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B2111933 - CT208H - M04

**Introduction to Oracle Database**

Summary:

An overview of Oracle Database with the following topics:

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# About Relational Databases

Every organization must manage and store information in order to fulfill its obligations.   
A database is created with the intention of gathering, storing, and retrieving relevant   
data for use by database applications.

**Database Management System (DBMS)**

A database management system (DBMS) is software that controls the   
storage, organization, and retrieval of data.

Typically, it has the following elements:

* Kernel code
* Repository of metadata
* Query language

A database application is a software program that interacts with a database to access and manipulate data.

The first generation of DBMS included the following types:

* Hierarchical
* Network

**Relational Model**

Today, the most widely accepted database model is the relational model. The relational model has the following major aspects:

* Structures
* Operations
* Integrity rules

A relational database stores data in a set of simple relations.   
A relation is a set of tuples. A tuple is an unordered set of attribute values.  
A table is a two-dimensional representation of a relation in the form of rows (tuples) and columns (attributes).

**Relational Database Management System (RDBMS)**

The relational model is the basis for a relational database management system (RDBMS).   
An RDBMS distinguishes between the following types of operations:

* Logical operations
* Physical operations

**Oracle Database**

Oracle Database is an RDBMS. An RDBMS that implements object-oriented features  
such as user-defined types, inheritance, and polymorphism is called an object-relational database management system (ORDBMS). Oracle Database has extended the relational model to an object-relational model, making it possible to store complex business models in a relational database.

# Schema Objects

Schema objects are user-created structures that directly refer to the data in the database. The database supports many types of schema objects, the most important of which are **tables** and **indexes**.

**Tables**

A table is a set of rows. A column identifies an attribute of the entity described by the table, whereas a row identifies an instance of the entity.

**Indexes**

An index is an optional data structure that you can create on one or more columns of a table. Indexes can increase the performance of data retrieval.

# Data Access

A general requirement for a DBMS is to adhere to accepted industry standards for a data access language.

**Structured Query Language (SQL)**

SQL is a set-based declarative language that provides an interface to an RDBMS such as Oracle Database. SQL statements enable you to perform the following tasks:

* Query data
* Insert, update, and delete rows in a table
* Create, replace, alter, and drop objects
* Control access to the database and its objects
* Guarantee database consistency and integrity

**PL/SQL and Java**

- PL/SQL is a procedural extension to Oracle SQL, which is integrated with Oracle Database, enabling you to use all of the Oracle Database SQL statements, functions, and data types.

-Oracle Database can also store program units written in Java. A Java stored procedure is a Java method published to SQL and stored in the database for general use. You can call existing PL/SQL programs from Java and Java programs from PL/SQL.

# Transaction Management

Oracle Database is designed as a multiuser database. The database must ensure that multiple users can work concurrently without corrupting one another's data.

**Transactions**

A transaction is a logical, atomic unit of work that contains one or more SQL statements. An RDBMS must be able to group SQL statements so that they are either all committed, which means they are applied to the database, or all rolled back, which means they are undone.

**Data Concurrency**

A requirement of a multiuser RDBMS is the control of data concurrency, which is the simultaneous access of the same data by multiple users. Without concurrency controls, users could change data improperly, compromising data integrity.

**Data Consistency**

In Oracle Database, each user must see a consistent view of the data, including visible changes made by a user's own transactions and committed transactions of other users.

# Oracle Database Architecture

A database server is the key to information management.

**Database and Instance**

An Oracle database server consists of a database and at least one database instance, commonly referred to as simply an instance. Because an instance and a database are so closely connected, the term Oracle database is sometimes used to refer to both instance and database.

**Database Storage Structures**

- A database can be considered from both a physical and logical perspective.

- Physical data is data viewable at the operating system level.

- Logical data such as a table is meaningful only for the database.

- The database has physical structures and logical structures. Because the physical and logical structures are separate, you can manage the physical storage of data without affecting access to logical storage structures.

**Database Instance Structures**

An Oracle database uses memory structures and processes to manage and access the database. All memory structures exist in the main memory of the computers that constitute the RDBMS.

**Application and Networking Architecture**

To take full advantage of a given computer system or network, Oracle Database enables processing to be split between the database server and the client programs. The computer running the RDBMS handles the database server responsibilities while the computers running the applications handle the interpretation and display of data.

# Oracle Database Documentation Roadmap

The documentation set is designed with specific access paths to ensure that users are able to find the information they need as efficiently as possible.

The documentation set is divided into three layers or groups: basic, intermediate, and advanced. Users begin with the manuals in the basic group, proceed to the manuals in the intermediate group (the 2 Day + series), and finally to the advanced manuals, which include the remainder of the documentation.

Reference: [Link](https://docs.oracle.com/en/database/oracle/oracle-database/12.2/cncpt/introduction-to-oracle-database.html#GUID-A42A6EF0-20F8-4F4B-AFF7-09C100AE581E)