

## RDBMS

- ◆ PL/SQL is a oracle procedural language extension to SQL.
- ◆ PL/SQL is not a case sensitive, so lower case letters are equivalent to corresponding upper case letters except within string and character literals.
- ◆ PL/SQL built in function.
  - Error reporting functions
  - Number functions
  - Character functions
  - Conversion functions
  - Data functions, Miscellinius functions
- ◆ (SQL CODE) function returns NUMBER
- ◆ (SQL ERROR) function returns CHAR
- ◆ (UID) function returns NUMBER
- ◆ (USER) returns VARCHAR2
- ◆ ENTRY ID return an auditing entry identifier
- ◆ Language returns language, territory and database character set in use.
- ◆ Session ID returns the auditing session identifier.
- ◆ TERMINAL returns the operators system identifier for the session terminals.
- ◆ PL/SQL provides two composite data types: TABLES AND RECORD
- ◆ You can use the % ROWTYPE attribute to declare a record that represents a row in a table or a row fetched by a cursor.
- ◆ **Conditional Control:** If statements (IF-THEN-ELSEIF)
- ◆ Iterative Control: LOOP and EXIT statements
- ◆ The WHILE LOOP statements associates a condition with a sequence of statements enclosed by the keywords LOOP and ENDLOOP  
**SYNTAX:** WHILE condition LOOP  
 sequence of statements;  
 END LOOP;
- ◆ Sequential Contol: GOTO and NULL statements
- ◆ PL/SQL a warning or error condition is called an exception
- ◆ Exceptions can be internally defined or user defined
- ◆ Examples of internally defined Exceptions include division by zero and out of memory.
- ◆ Some common internally defined exceptions include have predefined names, such as ZERO-DIVIDE and STORAGE-ERROR
- ◆ You can define exceptions of your own in like declarative part of any PL/SQL Block, Sub program or Package
- ◆ User defined exceptions must be given names.
- ◆ When an error occurs exception is raised i.e., normal execution stops and control transfers to the exception handling part of your PL/SQL bolck or sub program.

- ◆ Internal exceptions are raised implicitly by the Runtime System.
- ◆ User defined exception are raised exceptions must be raised explicitly by RAISE statements, which can also raise predefined exceptions
- ◆ A procedure is a sub program that performs a specific action.
- ◆ Sub programs are named PL/SQL blocks that can take parameters and be invoked.
- ◆ Sub programs called procedures and functions. Generally, you can use a procedure to perform an action and function to compute a value.
- ◆ EXISTS is more faster than IN because EXISTS returns a Boolean value whereas IN returns a value.
- ◆ A cursor is a mechanism used to fetch more than one row in a PL/SQL blocks
- ◆ CURSORS can be of two types      i) Implicit      ii) Explicit
- ◆ PL/SQL declares a cursor implicitly for all SQL data manipulations statements, including queries that returns only one row.
- ◆ Queries that returns more than one row you must declare an explicit cursor (or) use cursor for loop.
- ◆ Explicit cursor is a cursor in which the cursor name is explicitly assigned to a SELECT statement via the cursor----- Is statement.
- ◆ An implicit cursor is used for all SQL statements Declare, Open, Fetch, Close.
- ◆ An explicit cursors are used to process multi row select statements
- ◆ An implicit cursors are used to process Insert, Update, Delete, and a single row SELECT--- INTO statements.
- ◆ Cursor ATTRIBUTES % ROW COUNT, %NOT FOUND, %FOUND, %ISOPEN
- ◆ Cursor for loop is a loop where oracle implicitly declares a loop variable.
- ◆ No DATA FOUND is an exception raised only for the SELECT \_INTO. statements when the where clause of the query does not match any rows.
- ◆ When the where clause of the explicit cursor does not match any rows the % NOT FOUND attribute is set to TRUE instead.
- ◆ A cursor variable is a reference type.
- ◆ Functions are named PL/SQL blocks that return a value and can be called with arguments
- ◆ Procedure is a named block that can be called with parameter
- ◆ A procedure all is a PL/SQL statement by itself.
- ◆ A function call is called as part of an expression.
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- ◆ Actual parameters contain the values that are passed to a procedure and receive results.
- ◆ Formal parameters are the place holders for the values of actual parameters.
- ◆ Default values are assigned to actual parameters.
- ◆ A function cannot take a outparameter, because it has to return a value outparameter can not return a value.
- ◆ To drop the a procedure and a function.
- ◆ Drop procedure procedure-name
- ◆ Drop function function-name

- ◆ The language in which PL/SQL is embedded is known as the host language
- ◆ OCI stands for overall call interface.
- ◆ Database trigger (DBT) fires when a DML operation is performed on a database table
- ◆ Form trigger (FT) fires when user presses a key or navigates between fields on the screen.
- ◆ UTI-FILE is a package that adds the ability to read and write the operating system files.
- ◆ Functions associated with it are FOPEN, ISOPEN.
- ◆ Procedures associated with it are FCLOSE, FCLOSE-ALL
- ◆ "5" procedures to output data to a file PUT, PUT-LINE, NEW-LINE PUTF, FFTUSIT, PUT, FFWSH.PUT-LINE, FFWSH.NEW-LINE.
- ◆ We can not use a comment statement in database trigger.
- ◆ The max buffer size that can be specified using the DBMS - OUTPUT.ENABLE function, 1,000,00.
- ◆ The maximum no of triggers, can apply to a single table is "12" triggers
- ◆ Transaction is defined as all changes made to the database between successive commits.
- ◆ SQL\*LOADER is a product for moving data from external files into tables in an RDBMS. Files into tables in an RDBMS.
- ◆ "Oracle error no starts with ORA00001"
- ◆ Data is nothing but raw values. They can be numeric, character or boolean. Processed data is called information.
- ◆ A database is a repository for stored data. A computer based record keeping system is called database.
- ◆ A database management system (DBMS) consists of a collection of interrelated data and a set of programs to access those data.
- ◆ The primary goal of a DBMS is to provide the environment that is both convenient and efficient to use in retrieving and storing database information.
- ◆ Database systems are designed to manage large bodies of information
- ◆ The disadvantages of file management system are
  - | Data Redundancy and inconsistency
  - | Atomicity problems
  - | Difficulty in accessing data
  - | Data Isolation
  - | Security Problems
  - | Integrity Problems
- ◆ Data duplication at several places is called data redundancy.
- ◆ If the same data item has different values at different places it is called data inconsistency.
- ◆ Concurrent sharing is the ability of several users to be actually accessing the database at the same time.
- ◆ Data abstraction is hiding of complexities from different types of users.
- ◆ There are various levels of data abstraction.
- ◆ **Physical Level :** The lowest level of abstraction describes how the data are actually stored on the devices.
- ◆ **Logical Level :** The next higher level of abstraction describes what data are stored in the database. The logical level of abstraction is used by database administrators.

