ActiveNET

Oracle

SQL, PL/SQL

98 48 111 288 *By Suryanarayana*

Introduction to Database

Evolution of RDBMS

- Maintaining data in Ledgers, its advantages and disadvantages
- Maintaining data in File system, its advantages and disadvantages
- Maintaining data in Spreadsheets/Excel, its advantages and disadvantages
- Maintaining data in Database Management System, its advantages and disadvantages
- Maintaining data in RDBMS, its advantages and disadvantages

Database Models

- Hierarchical Model, Network Model, Relational Model

RDBMS

- How data is organized and stored in RDBMS
- Comparison between NoSQL DB and RDBMS
- 0-12 Edgar F Codd's Rules
- Features of RDBMS
- Normalization
  - 1NF, 2NF, 3NF, 3.5NF, 4NF, 5NF
- Types of Functional Dependencies
  - Trivial functional Dependency, Non-trivial functional Dependency, Multi-valued Dependency, Transitive Dependency
- Identifying of nouns in the functional requirements, converting them into tables
- Identifying of attributes in the functional requirements, converting them into fields/columns
- Identifying relation between nouns, converting them into relation between tables
- Preparing E-R (Entity Relationship) Diagrams
  - Mapping cardinalities
    - One-to-one, One-to-many, Many-to-one, Many-to-many
- RDBMS terminology

- Entity/ Table
- Attributes/Columns
  - Simple attributes, Composite attributes, Derived attributes, Single-value attributes, Multi-value attributes
- Keys
  - Primary Key, Super Key, Candidate Key, Alternate Key, Composite Key, Foreign Key
- Tuple/Record

SQL (Structured Query Language)

- Data types in Oracle
  - NUMBER, FLOAT, LONG, BINARY_FLOAT, BINARY_DOUBLE, CHAR, NCHAR, VARCHAR, VARCHAR2, NVARCHAR2, DATE, TIMESTAMP, INTERVAL YEAR, INTERVAL DAY, RAW, LONG RAW, ROWID, ROWNUM, UROWID, CLOB, NCLOB, BLOB, BFILE
- Database Literals
  - Text Literals, Numeric Literals, Datetime Literals, Interval Literals
- Operators
  - Unary Operator (+2460, -500), Binary Operator (1234+2345, 1234-2345)
  - Operator Precedence
- Database Objects
  - Table, Views, Materialized View, Synonyms, Sequence, Cluster
  - Indexes
    - B-tree Index, Bitmap Index
- Functions in Oracle
  - Single-row Functions
    - Numeric Functions
      - ABS, CEIL, EXP, FLOOR, LN, LOG, MOD, NANVL, POWER, REMINDER, ROUND, SQRT, TRUNC, WIDTH_BUCKET
    - Character Functions
      - ASCII, CHR, CONCAT, INITCAP, LOWER, LPAD, LTRIM, NLS_INITCAP, NLS_LOWER, NLSSORT, NLS_UPPER, REGEXP_REPLACE, REGEXP_SUBSTR, REPLACE, RPAD, RTRIM, SOUNDEX, SUBSTR, TRANSLATE, TRIM, UPPER, LENGTH, INSTR
    - Datetime Functions
      - ADD_MONTHS, CURRENT_DATE, CURRENT_TIMESTAMP, DBTIMEZONE, EXTRACT, FROM_TZ, LAST_DAY, LOCALTIMESTAMP, MONTHS_BETWEEN, NEW_TIME, NEXT_DAY, ROUND, SYSDATE, TO_CHAR, TRUNC
    - General Comparison Functions
      - GREATEST, LEAST
    - Conversion Functions

        - TO_CHAR, TO_DATE, NVL, DECODE
      - Large Object (LOB) Functions
        - BFILENAME
      - Null Related Functions
        - NULLIF, NVL
      - Environment Functions
        - UID, USER
    - Aggregate Functions
      - AVG, COUNT, DENSE_RANK, MIN, MAX, SUM
- DDL (Data Definition Language)
  - CREATE TABLE
    - With NOT NULL, BETWEEN, IN, >, >=, <, <=, <>, !=, PRIMARY EY, FOREIGN KEY, ON DELETE CASCADE constraints
  - ALTER TABLE
    - DROP constraint, ADD constraint, ADD COLUMN, MODIFY COLUMN, RENAME COLUMN, DROP COLUMN
  - DROP TABLE, CREATE INDEX, CREATE VIEW, CREATE SYNONYM, CREATE SEQUENCE
- DML (Data Manipulation Language)
  - INSERT, UPDATE, DELETE
- DRL (Data Retrieval Language)
  - SELECT, FROM, WHERE, ORDER BY, GROUP BY, HAVING, JOIN (INNER JOIN, LEFT OUTER JOIN, RIGHT OUTER JOIN, FULL JOIN)
  - WHERE condition with NULL, NOT NULL, LIKE, NOT LIKE, IN, NOT IN, BETWEEN, NOT BETWEEN
  - SET FUNCTIONS (UNION, UNION ALL, INTERSECT, MINUS)
  - SUB/NESTED QUERIES
    - In SELECT clause, FROM clause, WHERE clause
    - Single row-single column, Single row-multi column, Multi row-single column
    - Correlated sub queries
- DCL (Data Control Language)
  - GRANT, REVOKE, COMMIT, ROLLBACK, TRUNCATE

PL/SQL

- Introduction to PL/SQL
- PL/SQL Architecture
- PL/SQL Data types
  - NUMBER, CHAR, VARCHAR2, DATE, Anchored data types
- How to declare local variables in PL/SQL

- **How to initialize local variables in PL/SQL with := operator with direct literal and substitution variable**
- **How to write anonymous block**
- **PL/SQL block structure**
  - **DECLARE, BEGIN, EXCEPTION, END**
- **How to SET SERVEROUTPUT ON**
- **How to SET DEFINE OFF | ON**
- **How to fetch single row in PL/SQL into local variables, usage of DBMS_OUTPUT.PUT_LINE function, || as a concatenation operator**
- **How to write Nested blocks**
- **Control structures**
  - **Conditions**
    - **IF-END IF, IF-ELSE-END IF, IF-ELSIF-ELSE-END IF, Nested IF**
    - **Before CASE, Searched CASE Statement, CASE Statement, CASE Expression**
  - **Loops**
    - **LOOP-END LOOP, WHILE LOOP, END LOOP, FOR LOOP, REVERSE FOR LOOP, Error in FOR LOOP, Scope of FOR LOOP, Exiting FOR LOOP with IF condition, Exiting FOR LOOP with EXIT condition, Nested FOR LOOP,**
- **Exceptions**
  - **Oracle Pre-defined Exceptions**
  - **How to handle Exceptions**
  - **How to raise custom exceptions**
- **Cursors**
  - **How to fetch multiple rows in PL/SQL using CURSORS**
  - **Types of CURSORS**
    - **Implicit Cursors, Explicit cursors**
  - **Steps in CURSOR**
    - **DECLARE CURSOR, OPEN CURSOR, FETCH CURSOR, CLOSE CURSOR**
- **Packages**
  - **CREATE PACKAGE, CREATE PACKAGE BODY**
- **Writing user defined PROCEDURES**
- **Writing user defined FUNCTIONS**
  - **How to specify return type and return value**
  - **How to pass IN, OUT, INOUT parameters**
- **Triggers**
  - **Introduction to Trigger, CREATE Trigger ON TABLE BEFORE|AFTER INSERT|UPDATE|DELETE FOR EACH ROW**
- **Oracle built-in functions and procedures**

❖ **Live Project in PL/SQL**