Introduction

Objectives

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

- Define the goals of the course
- List the features of Oracle Database 12*c*
- Describe the salient features of Oracle Cloud
- Discuss the theoretical and physical aspects of a relational database
- Describe Oracle server's implementation of RDBMS and object relational database management system (ORDBMS)
- Describe the database and schema used in this course

Lesson Agenda

- Course objectives, agenda, and appendixes used in the course
- Overview of Oracle Database 12*c* and related products
- Overview of relational database management concepts and terminologies
- Introduction to SQL and its development environments
- The Human Resource(HR) Schema and the tables used in the Course
- Oracle database 12*c* SQL Documentation and Additional Resources

Course Objectives

After completing this course, you should be able to:

- Identify the major components of Oracle Database
- 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
- Run data definition language (DDL) statements to create and manage schema objects

Course Roadmap

- Lesson 1: Introduction
- **Unit 1: Retrieving, Restricting, and Sorting Data**
  - Lesson 2: Retrieving Data using SQL SELECT
  - Lesson 3: Restricting and Sorting Data
  - Lesson 4: Using Single-Row Functions to Customize Output
  - Lesson 5: Using Conversion Functions and Conditional Expressions
- Unit 2: Joins, Subqueries, and Set Operators
- Unit 3: DML and DDL

Course Roadmap

Lesson 1: Introduction

Unit 1: Retrieving, Restricting, and Sorting Data

Unit 2: Joins, Subqueries, and Set Operators

Unit 3: DML and DDL

- Lesson 6: Reporting Aggregated Data Using Group Functions
- Lesson 7: Displaying Data from Multiple Tables Using Joins
- Lesson 8: Using Subqueries to Solve Queries
- Lesson 9: Using Set Operators

Course Roadmap

- Lesson 1: Introduction
- Unit 1: Retrieving, Restricting, and Sorting Data
- Unit 2: Joins, Subqueries, and Set Operators
- **Unit 3: DML and DDL**
  - Lesson 10: Managing Tables Using DML Statements
  - Lesson 11: Introduction to Data Definition Language

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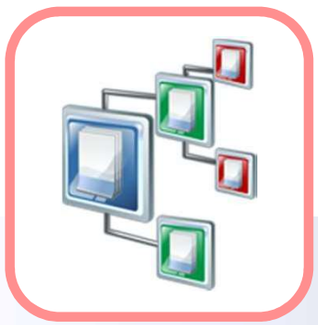
Oracle Database 12c: Focus Areas

Information Management



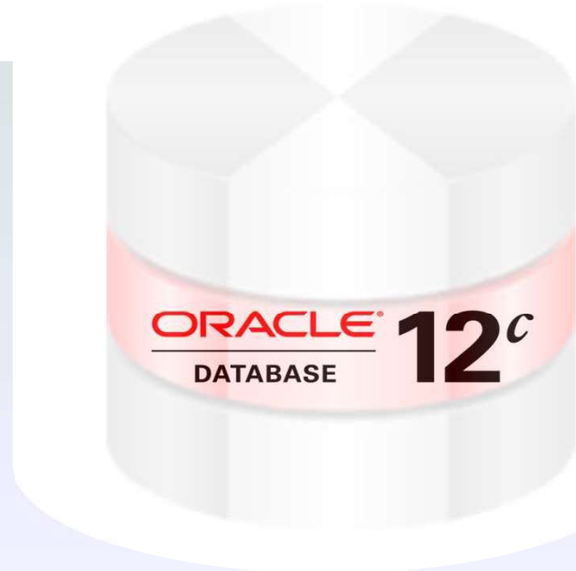
Oracle Cloud

Application Development

Infrastructure Grids

Oracle Database 12c

High Availability



Manageability

Performance

Security

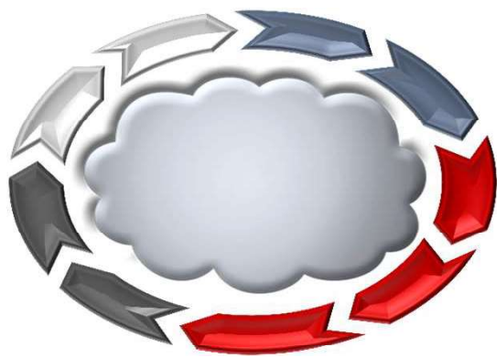
Information Integration

Oracle Fusion Middleware

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

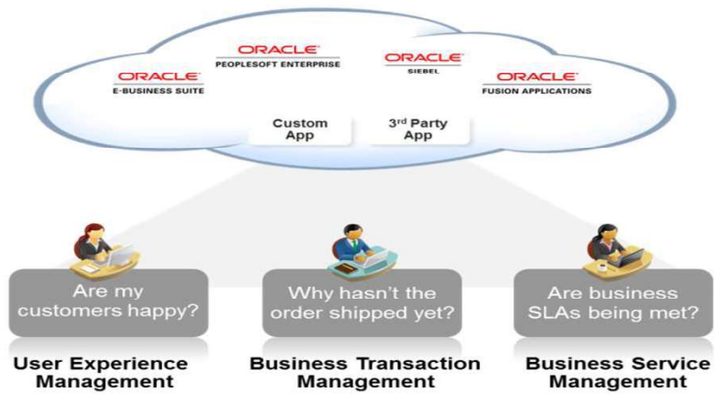
Oracle Enterprise Manager Cloud Control

- Create and manage a complete set of cloud services.
- Manage all phases of cloud life cycle.
- Manage the entire cloud stack
- Monitor the health of all components
- Identify, understand, and resolve business problems