- ◆ **View Level :** The highest level of abstraction describes only part of the entire database. The system may provide many views for the same database.
- ◆ **Schema :** The overall design of the database is called the database schema.
- ◆ **Instance :** The collection of information stored in the database at a particular moment is called as an instance.
- ◆ **Data Independent :** The ability to modify a schema definition in one level without affecting a schema definition in the next higher level is called data independence.
- ◆ **Physical Data Independence :** It is the ability to modify the physical schema without causing application programs to be rewritten.
- ◆ **Logical Data Independence :** It is the ability to modify the logical schema without causing application programs to be rewritten.
- ◆ Logical data independence is more difficult to achieve than in physical data independence

#### ⇒ DATA MODELS :

- ◆ A collection of conceptual tools for describing data, data relationships and consistency constraints is called a data model.
- ◆ Object based Data models are used in describing at the logical and view levels
- ◆ Record based Data models are also used in describing data in logical and view levels.
- ◆ The three most widely accepted record-based models are the relational, network and Hierarchical models.
- ◆ Relational model uses a collection of tables to represent both data and relationships among those data.
- ◆ Data in network model are represented by collections of records and relationships among data are represented by links. They are similar to arbitrary graphs.
- ◆ The hierarchical model is similar to the network model and also uses links. They are similar to trees.
- ◆ Physical data models are used to describe data in the lowest level.
- ◆ Database system provides two different types of languages.
  - 1) Data Definition Language
  - 2) Data Manipulation Language
- ◆ **Data Definition Language :** A database schema is specified by a set of definitions expressed by a special language called a data-definition language.
- ◆ The result of compilation of DDL statements is a set of tables that is stored in a special file called data dictionary.
- ◆ Data Dictionary is a file that contains meta data-data about data.
- ◆ **Data Manipulation Language :** It is a language that enables users to access or manipulate data. There are basically two types of data manipulation languages.

- ◆ **Procedural DMLs :** They require the user to specify what data are needed and how to get those data.
- ◆ **Non-procedural DML's :** They require the user to specify what data are needed without specifying how to get those data.
- ◆ A query is a statement requesting the retrieval of information
- ◆ A transaction is a collection of operations that performs a single logical function in a database application.

### I **DBA : (DATA BASE ADMINISTRATOR)**

- ◆ A person who has Central Control over the entire system is called DBA.
- ◆ The functions of a DBA are
  - Schema Definition
  - Storage structure and access-method definition
  - Schema and physical organization modification
  - Granting of authorization for data access
  - Integrity constraint specification
- ◆ **Database Users :**
- ◆ There are four types of database system users.
  - Application programmers
  - Sophisticated Users
  - Specialized Users
  - Naive Users
- ◆ Application programmers are computer professionals who write application programs.
- ◆ Sophisticated users interact with the system without writing programs, applications that do not fit into the traditional data-processing framework.
- ◆ Naive users are unsophisticated users who interact with the system by invoking one of the permanent application programs that have been written previously.
- ◆ A distributed database is spread across a network of computers that are geographically dispersed and connected via communication links.
- ◆ The functional components of a database system include

**File Manager :** It manages the allocation of space on disk storage and the data structures used to represent information stored in disk.

**Database Manager :** It provides the interface between the low-level data stored in the database and the application programs and queries submitted to the system.

**Query Processor :** It translates statements in a query language into low-level instructions that the database manager understands.

**DML Pre-compiler :** It converts DML statements embedded in an application program to normal procedure calls into host language.

**DDL Compiler :** It converts DDL statements to a set of tables containing metadata.

- ◆ Entity-Relationship Model
- ◆ An entity is a thing or object in the real world that is distinguishable from all other objects
- ◆ An entity set is a set of entities of the same type that share the same attributes.
- ◆ An entity is represented by a set of attributes.

- ◆ An attribute which is simple and which cannot be divided into subparts is called simple attribute.
- ◆ An attribute which can be divided into subparts is called composite attribute.
- ◆ The attribute which can have a single value is called single-valued attribute.
- ◆ A null value is used when an entity does not have a value for an attribute.
- ◆ The attribute which can be derived from the values of other related attributes is called derived attribute.
- ◆ A relationship is an association among several entities.
- ◆ A relationship set is a set of relationships same type.
- ◆ A relationship may have descriptive attributes.
- ◆ The number of entity sets that participate in a relationship set is called the degree of the relationship set.
- ◆ The mapping cardinalities can be one of the following
  - One to one
  - One to many
  - Many to one
  - Many to many
- ◆ Keys :
  - ◆ A super key is a set of one or more attributes that, taken collectively, allows us to identify uniquely an entity in the entity set.
  - ◆ Minimal set of super keys are called candidate keys.
  - ◆ Candidate key chosen by the database designer is primary key.
  - ◆ The major components of an E-R diagram are
    - Rectangles : Which represent entity sets
    - Ellipses : Which represent attributes
    - Diamonds : Which represent relationship sets
    - Lines : Which link attributes to entity sets and entity sets to relationship sets
    - Double Ellipses : Which represent multivalued attributes
    - Dashed Ellipses : Which denote derived attributes
    - Double lines : Which indicate total participation of an entity in a relationship set
  - ◆ An entity set which does not have sufficient attributes to form a primary key is called Weak entity set.
  - ◆ An entity set that has a primary key is termed a strong entity set.
  - ◆ The weak entity set depends on the strong entity set for primary key.
  - ◆ Specialization, Generalization and Aggregation are extended E-R features.
  - ◆ Specialization is a top-down approach, It is based on inheritance.
  - ◆ Generalization is a simple inversion of specialization.
  - ◆ Aggregation is an abstraction through which relationships are treated as higher level entities.
  - ◆ The E-R model is converted into corresponding tables.
  - ◆ An RDBMS consists of a collection of tables.
  - ◆ An RDBMS has to satisfy at least six of the 12 Codd rules.

