6-2
Structured Query Language (SQL)
Roadmap

- Introduction to Oracle Application Express
- Structured Query Language (SQL)
- Data Definition Language (DDL)
- Data Manipulation Language (DML)
- Transaction Control Language (TCL)

- Retrieving Data Using SELECT
- Restricting Data Using WHERE
- Sorting Data Using ORDER BY
- Joining Tables Using JOIN
Objectives

This lesson covers the following objectives:
• Describe how data is organized in a relational database
• Explain the various relational database terminologies
• Define the structured query language and its functions
• Describe how SQL processing takes place
• Identify the tools used to access the relational database
How Is Data Organized in Relational Databases?

– Data is stored in a two-dimensional matrix known as a table.
– RDBMS software is used to manage reading and manipulating data.
# Relational Database Terminology

<table>
<thead>
<tr>
<th>EMPLOYEE_ID</th>
<th>FIRST_NAME</th>
<th>LAST_NAME</th>
<th>SALARY</th>
<th>COMMISSION_PCT</th>
<th>DEPARTMENT_ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>Steven</td>
<td>King</td>
<td>24000</td>
<td>-</td>
<td>90</td>
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<tr>
<td>101</td>
<td>Neena</td>
<td>Kochhar</td>
<td>17000</td>
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<td>Lex</td>
<td>De Haan</td>
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<td>-</td>
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</tr>
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<td>Jose Manuel</td>
<td>Urman</td>
<td>7800</td>
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<td>100</td>
</tr>
</tbody>
</table>

1. John Chen
2. Employee ID
3. First Name
4. Last Name
5. Salary
6. Commission PCT
7. Department ID
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

<table>
<thead>
<tr>
<th>EMPLOYEE_ID</th>
<th>FIRST_NAME</th>
<th>LAST_NAME</th>
<th>DEPARTMENT_ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>Steven</td>
<td>King</td>
<td>90</td>
</tr>
<tr>
<td>101</td>
<td>Neena</td>
<td>Kochhar</td>
<td>90</td>
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<tr>
<td>102</td>
<td>Lex</td>
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</tr>
<tr>
<td>107</td>
<td>Diana</td>
<td>Lorentz</td>
<td>60</td>
</tr>
</tbody>
</table>

Table name: DEPARTMENTS

<table>
<thead>
<tr>
<th>DEPARTMENT_ID</th>
<th>DEPARTMENT_NAME</th>
<th>MANAGER_ID</th>
<th>LOCATION_ID</th>
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</thead>
<tbody>
<tr>
<td>10</td>
<td>Administration</td>
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<td>1700</td>
</tr>
<tr>
<td>20</td>
<td>Marketing</td>
<td>201</td>
<td>1800</td>
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<td>30</td>
<td>Purchasing</td>
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<td>1700</td>
</tr>
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<td>Human Resources</td>
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<td>2400</td>
</tr>
<tr>
<td>50</td>
<td>Shipping</td>
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<td>1500</td>
</tr>
</tbody>
</table>

Primary key
Foreign key
Primary key
What Is SQL?

- Structured query language (SQL) is the set-based, declarative language used to access data in an Oracle database.

- SQL provides an interface to a relational database and provides statements that help work with the database.
Functions of SQL

• Creating, replacing, altering, and dropping database objects
• Inserting, updating, and deleting rows in a table
• Querying data stored in the database
• Controlling access to the database and database objects
• Guaranteeing database consistency and integrity
SQL Processing

Stages of SQL processing

- Parsing
- Optimization
- Row Source Generation
- Execution
Accessing Data in the Oracle Database Server

SQL*Plus

Oracle SQL Developer

Structured Query Language (SQL)
Case Scenario: Need to Extract Data

Sure. Let me think of some use cases.

Sean, by now you should understand the need to use SQL to access data in a relational database. Can you think of scenarios where retrieving data from a database table would be necessary?
Use Cases

Hospitals

Retail

Airports

Schools
Connecting to an Oracle Database

• You can connect to an Oracle database through a client program such as:
  – SQL*Plus
  – Oracle SQL Developer
Connecting to an Oracle Database Using SQL*Plus

1. Open SQL*Plus.
2. Enter the user name and password.
3. Verify the last successful login date.
4. Connect to the Oracle database.
Connecting to an Oracle Database Using Oracle SQL Developer

![Image](image_url)

- **a** Oracle SQL Developer
- **b** Connections
- **c** New / Select Database Connection
  - **Connection Name**
  - **Connection Details**
  - **hr_orcl**
  - **sys_orcl**
  - **unit_test_repos_orcl**

- **d** Test
- **e** Connect

Structured Query Language (SQL)
Summary

In this lesson, you should have learned how to:

• Describe how data is organized in a relational database
• Explain the various relational database terminologies
• Define the structured query language and its functions
• Describe how SQL processing takes place
• Identify the tools used to access the relational database