Complete life cycle

Complete stack



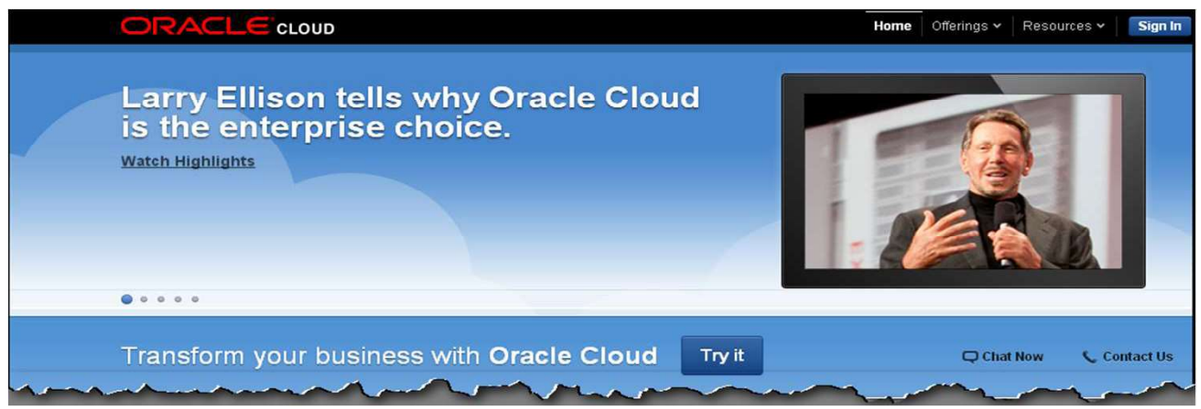
Complete integration

Self-Service IT I Simple and Automated I Business-Driven

The Oracle Cloud is an enterprise cloud for business. It consists of many different services which share some common characteristics:

- On-demand self-service
- Resource pooling
- Rapid elasticity
- Measured service
- Broad network access

www.cloud.oracle.com



Oracle Cloud Services

Oracle Cloud provides three types of services:

- Software as a Service (SaaS)
- Platform as a Service (PaaS)
- Infrastructure as a Service (IaaS)

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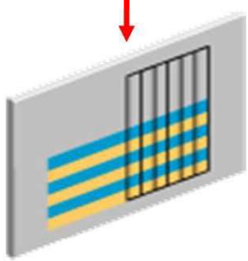
Relational and Object Relational

- 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

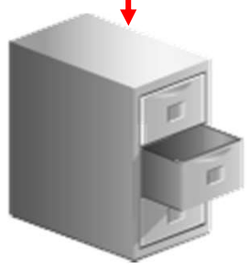
Data Storage on Different Media

	DEPARTMENT_ID	DEPARTMENT_NAME	MANAGER_ID	LOCATION_ID
1	10	Administration	200	1700
2	20	Marketing	201	1800
3	50	Shipping		
4	60	IT		
5	80	Sales		
6	90	Executive		
7	110	Accounting		
8	190	Contracting		

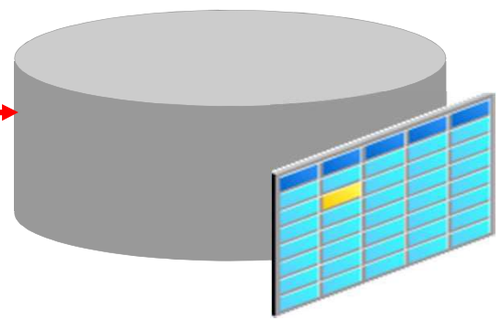
	GRADE_LEVEL	LOWEST_SAL	HIGHEST_SAL
1	A	1000	2999
2	B	3000	5999
3	C	6000	9999
4	D	10000	14999
5	E	15000	24999
6	F	25000	40000



