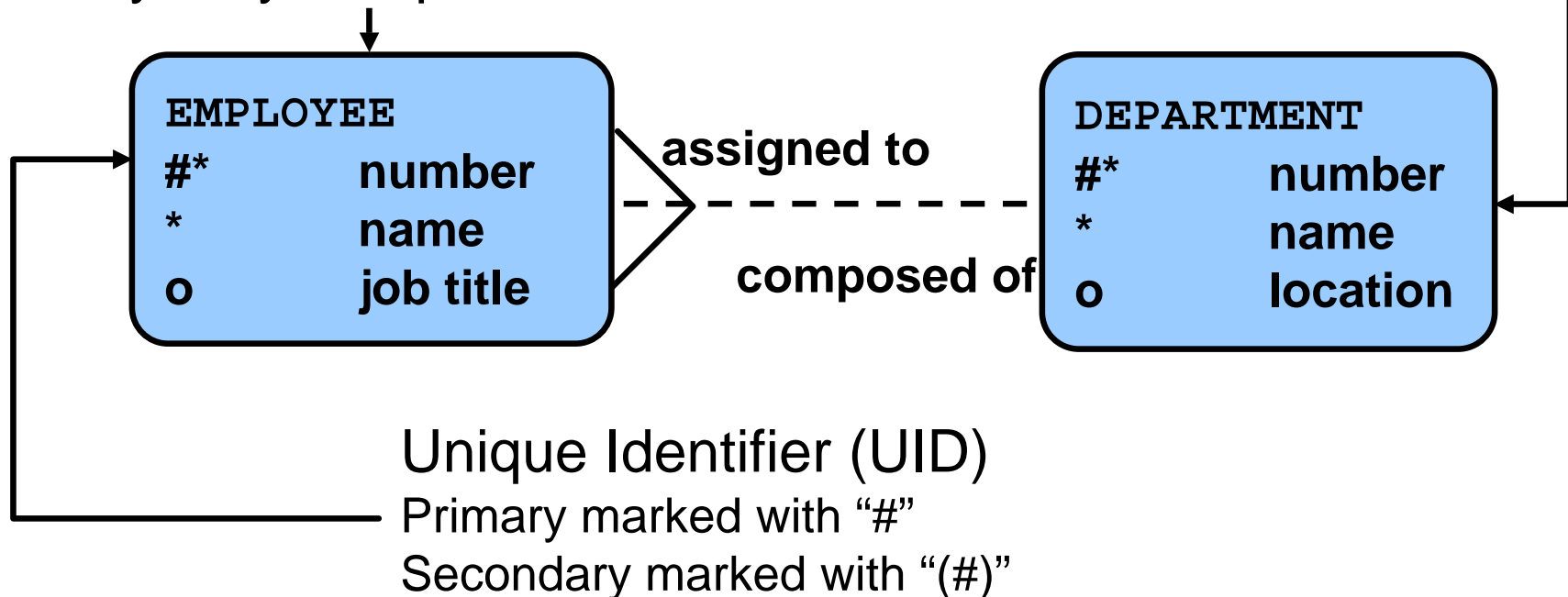
Entity Relationship Modeling Conventions

Entity:

- Singular, unique name
- Uppercase
- Soft box
- Synonym in parentheses

Attribute:

- Singular name
- Lowercase
- Mandatory marked with “*”
- Optional marked with “o”



Relating Multiple Tables

- Each row of data in a table is uniquely identified by a primary key.
- You can logically relate data from multiple tables using foreign keys.

Table name: EMPLOYEES

| EMPLOYEE_ID | FIRST_NAME | LAST_NAME | DEPARTMENT_ID |
|-------------|------------|-----------|---------------|
| 100 | Steven | King | 90 |
| 101 | Neena | Kochhar | 90 |
| 102 | Lex | De Haan | 90 |
| 103 | Alexander | Hunold | 60 |
| 104 | Bruce | Ernst | 60 |
| 107 | Diana | Lorentz | 60 |

...