- ◆ Normalization is the process of refining the data model built by the Entity-Relationship model.
- ◆ Advantages of normalization are
  1. improves database design
  2. ensures minimum redundancy of data
  3. ensures minimum redundancy of data
  3. reduces need to recognize data
- ◆ **First Normal Form :** A relation R is in first normal form if and only if all the underlying domains contain atomic values only.
- ◆ **Second Normal Form :** A relation is in second normal form if and only if it is in 1NF and every nonkey attribute is fully dependent on the primary key.
- ◆ **Third Normal Form :** A relation is in third normal form if and only if it is in 2NF and every nonkey attribute is nontransitively dependent on the primary key.

## ⇒ ORACLE SERVER CONCEPTS

- ◆ A database server focusses on efficiency managing resources.
- ◆ The primary job of a server is to manage its resources
- ◆ **Functions of db servers :**
  1. Management of single database among concurrent users
  2. Control of database across and other security requirements
  3. Protection of database information with back-up and recovery features.
  4. Central server manages the database among a number of clients.
- ◆ Activities in space management are

### **Table Space Creation and Growth :**

- When a new application is installed in a system, we create one or more new ‘ tablespaces’ in the oracle database, so that the application’s data is physically separated from other application data.
- If the tablespace is not enough for required storage, its storage capacity can be increased and data files are configured to make the tablespace grow dynamically.

### **Tuning Space Usage :**

- DBA needs to understand correctly about the database objects while creating them to see that the database will make use of space and deliver optional performance regarding due I/O operators.
- The DBA is responsible for the effective database design, considering the space implicants of the tables.

## ⇒ MONITORING OF SPACE USAGE :

- Once the database is created, there is a need to consistently monitor storage structures.
- If a table needs more space, oracle will automatically, extend it according to the requirements.
- ◆ **Open Database :** The database which is under use and subjected to continuous operational activities is called “open-database” or “online database”
- ◆ **Closed Database :** The database which is under shut down state is called “closed database” is “offline database”
- ◆ **Logical Database Structures :**

- ◆ The logical database structure is determined by 2 components.
  - 1 Tablespaces
  - 1 Scheme objects
- ◆ **Tablespaces :** A database in oracle is divided into logical storage units called tablespaces
- ◆ Every oracle database has atleast one tablespace called "System table Space"
- ◆ **Scheme Objects :** The scheme objects are the logical structures that directly refer to the data inside the database
- ◆ The various scheme objects are
  - Tables
  - Indexes
  - Stored procedures
  - Synonyms
  - Views
  - Clusters
  - Database links
  - Sequences
- ◆ A table is a relation whichy consists of a set of records. It is also called base table.
- ◆ A view is a logical representation of 1 or more tables. The view derives data values from the base table.
- ◆ An index is a table of pointers used for faster accessing of row in database table.
- ◆ A cluster is a collection of catalogs. The data clusters for a database are used to physically store, related rows together, to improve the performance of certain operations on the database.
- ◆ A stored procedure is a compiled collection of SQL statements, flow control statements and variable declarations.
- ◆ A database link is used to connect one database with a remote database.
- ◆ A synonym is an alias name for other scheme objects.
- ◆ A sequence generates a sequence of unique numbers.
- ◆ Data Blocks, Extents and Segments
- ◆ **Data Blocks :** A data block is a partition or logical area of storage in database that directly corresponds to one or more physical data files.
- ◆ **Extents :** An extent is a specific number of continuous data blocks obtained in a single allocation used to store a specific type of information. This is the next level of logical database space.
- ◆ **Segments :** A set of extents allocated for a certain logical structures.
- ◆ The different types of segments are
- ◆ **Data Segments :** Each table stores all its data in the extents of data segment.
- ◆ **Index Segments :** Each index stores its data in index segment
- ◆ **Rollback Segments :** They contain information required for "read consistency" and 'redo changes' which transactions are rolled back.
- ◆ **Temporary Segments :** Created temporarily by oracle server.
- ◆ **Bootstrap Segment :** contain information regarding loading of oracle server.
- ◆ **PHYSICAL DATABASE STRUCTURES :**
- ◆ The physical database structures are
  - \* Data Files

- \* Redo Log Files
- \* Control Files
- ◆ **Data Files :** The data files contain a set of dictionary and user tables
- ◆ The data files contain all database data.
- ◆ The oracle data files are the only physical database objects.
- ◆ Each data file is allocated to a tablespace.
- ◆ **Redo Log Files :** Redo files contain recovery data.
- ◆ It is a set of OS files, external to the database that record all changes made to the database.
- ◆ During recovery, all the changes made in the redo log are applied to the database.
- ◆ **Control Files :** These are small mandatory files which are automatically created and maintained by oracle.
- ◆ They identify and verify database configuration by identifying and locating the data and redo log files.
- ◆ Oracle server also uses some other types of files
- ◆ **Parameter file :** used to design the characteristics of an oracle instance.
- ◆ **Password file :** used to authenticate privileged database users.
- ◆ **Archived Redo Log files :** These are offline copies of the redo-log files that may be necessary to recover from media failures.

#### ⇒ ORACLE SYSTEM ARCHITECTURE

- ◆ Oracle tools are integrated with kernel as "ablibs".
- ◆ The oracle tools allow the user to create database, objects, forms, reports.
- ◆ Oracle server is an Object-relational Database Management System that provides open, comprehensive, integrated approach to information management.
- ◆ Oracle Server consists of Oracle Instance and Oracle database.
- ◆ Oracle Instance consists of a memory structure called SGA (System Global Area) and background processes used by an oracle server to manage a database
- ◆ An oracle instance is a means to access an oracle database and always opens one and only one database.

#### ⇒ SGA

- ◆ SGA contains data and control information for the oracle server.
- ◆ SGA is allocated in virtual memory of the computer where the oracle-server resides.
- ◆ SGA comprises of the following memory structures
  - \* Shared Pool
  - \* Buffer Cache
- ◆ **Shared Pool :** Shared pool is used to store information such as the most recently used SQL statements + PL/SQL procedure and the most recently used data from data dictionary.
- ◆ **Buffer Cache :** It reduces the disk I/O by storing data that the transactions have recently requested.
- ◆ This is in-memory work area for transaction processing.
- ◆ 'DB buffer Cache' is used to store the most recently used data.

