SQL Introduction

Lesson Objectives

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

- 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

Relational and Object Relational Database Management Systems

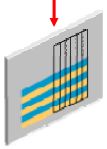
- Relational model and object relational model
- User-defined data types and objects
- Fully compatible with relational database
- Supports multimedia and large objects
- High-quality database server features

3

Data Storage on Different Media

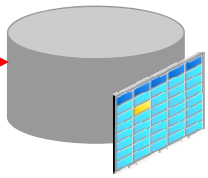
	DEPARTMENT_ID	DEPARTMENT_NAME	MANAGER_ID	LOCATION_ID
1	10	Administration	200	1700
2	20	Marketing	201	1800
3	50	Shipping		
4	60	IT		
5	80	Sales		
6	90	Executive		
7	110	Accounting		
8	190	Contracting		

	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

4

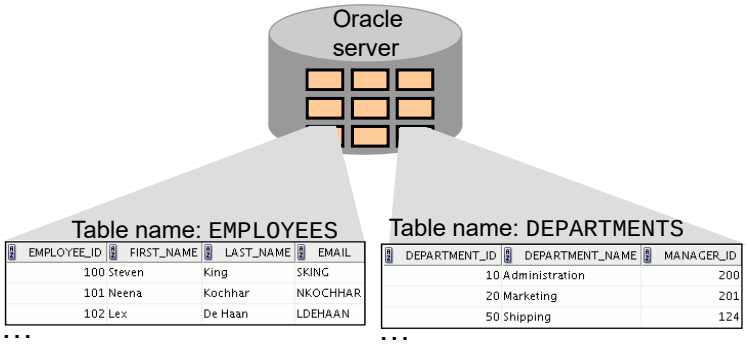
Relational Database Concept

- 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

5

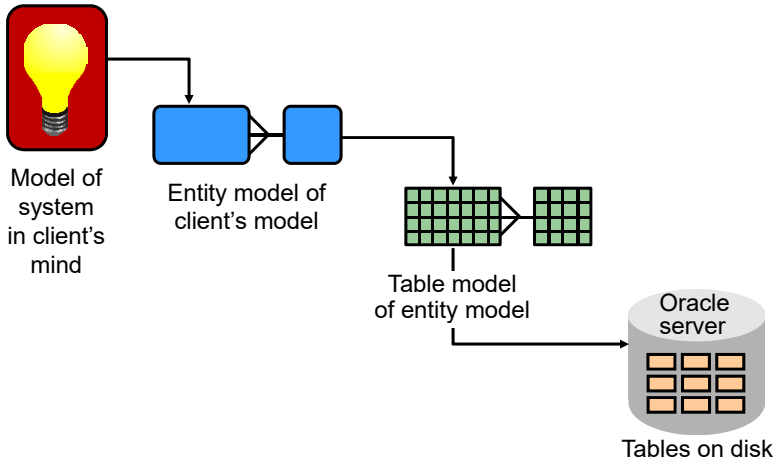
Definition of a Relational Database

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



6

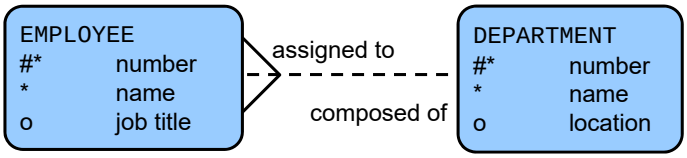
Data Models



7

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 . . ."

8

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: 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

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

9

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 tables.)

```
SELECT department_name
FROM   departments;
```

Oracle server

DEPARTMENT_NAME
Administration
Marketing
Shipping
IT
Sales
Executive
Accounting
Contracting

10

SQL Statements Used in the Course

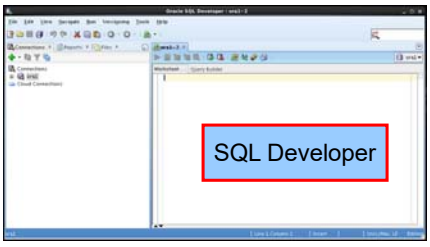
SELECT INSERT UPDATE DELETE MERGE	Data manipulation language (DML)
CREATE ALTER DROP RENAME TRUNCATE COMMENT	Data definition language (DDL)
GRANT REVOKE	Data control language (DCL)
COMMIT ROLLBACK SAVEPOINT	Transaction control

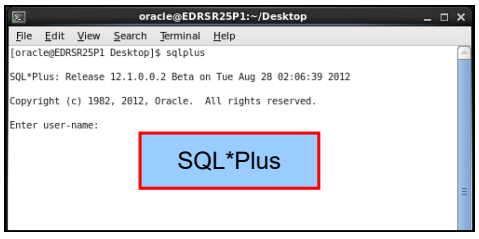
11

Development Environments for SQL

There are two development environments for this course:

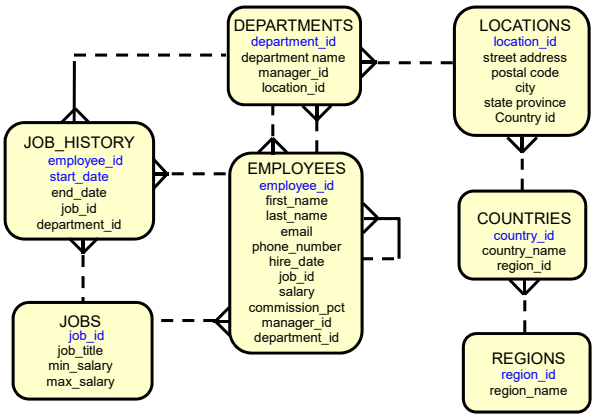
- The primary tool is Oracle SQL Developer.
- SQL*Plus command-line interface can also be used.





12

Human Resources (HR) Schema



13

Tables Used in the Course

EMPLOYEES

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

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

JOB_GRADES

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

DEPARTMENTS

14

Summary

In this lesson, you should have learned:

- The theoretical and physical aspects of a relational database
- Oracle server's implementation of RDBMS and object relational database management system (ORDBMS)
- The development environments that can be used for this course
- About the database and schema used in this course

15