Primary key

Foreign key

Primary key

Table name: DEPARTMENTS

| DEPARTMENT_ID | DEPARTMENT_NAME | MANAGER_ID | LOCATION_ID |
|---------------|-----------------|------------|-------------|
| 10 | Administration | 200 | 1700 |
| 20 | Marketing | 201 | 1800 |
| 50 | Shipping | 124 | 1500 |
| 60 | IT | 103 | 1400 |
| 80 | Sales | 149 | 2500 |
| 90 | Executive | 100 | 1700 |
| 110 | Accounting | 205 | 1700 |
| 190 | Contracting | (null) | 1700 |

Relational Database Terminology

| 2 | 3 | 4 | 5 | 6 | 1 |
|-------------|------------|-----------|--------|----------------|---------------|
| EMPLOYEE_ID | FIRST_NAME | LAST_NAME | SALARY | COMMISSION_PCT | DEPARTMENT_ID |
| 100 | Steven | King | 24000 | (null) | 90 |
| 101 | Neena | Kochhar | 17000 | (null) | 90 |
| 102 | Lex | De Haan | 17000 | (null) | 90 |
| 103 | Alexander | Hunold | 9000 | (null) | 60 |
| 104 | Bruce | Ernst | 6000 | (null) | 60 |
| 107 | Diana | Lorentz | 4200 | (null) | 60 |
| 124 | Kevin | Mourgos | 5800 | (null) | 50 |
| 141 | Trenna | Rajs | 3500 | (null) | 50 |
| 142 | Curtis | Davies | 3100 | (null) | 50 |
| 143 | Randall | Matos | 2600 | (null) | 50 |
| 144 | Peter | Vargas | 2500 | (null) | 50 |
| 149 | Eleni | Zlotkey | 10500 | 0.2 | 80 |
| 174 | Ellen | Abel | 11000 | 0.3 | 80 |
| 176 | Jonathon | Taylor | 8600 | 0.2 | 80 |
| 178 | Kimberely | Grant | 7000 | 0.15 | (null) |
| 200 | Jennifer | Whalen | 4400 | (null) | 10 |
| 201 | Michael | Hartstein | 13000 | (null) | 20 |
| 202 | Pat | Fay | 6000 | (null) | 20 |
| 205 | Shelley | Higgins | 12000 | (null) | 110 |
| 206 | William | Gietz | 8300 | (null) | 110 |

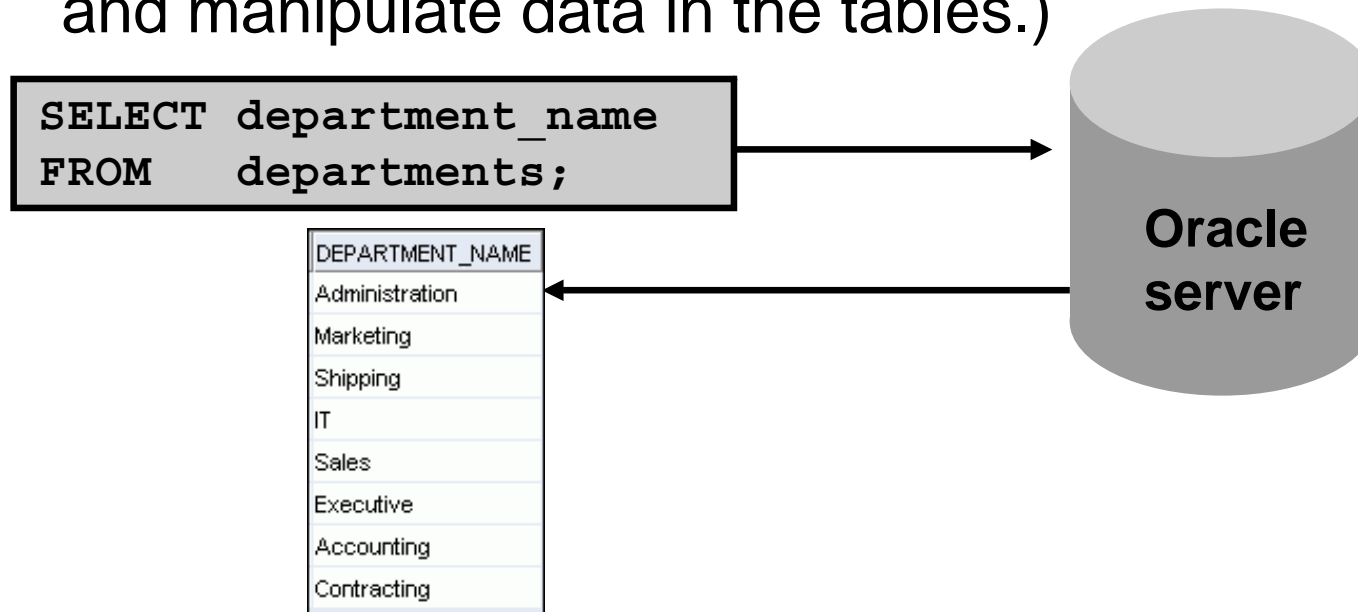
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Using SQL to Query Your Database