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- ◆ 'Redo log buffer' is used to register changes made to the database using the instance.
- ⇒ **DB BUFFER CACHE**
- ◆ 'DB buffer Cache' stores the most recently used blocks.
- ◆ When a query is processed the server process looks for the blocks needed in data-base buffer caches. If the block is not found in the database buffer cache, the server process reads the block from the data file and places a copy in the buffer cache. Subsequent requests for the same block are likely to find the block in memory, and may not require physical reads.
- ◆ Oracle server uses Least Recently Used (LRU) algorithm to age out buffers, that have not been accessed recently to make way for new blocks to be accommodated in the buffer cache.

#### ⇒ **REDO LOG BUFFER**

- ◆ Its size in bytes is defined by the 'log-buffer' parameter.
- ◆ It stores redo-records, which record changes (i.e., the block that is changed, the location of the change and the new value)
- ◆ The redo log buffer is used sequentially and changes made by one transaction may be interleaved with changes made by other transactions.

#### ⇒ **PGA (PROCESS OR PROGRAM GLOBAL AREA)**

- ◆ The PGA is not shared and not writable.
  - ◆ PGA is a memory region, that contains data and control information, for a single server process or a single background process
- It contains :

1 Sort Area	1 Session information	1 Cursor State	1 Stack Space
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- ◆ Sort Area is used for any sort that may be necessary, before rows are processed or returned to the user.
- ◆ Session Information is information such as user privileges for the session.
- ◆ Cursor State indicates the state of various cursors that are currently used by the sessions.
- ◆ Stack Space contains are session variables.
- ◆ The PGA is allocated when a process is created and deallocated when the process is terminated.

#### ⇒ **ORACLE PROCESSES**

- ◆ A process is a task that a computers OS schedule and executes.
- ◆ A client/server system splits processing as client process / server process
- ◆ Other set of process are  
Foreground server processes  
Background processes

#### ⇒ **USER PROCESS (CLIENT)**

- ◆ A user starts a tool such as SQL Plus. The user process is started when the tool is started and is terminated when the user exists.
- ◆ In client server model the application runs on the client machine.
- ◆ The user process include CPI (User Program Interface)

- ◆ UPI generates calls to the oracle server, whenever the user makes a request.
- ⇒ **SERVER PROCESS**

- ◆ Each server process uses an area of memory called PGA.
- ◆ The server process uses the OPI (Oracle Program Interface) which is used to communicate with Oracle Server, at the request of the user process.
- ◆ The server process returns status information and results to the user process.

⇒ **PROCESSING OF A DML STATEMENT :**

- ◆ A DML statement requires 2 phases of processing parsing and executing.

⇒ **STEPS IN EXECUTING THE UPDATA STATEMENT :**

- ◆ The server process reads the data and rollback blocks from th data files, they are not already in the buffer cache.
- ◆ Copies to the block that are read are placed in the buffer cache.
- ◆ The server process places locks on the data.
- ◆ The server process records the changes to be made to the rollback (before image) and to the data (new value) in the redo-log buffer.
- ◆ The changed blocks in the buffer cache are marked as dirty buffers.

⇒ **ROLLBACK SEGMENT :**

- ◆ Before making a change, the server process saves the old value into a rollback segment.
- ◆ Rollback segments tables and indexes exist in data files and parts of them are brought into the 'db buffer cache' when required.

⇒ **OTHER PROCESSES :**

- ◆ The Foreground Server Process directly handles request from client processes.
- ◆ During transaction processing oracle automatically adjusts the number of foreground server processes to match the processing on the system.
- ◆ Background process handles specific jobs of database server
- ◆ Each oracle instance may use several background server processes depending on the configuration
- ◆ Some important background processes are
- ◆ **DBMS:** (DataBase Writer) It is responsible for writing changed data to the database.
- ◆ **LGWR:(LOG Writer)** It records, changes registered in redo-log-buffer to the database in the disk.
- ◆ **ARCH:** (ARCHive) The archive process
- ◆ **CKPT:** (Check Point Process) It is responsible for updating the database status information whenever changes in the buffer cache are permanently recorded in the database. It is responsible for signalling DBWR at check points and updating all data files and control files.
- ◆ **PMON:** (Process MONitor) It performs process recovery when the user process fails. It clears the cache and release the resources that the process was using

- ◆ **SMON :** (System Monitor) It performs instance recovery and claims up temporary segments that are no longer in use. It checks for consistency and initiate the recovery of the database, when the database is opened.
- ◆ **RECO :** It resolves distributed transactions that are pending due to a network failure in the distributed database.

## SQL (STRUCTURED QUERY LANGUAGE)

- ◆ SQL is the standard language used to access data held in relational database.
- ◆ SQL statements are divided into 6 categories
- ◆ Data Manipulation Language statements: These statements are used to change the data in tables or query data in a database table, but not change the structure of the table  
Eg: Select, Insert, Update, Delete
- ◆ Transaction Control Statements: These statements guarantee the consistency of the data by organising SQL statements into logical transactions, which either succeed or fail as a unit.  
Eg: Commit, Rollback, Savepoint
- ◆ Session Control Statement: These statements change the settings for a single database connection. Eg : Alter Session
- ◆ System Control Statements: These statements change the settings for the entire database.  
Eg: Alter System
- ◆ Embedded SQL Statements: These statements are used in Oracle precompiler and Oracle Call Interface Programs  
Eg : Connect, declare cursor
- ◆ **Creation of a table:**

- ◆ The basic elements of create table command are the word create, the name of the table, an opening parenthesis, column definitions, closing parenthesis and SQL terminator.
- ◆ Individual column definitions are separated by commas.

### **SYNTAX :**

```
create table tablename(
    Variablename datatype,
    Variablename datatype,
);
```

### **Data Constraints :**

- ◆ Data constraints are the data value restrictions applied on the columns
- ◆ **Column level constraints:** If the constraints are defined along with the column definition, it is called as column level constraint.

**Table level constraints:** If the constraints are defined for the table then they are called table constraints.

### **Null value constraints:**

Setting a null value is appropriate when the actual value is unknown.

A null value is not equivalent to 0.

A null value will evaluate to null in an expression.

A null value will evaluate to null in an expression.