Electronic spreadsheet



Filing cabinet



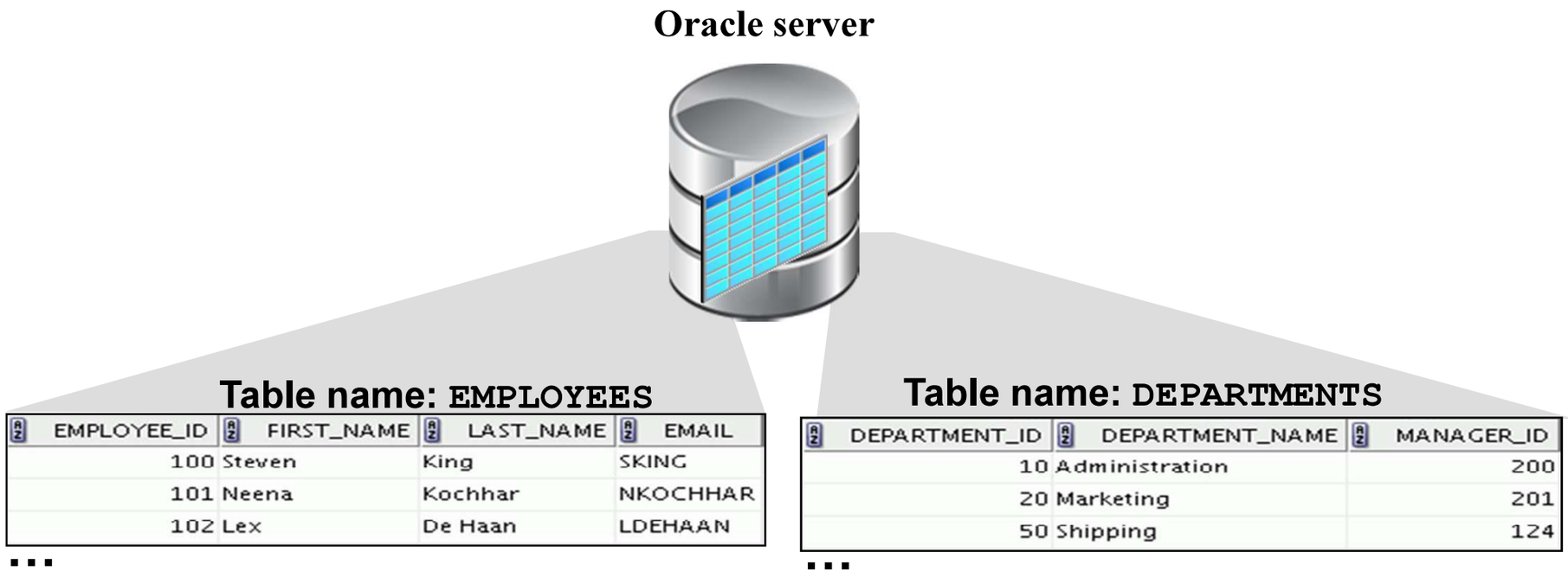
Database

Relational Database Concept

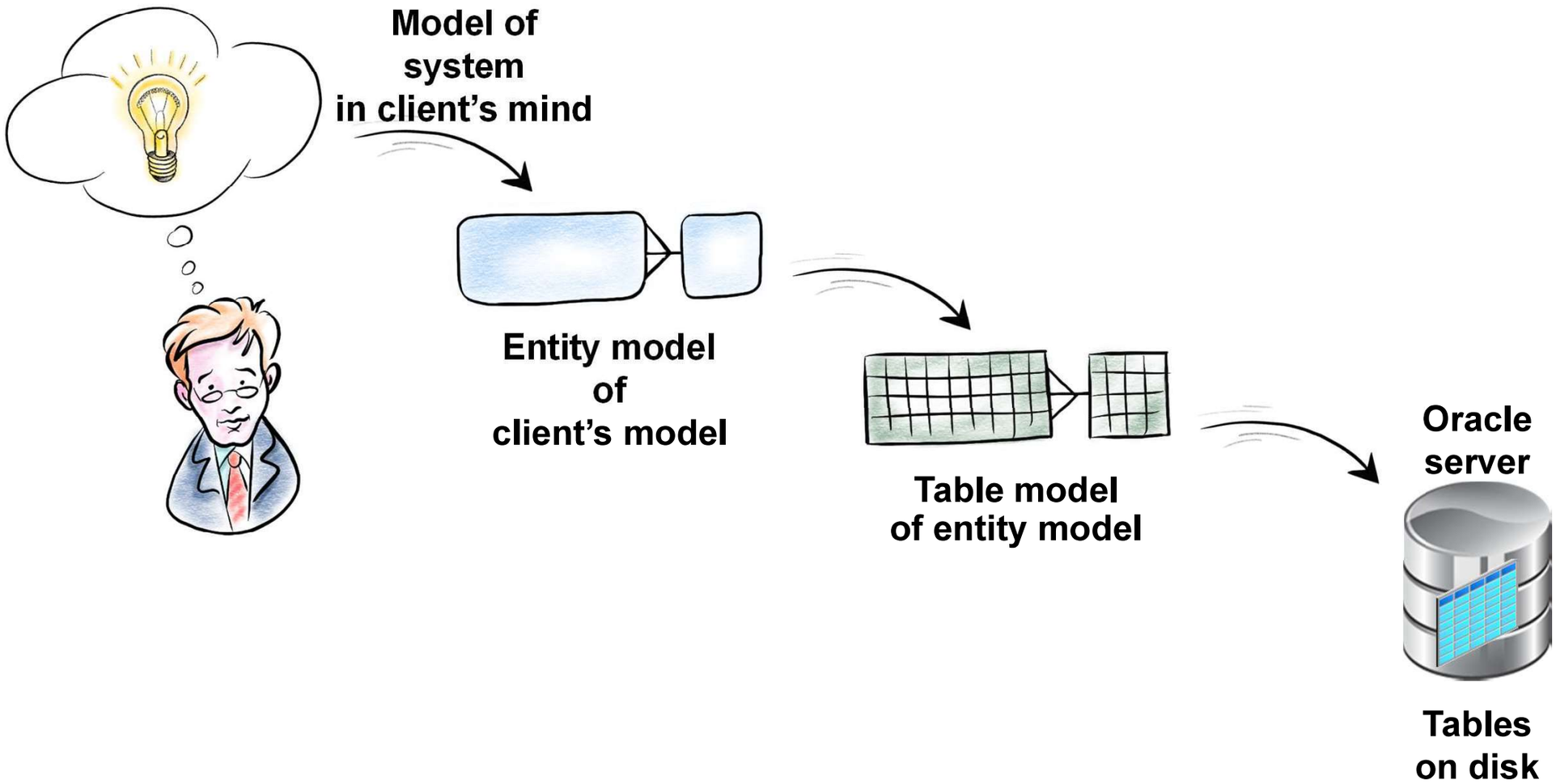
- Dr. E. F. Codd proposed the relational model for database systems in 1970.
- It is the basis for the relational database management system (RDBMS).
- The relational model consists of the following:
  - Collection of objects or relations
  - Set of operators to act on the relations
  - Data integrity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

Definition of a Relational Database

- A relational database is a collection of relations or two-dimensional tables controlled by the Oracle server.