Structured query language (SQL) is:

- The ANSI standard language for operating relational databases
- Efficient, easy to learn, and use
- Functionally complete (With SQL, you can define, retrieve, and manipulate data in the tables.)



SQL Statements

SELECT
INSERT
UPDATE
DELETE
MERGE

Data manipulation language (DML)

CREATE
ALTER
DROP
RENAME
TRUNCATE
COMMENT

Data definition language (DDL)

GRANT
REVOKE

Data control language (DCL)

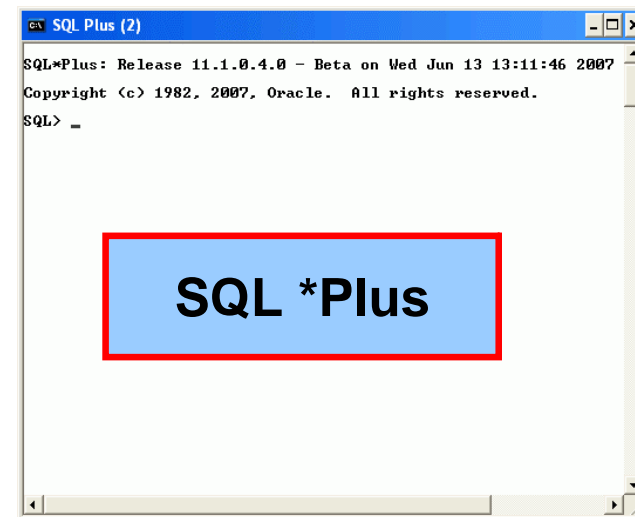
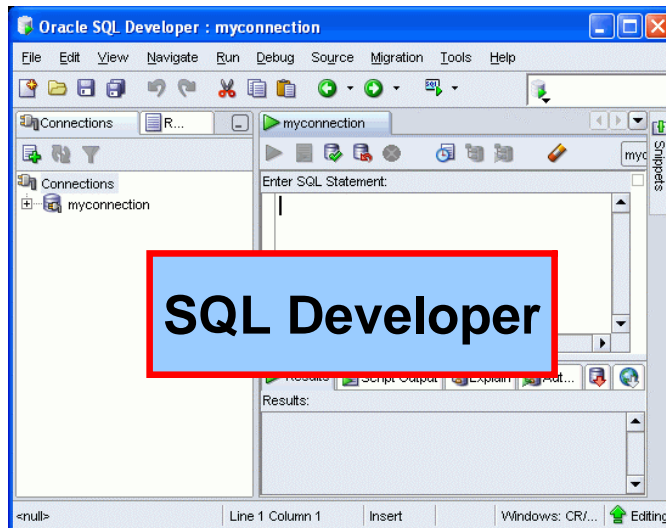
COMMIT
ROLLBACK
SAVEPOINT