When a column is set to not null, one cannot enter null value into that column.

NULL keyword is used.

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**⇒ Primary key concepts:**

- ◆ A primary key is one or more columns in a table used to uniquely identify each row in the table. Primary key values must not be null and must be unique across the column. A multicolumn primary key is called primary key is called composite primary key.
- ◆ A primary key is given by PRIMARY KEY keyword.

**⇒ UNIQUE KEY CONCEPTS:**

- ◆ A unique key is similar to primary key, except that the purpose of an unique key is to ensure that information in the column for each record is unique.
- ◆ A table can have many unique keys. An unique key is given by UNIQUE.

**⇒ DEFAULT VALUE CONCEPTS:**

- ◆ At the time of cell creation a default value can be assigned to it.
- ◆ When the user is loading a record with values and leaves this cell empty, the system will automatically load this cell with default value specified.
- ◆ The DEFAULT clause is used.

**⇒ FOREIGN KEY CONCEPTS:**

- ◆ A foreign key is a column which is the primary key from other table.
- ◆ Foreign keys are used to represent the relationship between the tables.
- ◆ Foreign key is also called referential integrity constraint.
- ◆ It rejects an insert or update of a value if a corresponding value does not exist in the primary key table.
- ◆ The data type of the foreign key should match in both the tables.

**⇒ CHECK INTEGRITY CONSTRAINTS:**

- ◆ It is used to enforce rules based on logical expressions.
- ◆ The check constraint consists of keyword CHECK followed by a parenthesised predicate containing the fields to be checked.

**⇒ ALTERING TABLES:**

- ◆ The rules for adding a column to a table are
  - \* We can add a new column at any time if NOT NULL is not specified.
  - \* We can increase the width of a column at any time.
- ◆ We cannot delete a column we use  
`Alter table tablename add(newcolumnname datatype(size));`
- ◆ To modify a column we use  
`Alter table tablename modify(columnname datatype(newsize));`
- ◆ We cannot decrease the size of a column.

**⇒ DROPPING TABLES :**

- ◆ A table can be removed or deleted or dropped by using Drop table tablename;
- ◆ Truncate command will remove all rows in the table but retains the table definition.

**⇒ INSERTION OF DATA INTO TABLES:**

- ◆ A single row can be inserted by

- Insert into tablename values (v1,v2.....);
- Inserting data into a table from another table  
Insert into tablename1 select columnname 1, columnname 2 from tablename 2;

### UPDATING CONTENTS OF A TABLE :

- The contents of a table are updated by **update** statement which is used as follows
- Eg: Update emp set sal = sal + 2000 where ename='john';
- Updations which do not satisfy the constraints are not allowed.

### DELETING ROWS OF A TABLE :

- The rows of a table can be deleted as follows
- Delete form tablename :
- This deletes all the rows,
- Delete from tablename where condition
- This deletes the rows which satisfy the given condition from the table.

### Retrieving information from a table :

- The basic structure of an SQL expression consists of three clauses ; select, from and Where.
- A typical SQL query has the form
- Select <columnlist>  
from <tablelist>  
where condition  
[group by <columnname>]  
[having <condition>]  
[order by <expression>];

- The keyword distinct is used after select to avoid duplicate tuples.  
Eg : Select distinct job from emp;

- The keyword all is used after select to have duplicate values.  
Eg : Select distinct j ob from emp;

- The “asterisk” is used to denote all attributes.  
Eg : Select \* from emp ;

- Shows all the rows with all columns of the table emp

### **Logical Operators**

And logical and

or logical or

Not logical not

### **Relational Operators**

= Equal to

> Greater than

< Less than

>= Greater than or equal to

<= Less than or equal to

### **Special Operators**

!= <> Not equal to

is null checks for null values

in check a value in a set of values

Between checking a value within a range.

Like matching for a pattern in a column.

- SQL uses logical connectives and,or,not

- SQL includes a between comparision operator used to specify range of values.

- Eg : Select loannumber from loan where amount between 9000 and 20000;
- SQL provides a mechanism for renaming both relations (tables) and attributes (columns) by using as clause. Select empno as employee number from emp;
- Pattern matching of strings is done by like operator. Two symbols are used Percent (%) the character % matches any substring.
- Eg : Select customername from customer where cust-street like "%main%"; It displays all customers whose street address includes the substring main.
- The order by clause allows the rows in the result of the query to appear in sorted order.
- To specify the sort order, we specify desc for descending operate on two or more select statements and they will find the union intersection and difference of the rows selected by the two select statements. Datatype of the corresponding columns must be same.
- Eg : Select cname from depositor union select cname from borrower.

#### ⇒ AGGREGATE FUNCTIONS :

- Aggregate functions are functions that take a collection of values as input and return a single value.
- SQL has five built-in aggregator functions
 

Average	avg
Minimum	min
Maximum	max
Total	sum
Count	count
- Eg. Select avg (balance) from account ;
- The set of rows can be grouped by the group by clause.
- Eg. Select branch-name, avg (balance) from account group by branch-name;
- The HAVING Clause is used only with expression and columns that are specified with Group by clause.
- Select count(\*) from customer.
- It is used to count the number of rows in the table customer.
- The special operator IS is used with keyword NULL to locate null values.

#### ⇒ NESTED QUERIES :

- The result of one query is dynamically substituted in the condition of another.
- SQL first evaluates the inner query within the where clause.
- There is no particular limitation to the level of nesting queries.
- The special operators for nested queries are exists, any some and all.
- Exists operator produces boolean result.
- Exists operator takes a subquery as an argument and evaluates it to true, if it produces any output otherwise it evaluates to false.
- Correlated Subqueries :
- In a correlated subquery the table used in outer query refers to the table used in the inner subquery.

⇒ **JOINS :**

- SQL has the ability to define relationships between multiple tables and draw information from them in terms of these relationships in a single command.

⇒ **SELF JOIN**

- Joining a table to itself means that each row of the table is combined with itself and with every other row of the table.

→ The self join can be viewed as a join of two copies of the same table.

- To distinguish the column names from one another, aliases for the actual table name are used, since both the tables have the same name.

→ Equijoin

- When two tables are joined together using equality of values in one or more columns then they form equi-join.

→ Equi-joins are also called inner join or natural join.

- In natural join the rows with the same values of the primary key of both the tables are joined.

→ We may lose information in natural join.