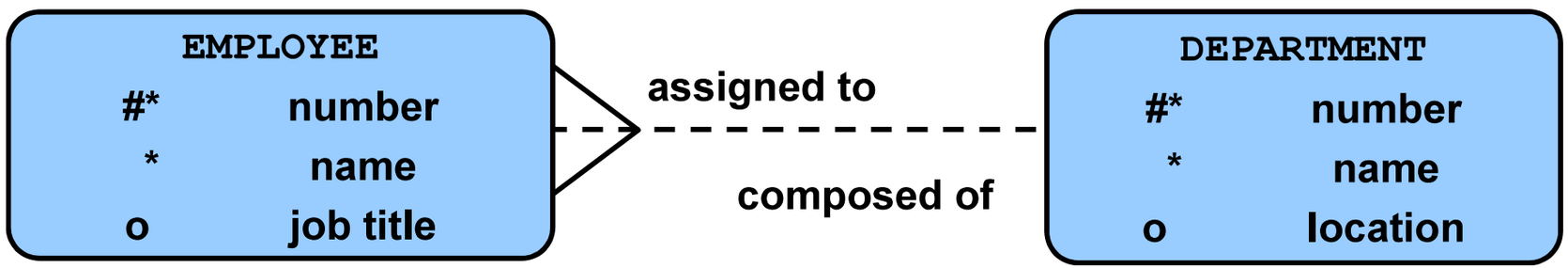


Data Models


Model of
system
in client's mind
Entity model
of
client's model
Table model
of entity model
Oracle
server
Tables
on disk

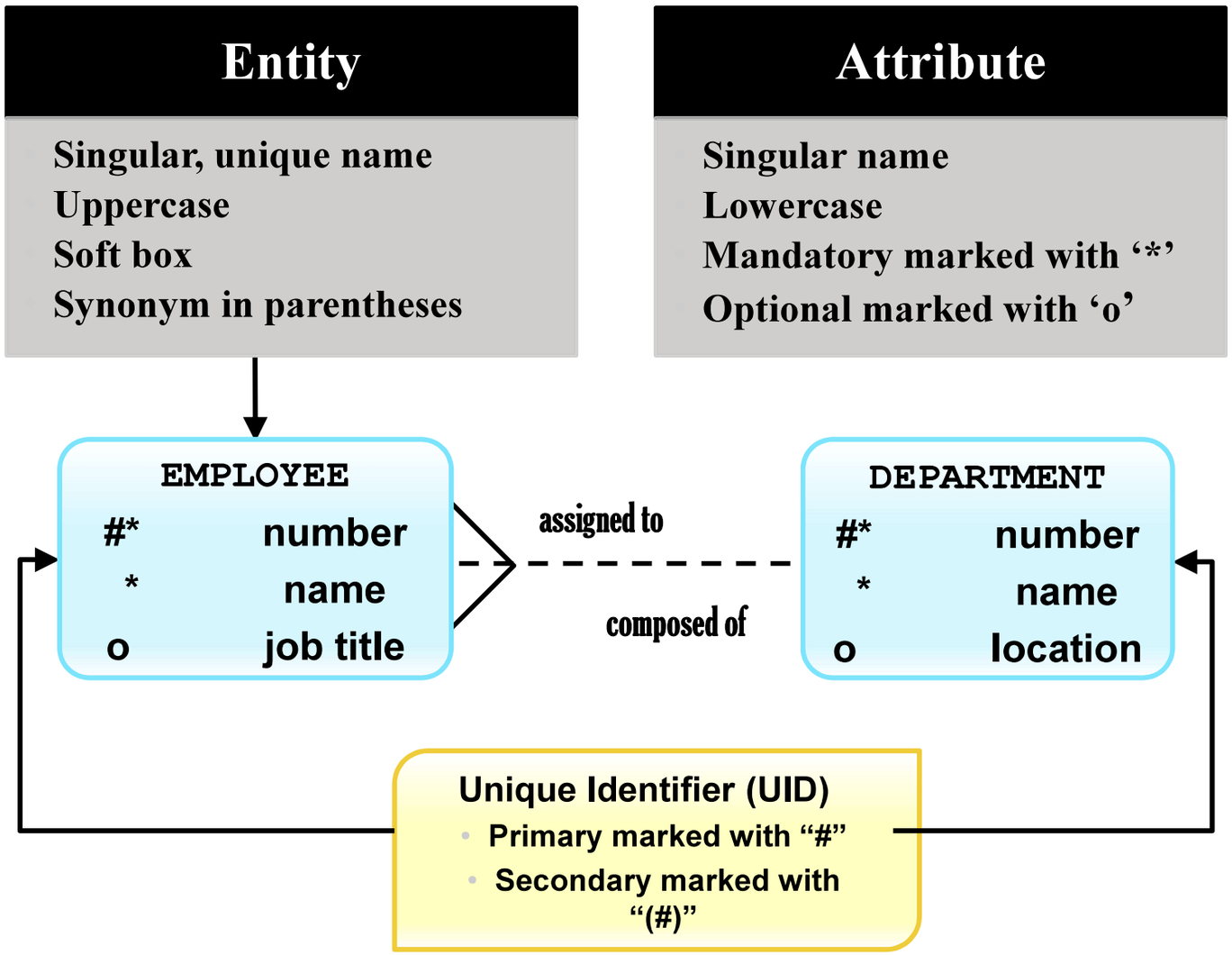
Entity Relationship Model

- 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



Relating Multiple Tables

- Each row of data in a table can be 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
124	Kevin	Mourgos	50
141	Trenna	Rajs	50
142	Curtis	Davies	50