Transaction control

Development Environments for SQL

There are two development environments for this course:

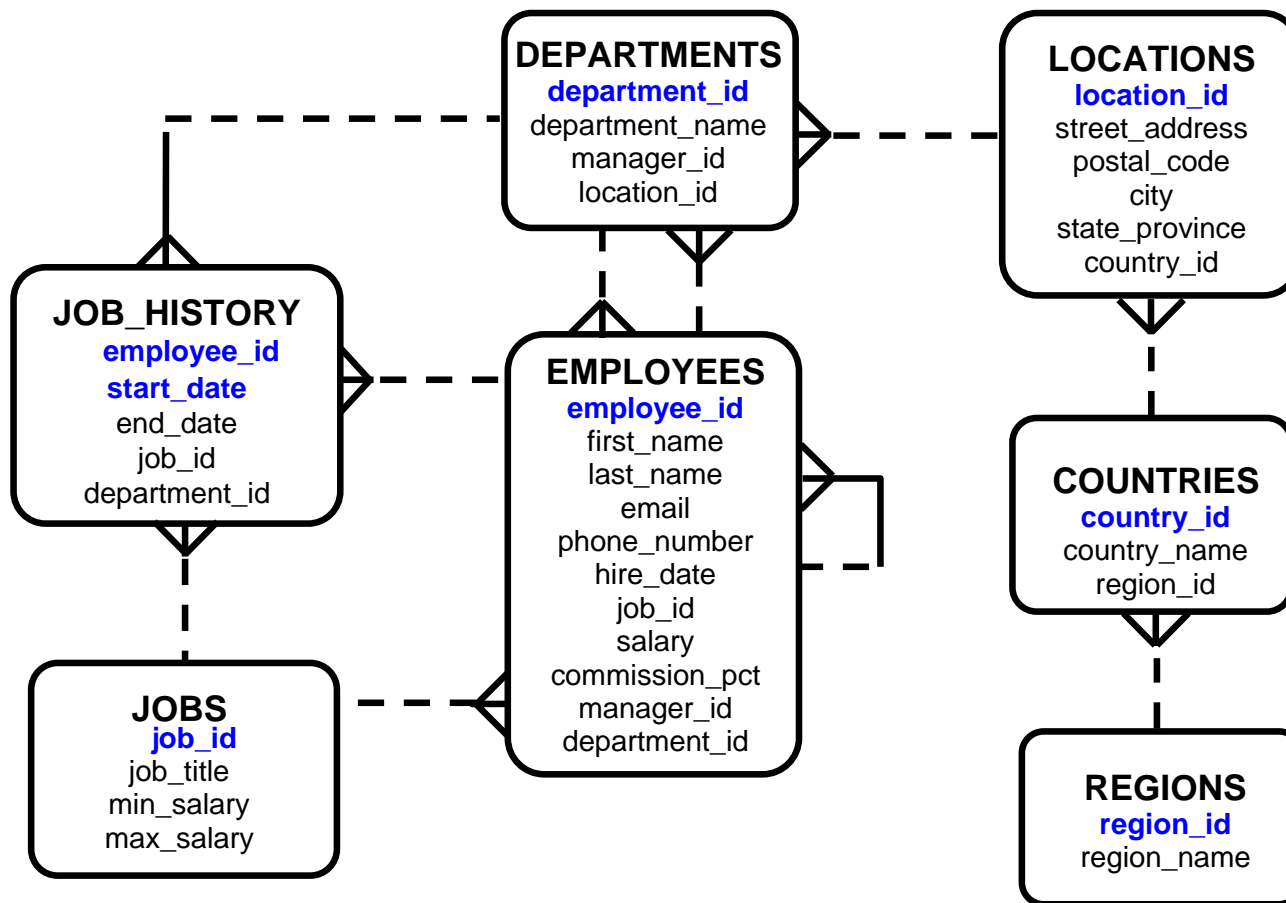
- Primary tool is Oracle SQL Developer
- SQL*Plus command line interface may also be used