- If we don't want to lose any information of left table then left outer join is performed.

- If we don't want to lose any information of left table then left outer join is performed

- If we don't want to lose any information of right table then right outer join is performed.

⇒ **VIEWS :**

- A view is a database object that contains no data of its own.

- It is virtual table whose contents are taken from other tables through the execution of a query.

The changes performed in the base tables are automatically reflected in the views.

- A view is queried similar to a table and an user cannot distinguish between a view and a table.

- A view is created with the command **Create view**

Eg: Create view dept20 as select \* from emp where deptno=20;

- View does not store any data, so there is no problem of redundancy.

- Complicated queries can be simplified by views.

- The insert, update and delete commands can be used with views.

- Syntax for dropping a view

Drop view viewname;

- Indexing and clustering are the methods for enhancing performance in retrieving information from a table.

⇒ **INDEXES:**

- An index is a database object which provides fast access path to columns that are indexed.

- Indexes are also used to ensure that no duplicate values are entered into a column.

- Indexes are referred whenever the indexed columns are referred in the **where** clause.

- Indexes are stored separately from actual data.

- Indexes need not be activated or deactivated. With every data manipulation the appropriate index is automatically updated.

- ◆ There is no limit on the number of indexes on a table in oracle.
- ◆ Syntax for creating an index
- ◆ **Create [unique] index** indexname on tablename
- ◆ Syntax for dropping an index
- ◆ **Drop index** indexname;
- ◆ **Clusters:** Clustering is a method of storing tables that are related and often accessed together.
- ◆ A cluster is a group of rows from separate tables stored in the same block.
- ◆ Clustered tables must have a common column called the cluster column.
- ◆ To cluster tables the user must own the table.
- ◆ Syntax for dropping a cluster.
- ◆ **Drop cluster** clustername;
- ◆ **Sequences :** A sequence is a database object used to generate unique integers generally for the use of primary keys.
- ◆ Syntax for creation of sequence
- ◆ **Create sequence** seqname [INCREMENT BY n] [START WITH n];
- ◆ The default incrementation is by 1. START WITH is the number with which the sequence begins.
- ◆ CURRVAL returns the current value of sequence.
- ◆ NEXTVAL returns the next value of the sequence.
- ◆ Syntax for dropping a sequence
- ◆ **Drop sequence** sequencename;
- ◆ **Synonyms:**
- ◆ Oracle allows to create a synonym for a complicated reference.
- ◆ The synonym essentially renames the table reference, similar to an alias.
- ◆ Syntax for creation of synonyms
- ◆ **Create synonym** synonymname for reference;
- ◆ Creating a synonym does not grant any privileges on the referenced object.
- ◆ Syntax for dropping of synonym
- ◆ **Drop synonym** synonymname;
- ◆ **Grant, Revoke and Privileges**
- ◆ There are two kinds of privileges namely **object** privileges and **system** privileges.
- ◆ GRANT statement is allowed to give a privilege and REVOKE statement is used to remove access allowed.
- ◆ Syntax of using grant statement  
GRANT privilege ON object TO grantee [WITH GRANT OPTION];  
Privilege - desired privilege  
Object - to which access is granted  
Grantee - user who will receive privilege
- ◆ Syntax of using revoke statement  
REVOKE privilege ON object FROM grantee;

- ◆ In a large oracle system with many different user accounts administrating privileges can be a challenge. A role is essentially a collection of privileges both object and system.
- ◆ The role PUBLIC is predefined by oracle and every user has been automatically granted the role.

### **Transaction Control:**

- ◆ A transaction is a series of SQL statements that either succeed or fail as a unit. This prevents inconsistent data.

### **Commit**

- ◆ When a **commit** statement is issued the database transaction is ended.
- ◆ All work done by the transaction is made permanent.
- ◆ Other sessions can see changes made by the transaction.

### **Rollback:**

- ◆ When **rollback** statement is issued to database then all the work done by the transaction is undone.

### **Save Points:**

- ◆ The rollback undoes entire transaction by using savepoint only part of a transaction can be undone.

### **Syntax: savepoint name;**

- ◆ Once a savepoint is defined the program can rollback to the savepoint.
- ◆ When rollback to savepoint is issued then any work done since savepoint is undone.

### **PL/SQL**

- ◆ PL/SQL is a sophisticated programming language to access oracle database from various environments.

PL/SQL stands for Procedural Language Structured Query Language.

- ◆ In PL/SQL several SQL statements can be bundled together into one PL/SQL block and sent to server as a single unit.

### **Block Structure of a PL/SQL program**

#### **Declare**

Declarative section

#### **Begin**

Executable section

#### **Exception**

Exception handling section

#### **End;**

- ◆ All PL/SQL statements are either procedural or SQL statements.

PL/SQL is not case-sensitive

- ◆ PL/SQL character set is single-byte character set.

Identifiers are used to name variables cursors and subprograms. Maximum length of an identifier is 30 characters.

- ◆ Reserved words have special meaning to PL/SQL.

- ◆ Every variable is associated with a specific type.
- ◆ A literal is a character numeric or boolean value that is not an identifier.
- ◆ Character literals are known as string literals delimited by single quotes.
- ◆ Numeric literals represent either an integer or real value
- ◆ Boolean literals are only 3 boolean values true, false and null.
- ◆ Single line comments are represented by two dashes \_\_\_\_.
- ◆ Multiline comments start with /\* and end with \*/.
- ◆ Variables are memory locations which can store data values.
- ◆ All PL/SQL types are either scalar, composite or reference.

⇒ **SCALAR TYPES :**

- ◆ Numeric family : They store integer or real values. Basic types in this family are Number and binary\_integer.
- ◆ Number can hold integer or real quantity. Syntax : number (p,s) p-precision and s-scale.
- ◆ A subtype is an alternate name for a type. The number of subtypes equivalent to Number are
 

Dec	decimal	doubleprecision	integer	int
Numeric	real	smallint		
- ◆ Binary\_integer can hold only integers.
- ◆ The subtypes of binary\_integer are
 

natural	positive
---------	----------

⇒ **CHARACTER FAMILY :**

- ◆ The basic types are varchar2, char and long.
- ◆ Varchar2 can hold variable length character strings with a maximum length.
- ◆ Char variables are fixed length character strings.
- ◆ Character is the subtype of char.
- ◆ Long is a variable length string.