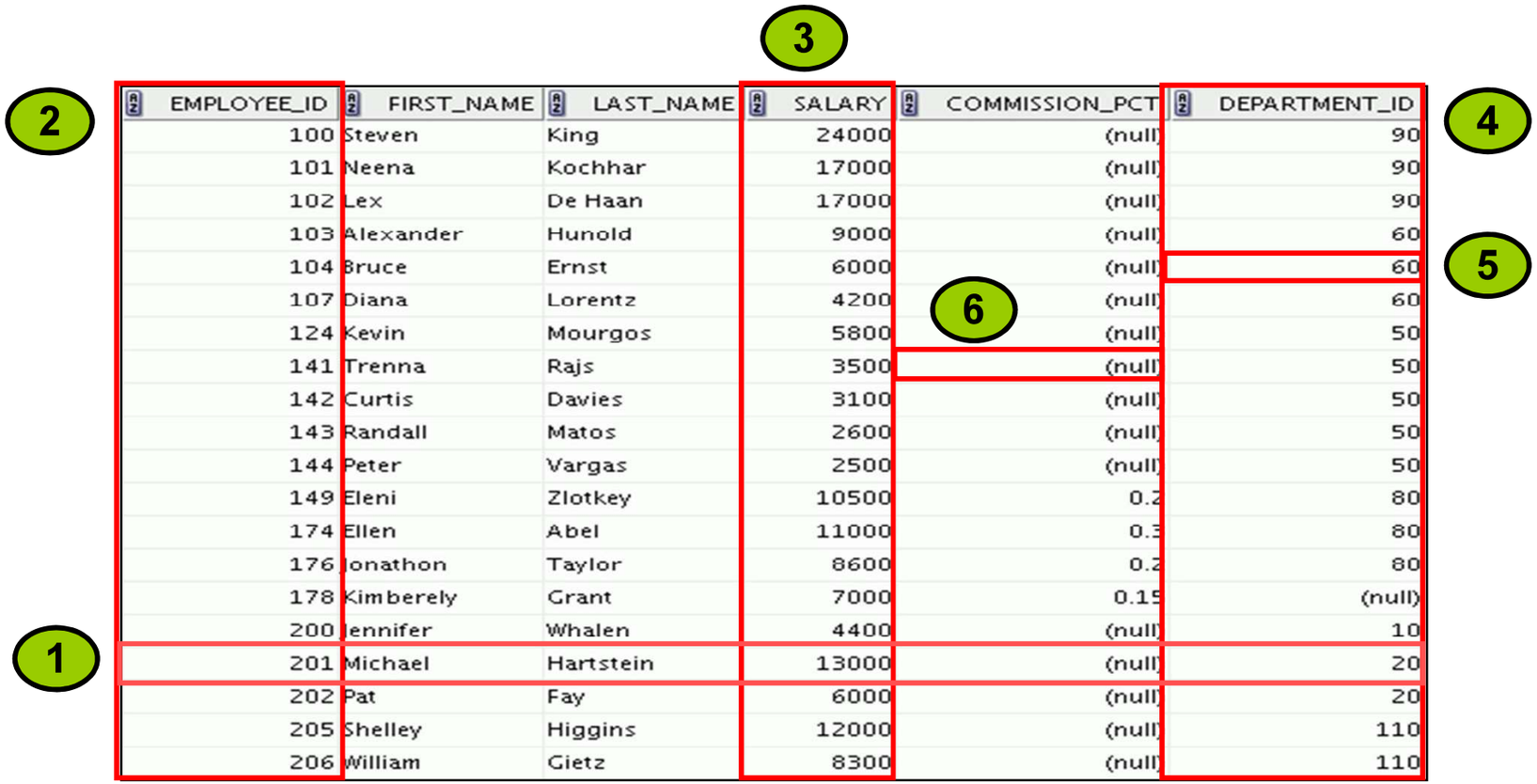
Primary key **Foreign key**

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

Primary key

Relational Database Terminology



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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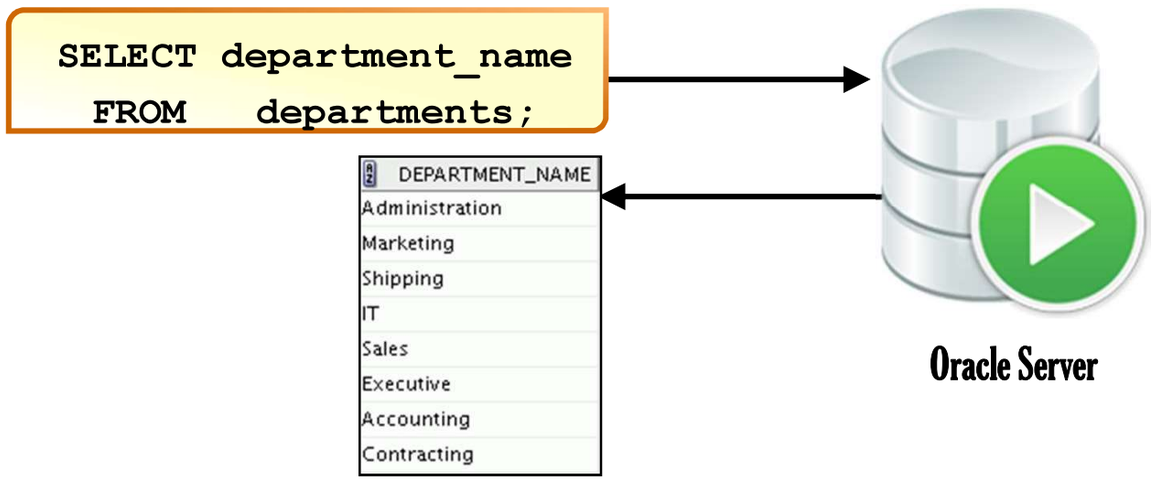
Using SQL to Query Your Database

Structured query language (SQL) is:

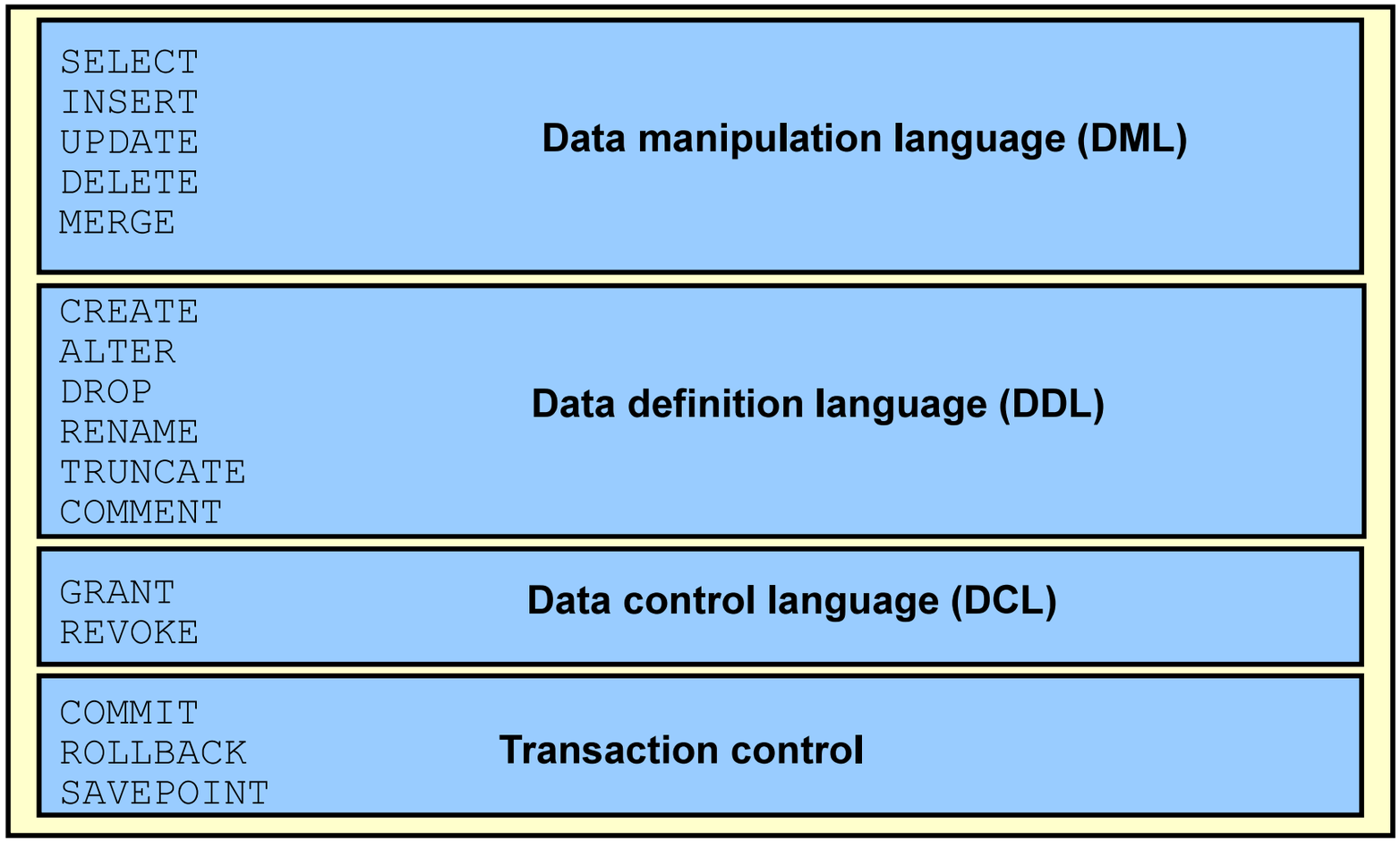
- The ANSI standard language for operating relational databases
- Efficient, easy to learn, and use
- Functionally complete (With SQL, you can define, retrieve, and manipulate data in the tables.)



How SQL Works

- SQL is standalone and powerful.
- SQL processes groups of data.
- SQL lets you work with data at a logical level.