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The Human Resources (HR) Schema



Tables Used in the Course

EMPLOYEES

| EMPLOYEE_ID | FIRST_NAME | LAST_NAME | SALARY | COMMISSION_PCT | DEPARTMENT_ID | EMAIL | PHONE_NUMBER | HIRE_DATE |
|-------------|------------|-----------|--------|----------------|---------------|----------|--------------|-----------|
| 100 | Steven | King | 24000 | (null) | 90 | SKING | 515.123.4567 | 17-JUN-87 |
| 101 | Neena | Kochhar | 17000 | (null) | 90 | NKOCHHAR | 515.123.4568 | 21-SEP-89 |
| 102 | Lex | De Haan | 17000 | (null) | 90 | LDEHAAN | 515.123.4569 | 13-JAN-93 |
| 103 | Alexander | Hunold | 9000 | (null) | 60 | AHUNOLD | 590.423.4567 | 03-JAN-90 |
| 104 | Bruce | Ernst | 6000 | (null) | 60 | BERNST | 590.423.4568 | 21-MAY-91 |
| 107 | Diana | Lorentz | 4200 | (null) | 60 | DLORENTZ | 590.423.5567 | 07-FEB-99 |
| 124 | Kevin | Mourgos | 5800 | (null) | 50 | KMOURGOS | 650.123.5234 | 16-NOV-99 |
| 141 | Trenna | Rajs | 3500 | (null) | 50 | TRAJS | 650.121.8009 | 17-OCT-95 |
| 142 | Curtis | Davies | 3100 | (null) | 50 | CDAVIES | 650.121.2994 | 29-JAN-97 |
| | | | | | 50 | RMATOS | 650.121.2874 | 15-MAR-98 |

| DEPARTMENT_ID | DEPARTMENT_NAME | MANAGER_ID | LOCATION_ID |
|---------------|-----------------|------------|-------------|
| 10 | Administration | 200 | 1700 |
| 20 | Marketing | 201 | 1800 |
| 50 | Shipping | 124 | 1500 |
| 60 | IT | 103 | 1400 |
| 80 | Sales | 149 | 2500 |
| 90 | Executive | 100 | 1700 |
| 110 | Accounting | 205 | 1700 |
| 190 | Contracting | (null) | 1700 |

| GRADE_LEVEL | LOWEST_SAL | HIGHEST_SAL |
|-------------|------------|-------------|
| A | 1000 | 2999 |
| B | 3000 | 5999 |
| C | 6000 | 9999 |
| D | 10000 | 14999 |
| E | 15000 | 24999 |
| F | 25000 | 40000 |

DEPARTMENTS

JOB_GRADES

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Oracle Database 11g Documentation

- *Oracle Database New Features Guide 11g, Release 1 (11.1)*
- *Oracle Database Reference 11g, Release 1 (11.1)*
- *Oracle Database SQL Language Reference 11g, Release 1 (11.1)*
- *Oracle Database Concepts 11g, Release 1 (11.1)*
- *Oracle Database SQL Developer User's Guide, Release 1.2*

Additional Resources

For additional information about the Oracle Database 11g, refer to the following:

- *Oracle Database 11g: New Features eStudies*
- *Oracle by Example series (OBE): Oracle Database 11g*
 - http://www.oracle.com/technology/obe/11gr1_db/index.htm

Summary

In this lesson, you should have learned that:

- Oracle Database 11g extends:
 - The benefits of infrastructure grids
 - The existing information management capabilities
 - The capabilities to use the major application development environments such as PL/SQL, Java/JDBC, .NET, XML, and so on
- The database is based on ORDBMS
- Relational databases are composed of relations, managed by relational operations, and governed by data integrity constraints
- With the Oracle server, you can store and manage information by using SQL

Practice I: Overview

This practice covers the following topics:

- Running the Oracle SQL Developer demo
- Starting Oracle SQL Developer, creating a new database connection, and browsing the HR tables