⇒ **RAW FAMILY :**

- ◆ The types in the raw family are used to store binary data.
- ◆ Raw is similar to char variables except that they are not converted between character sets.
- ◆ Long raw is similar to long except that it is not converted between character sets.

⇒ **DATE FAMILY :**

- ◆ Date type is used to store both date and time information including century, year month day, hour minute and second.
- ◆ Values are assigned to date variables via to\_date built in function

⇒ **ROWID FAMILY :**

- ◆ Rowid can hold a rowid which can be thought of as a unique key for every row in the database.

⇒ **BOOLEAN FAMILY :**

Boolean can hold true, false or null only.

- ⇒ **TRUSTED FAMILY** : Mlslabel to store variable length binary labels.
- ⇒ **COMPOSITE TYPES** : The composite types are records and tables.
- ⇒ **RECORDS** : PL/SQL records are similar to C structures. It provides a way to deal with separated but related variables as unit.

♦ **Syntax :**

```
TYPE record-type IS RECORD {
    Field type [NOT NULL] [ := exp],
    ....);
```

♦ In order to refer a field within a record dot notation is used.

♦ Syntax : recordname.fieldname.

♦ In order for one record to assigned to another both records must be of the same type.

♦ To declare a record with the same type as a database row we use %rowtype. Tables:

♦ PL/SQL tables are similar to arrays in C.

⇒ **SYNTAX :**

```
TYPE table_type IS TABLE OF type INDEX BY BINARY_INTEGER ;
```

♦ A PL/SQL table is similar to database table with two columns KEY and VALUE Reference Type

♦ A reference type in PL/SQL is same as pointers in C.

♦ A variable that is declared of reference type can point to different storage locations over the life of the program.

♦ The reference type in PL/SQL is cursor.

⇒ **CURSORS :**

♦ In order to process an SQL statement it needs to allocate memory. This memory is called context area. A cursor is a handle or pointer to the context area.

♦ Processing explicit cursors

    1 Declare the cursor    1 Open cursor for a query

    1 Fetch results into PL/SQL variables.                 1 Close the cursor

⇒ **DECLARING A CURSOR :**

♦ It defines name of cursor and associates with a SELECT statement.

    Syntax : CURSOR cursorname IS select statement;

    Opening a cursor

♦ **Syntax :** OPEN cursorname ;

♦ The values of bind variables are examined.

♦ Active set pointer is pointed to first row.

⇒ **FETCHING FROM A CURSOR :**

♦ Syntax : FETCH cursorname INTO listofvariables.

♦ The variables in the INTO clause must be compatible with select statement of the cursor.

♦ After each FETCH the active set pointer is increased to the next row.

⇒ **CLOSING A CURSOR :**

♦ When all the active set has been retrieved, the cursor should be closed.

- ♦ All the resources are freed and it is illegal to FETCH from it after it is closed.

⇒ **CURSOR ATTRIBUTES :**

- ♦ They are appended to a cursor name in PL/SQL block and then used in expressions.
- ♦ %found is a boolean attribute. It returns true if previous fetch statement returns a row and false if it does not. It is illegal to check when cursor is not open.
- ♦ %not found is opposite of %found.
- ♦ %is open is used to determine whether or not the associated cursor is open. If it is open, it returns true else returns false.
- ♦ %rowcount is a numeric attribute and returns the number of rows fetched by the cursor so far.
- ♦ The implicit cursor is the sql cursor.

⇒ **PL/SQL Control Structures :**

- ♦ **If-then-else statement :**

Syntax : if boolexp 1 then  
 Seq 1  
 [elsif boolexp2 then  
 seq2]  
 end if;

- ♦ **Simple loop :**

Syntax :  
 loop  
 Seq of statements ;  
 exit when condition  
 end loop;

- ♦ **While loop :**

While cond loop  
 Seq of statements ;  
 End loop;

- ♦ **For loop :**

For loopcounter in [reverse] low bound...highbound loop  
 End loop;

- ♦ If REVERSE is used values ranging from high bound to low bound are used.

⇒ **PROCEDURES :**

- ♦ Procedures are also known as subprograms.

- ♦ When a procedure is created, it is compiled and stored in the database.

- ♦ Syntax for creating a procedure :

```
CREATE [OR REPLACE] PROCEDURE proc_name
[(argument [{IN|OUT} IN OUT {} type,...]) {IS|AS}
procedure_body ;
```

- ♦ If the parameter is sent in IN mode then it is read-only.
- ♦ If the parameter is sent in OUT mode then it is write-only.
- ♦ If the parameter is sent in IN OUT mode then it is both read and write.

- ◆ The arguments can be passed to procedures by using positional notation, named notation and mixed notation.
- ◆ If the actual arguments are associated with formal arguments by position it is called positional notation.
- ◆ In named notation the formal parameter and actual parameter are both included for each argument separated by =>
- ◆ Mixed notation uses both positional notation and named notation.
- ◆ Syntax for dropping a procedure
- ◆ Drop procedure procedurename ;

#### **FUNCTIONS :**

- ◆ A function is very similar to a procedure except that it has a return value.
- ◆ Syntax for creating a function :
- ◆ 

```
CREATE [OR REPLACE] FUNCTION func_name
  {(argument [ {IN|OUT|IN OUT}] type, ....)} RETURN ret_type {IS | AS}
  func_body;
```
- ◆ The RETURN statement is used to return the control to the calling environment with a value.
- ◆ Functions can accept some default values.
- ◆ Generally if we have more than one return value then we make use of a procedure and if we have only one return value then we use a function.
- ◆ Syntax for dropping a function;
- ◆ Drop function functionname ;
- ◆ Procedures and functions are present in the data dictionary once it is compiled. So procedure and functions are called stored subprograms.
- ◆ Packages
- ◆ Packages allow related objects to be stored together.
- ◆ A package has two separate parts - specification and body.
- ◆ Syntax for package specification
- ◆ 

```
CREATE [OR REPLACE] PACKAGE pac_name {IS | AS}
  Procedurespecification, functionspecification
```

END ;

- ◆ Package body contains the code for the forward subprogram declaration.