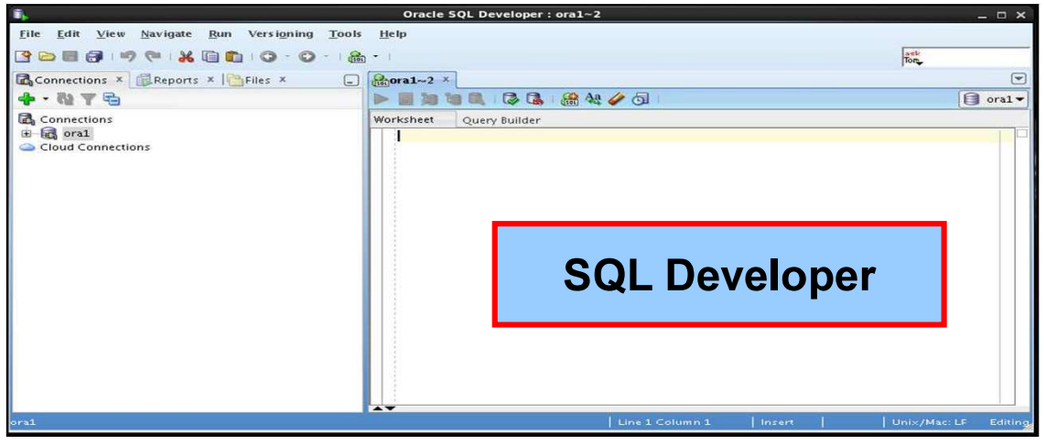
SQL Statements Used in the Course

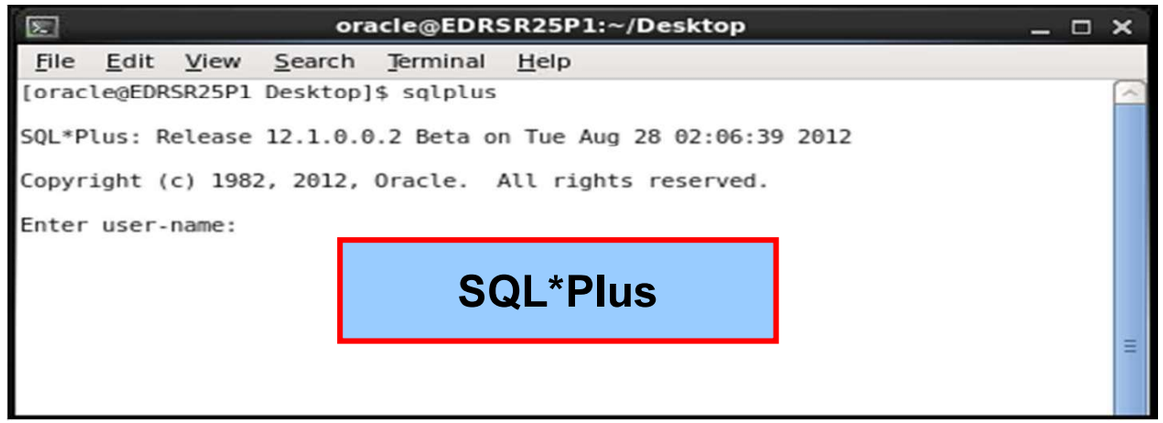


Development Environments for SQL

There are two development environments for this course:

- The primary tool is Oracle SQL Developer.
- SQL*Plus command-line interface can also be used.





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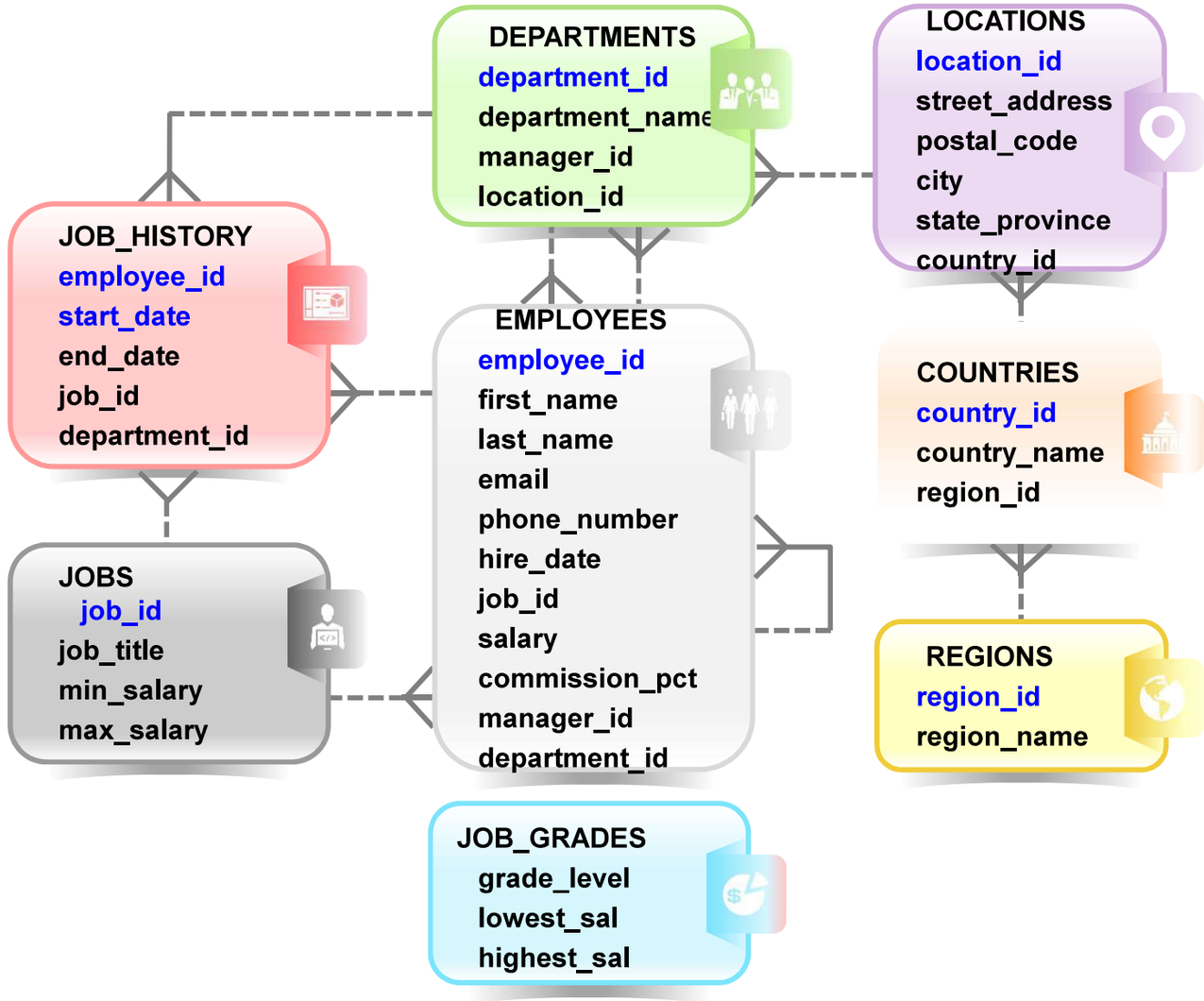
Human Resources (HR) Schema



Tables Used in the Course

EMPLOYEES

	EMPLOYEE_ID	FIRST_NAME	LAST_NAME	EMAIL	PHONE_NUMBER	HIRE_DATE	JOB_ID	SALARY
1	100	Steven	King	SKING	515.123.4567	17-JUN-03	AD_PRES	24000
2	101	Neena	Kochhar	NKOCHHAR	515.123.4568	21-SEP-05	AD_VP	17000
3	102	Lex	De Haan	LDEHAAN	515.123.4569	13-JAN-01	AD_VP	17000
4	103	Alexander	Hunold	AHUNOLD	590.423.4567	03-JAN-06	AC_MGR	12008
5	104	Bruce	Ernst	BERNST	590.423.4568	21-MAY-07	IT_PROG	6000
6	107	Diana	Lorentz	DLORENTZ	590.423.5567	07-FEB-07	IT_PROG	4200
7	124	Kevin	Mourgos	KMOURGOS	650.123.5234	16-NOV-07	ST_MAN	5800
8	141	Trenna	Rajs	TRAJS	650.121.8009	17-OCT-03	ST_CLERK	3500
9	142	Curtis	Davies	CDAVIES	650.121.2994	29-JAN-05	ST_CLERK	3100
10	143	Randall	Matos	RMATOS	650.121.2874	15-MAR-06	ST_CLERK	2600
11	144	Peter	Vargas	PVARGAS	650.121.2004	09-JUL-06	ST_CLERK	2500
12	149	Eleni	Zlotkey	EZLOTKEY	011.44.1344.429018	29-JAN-08	SA_MAN	10500
13	174	Ellen	Abel	EABEL	011.44.1644.429267	11-MAY-04	SA_REP	11000
14	176	Jonathon	Taylor	JTAYLOR	011.44.1644.429265	24-MAR-06	SA_REP	8600
15	178	Kimberely	Grant	KGRANT	011.44.1644.429263	24-MAY-07	SA_REP	7000
16	200	Jennifer	Whalen	JWHALEN	515.123.4444	17-SEP-03	AD_ASST	4400
17	201	Michael	Hartstein	MHARTSTE	515.123.5555	17-FEB-04	MK_MAN	13000
18	202	Pat	Fay	PFAY	603.123.6666	17-AUG-05	MK_REP	6000
19	205	Shelley	Higgins	SHIGGINS	515.123.8080	07-JUN-02	AC_MGR	12008
20	206	William	Gietz	WGIETZ	515.123.8181	07-JUN-02	AC_ACCOUNT	8300

	GRADE_LEVEL	LOWEST_SAL	HIGHEST_SAL
1	A	1000	2999
2	B	3000	5999
3	C	6000	9999
4	D	10000	14999
5	E	15000	24999
6	F	25000	40000

JOB_GRADES

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3	50	Shipping	124	1500
4	60	IT	103	1400
5	80	Sales	149	2500
6	90	Executive	100	1700
7	110	Accounting	205	1700
8	190	Contracting	(null)	1700

DEPARTMENTS

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Oracle Database Documentation

- Oracle Database New Features Guide
- Oracle Database Reference
- Oracle Database SQL Language Reference
- Oracle Database Concepts
- Oracle Database SQL Developer User's Guide

Additional Resources

For additional information about Oracle Database 12*c*, refer to the following:

- *Oracle Database 12c: New Features eStudies*
- *Oracle Learning Library:*
  - http://www.oracle.com/goto/oll
- *Oracle Cloud :*
  - www.cloud.oracle.com

Summary

In this lesson, you should have learned that:

- Oracle Database 12c extends:
  - The existing information management capabilities
  - Oracle Cloud
- 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 Introduction : Overview

This practice covers the following topics:

- Starting Oracle SQL Developer
- Creating a new database connection
- Browsing the `HR` tables