#### **DATABASE TRIGGERS :**

- ◆ Triggers are similar to procedures with declarative, executable and exception-handling sections
- ◆ A trigger is executed implicitly whenever the triggering event happens.
- ◆ The act of executing a trigger is called firing a trigger.
- ◆ Triggers are used for maintaining complex integrity constraints.
- ◆ Syntax of creating a trigger
- ◆ 

```
CREATE [OR REPLACE] TRIGGER trigg_name
  {BEFORE| AFTER} trigg_event ON tab_ref
  [FOR EACH ROW]
```

Type of triggers  
Category  
Statement

Timing

Level  
each

## values

Insert, update, delete

## comments

defines which kind of DML statement causes the trigger to fire

defines whether the statement is executed before or after if the trigger is row-level it fires once

Row is affected. A statement-level trigger fires once before or after the statement

- A trigger may not issue any transaction control statements like commit, rollback and savepoint.
- Syntax for dropping a trigger
 

```
Drop trigger triggername ;
```
- A trigger can be disabled without dropping it.
- When a trigger is disabled it still exists in data dictionary but is never fired.

⇒ **ORDER OF TRIGGER FIRING :**

- 1. Execute the before-statement-level trigger
- 2. For each row effected by statement
  - execute the before-row-level trigger
  - execute the statement itself
  - execute after row-level trigger if present

- 3. Execute after-row level trigger if present.
- A row-level trigger fires once per row processed by the triggering statement. Inside the trigger we can access the row that is currently being processed. We can access the old value before updation by :old pseudo record and the new value by :new pseudo record.

⇒ **EXCEPTION HANDLING :**

- PL/SQL implements error handling via exceptions and exception handlers.
- Exceptions are designed for run-time error handling.
- There are two types of exceptions namely-predefined exceptions and user-defined exceptions.
- Exceptions are explicitly raised by RAISE statement.

## PRACTICE SET - I

01. When several users access the database at the same time, it is said to be
 

1) connecting trap	2) concurrent sharing
3) integrated dated	4) database
02. To which component of DBMS do disks, drums, tapes belong to
 

1) hardware	2) software	3) data	4) users
-------------	-------------	---------	----------
03. An area holding a group of records which are addressed jointly is called as a
 

1) block	2) bucket	3) extent	4) data set
----------	-----------	-----------	-------------
04. The concept of locking is not used for solving with following problem

- RDBMS
05. 1) lost update  
3) inconsistent data  
The entity-relationship model comes under  
1) object based logical models  
3) physical data model  
2) uncommitted dependency  
4) deadlock
06. If every nonkey attribute is functionally dependent on the primary key, then the Relation will be in  
1) 1NF                    2) 2NF  
3) 3NF                    4) 4NF  
The column of a table is referred to as the  
1) tuple                    2) attribute
07. Which of the following is record based logical model  
1) network model                    3) entity  
2) E-R model                    4) degree  
In an E-R model ellipses represent  
1) entity sets                    2) relationship sets  
3) attributes                    4) memory frame model
08. The set of permitted values for each attribute is called its  
1) attribute set                    2) attribute range  
3) domain                    4) weak entity set  
Choose the incorrect statements  
1) procedural DML requires user to specify what data is needed and how to get it  
2) procedural DML requires user to specify what data is needed without specifying how to get it  
3) Non-procedural DML requires the user to specify what data is needed without specifying how to get it.  
4) None of the above
09. Relations from E-R model will always be in  
1) 1NF                    2) 2NF                    3) 3NF                    4) 4NF
10. Choose the incorrect statement  
1) In network model, data is represented by a collection of records and relationship by links  
2) in hierarchical model, data and relationships among data are represented by records and links respectively  
3) in hierarchical model, the records are organized as a collection of arbitrary graphs  
4) none
11. Choose the correct remark  
1) an alternate key is a candidate key, that is not a primary key  
2) an alternate key is a primary key, that is not a candidate key  
3) an alternate key is a candidate key, that is also primary key  
4) none
12. E-R modelling technique is a  
1) top-down approach                    2) bottom-up approach  
3) left-right approach                    4) none
13. Who of the following is more concerned about the conceptual level of RDBMS  
1) DBA                    2) end user                    3) systems programmer                    4) client
14. An attribute of one table matching the primary key of another table is called  
1) foreign key                    2) secondary key                    3) candidate key                    4) composite key
15. A weak entity set is meaningful if it is a part of  
1) one-to-one relationship                    2) one-to-many relationship  
3) many-to-many relationship                    4) none



36. Which of the following is a process that acts in refining and segregating data into Tables to avoid redundancy  
 1) segregation      2) refinement      3) aggregation      4) normalization
37. The DBMS acts as an interface between what two components of an enterprise-class database system?  
 1) Database application and the database  
 2) Data and the database  
 3) The user and the database application  
 4) Database application and SQL
38. Which of the following products was an early implementation of the relational model developed by E.F. Codd of IBM?  
 1) IDMS      2) DB2      3) dBase-II      4) R:base
39. The following are components of a database except \_\_\_\_\_.  
 1) user data      2) metadata      3) reports      4) indexes
40. An application where only one user accesses the database at a given time is an example of a(n)  
 1) single-user database application      2) multiuser database application  
 3) e-commerce database application      4) data mining database application
41. An on-line commercial site such as Amazon.com is an example of a(n)  
 1) single-user database application      2) multiuser database application  
 3) e-commerce database application      4) data mining database application
42. Which of the following products was the first to implement true relational algebra in a PC DBMS?  
 1) IDMS      2) Oracle      3) dBase-II      4) R:base
43. SQL stands for \_\_\_\_\_.  
 1) Structured Query Language      2) Sequential Query Language  
 3) Structured Question Language      4) Sequential Question Language
44. Because it contains a description of its own structure, a database is considered to be \_\_\_\_\_.  
 1) described      2) metadata compatible  
 3) self-describing      4) an application program
45. The following are functions of a DBMS except \_\_\_\_\_.  
 1) creating and processing forms      2) creating databases  
 3) processing data      4) administrating databases
46. Helping people keep track of things is the purpose of a(n) \_\_\_\_\_.  
 1) database      2) table      3) instance      4) relationship
47. Which of the following products implemented the CODASYL DBTG model?  
 1) IDMS      2) DB2      3) dBase-II      4) R:base
48. An Enterprise Resource Planning application is an example of a(n) \_\_\_\_\_.  
 1) single-user database application      2) multiuser database application  
 3) e-commerce database application      4) data mining database application
49. A DBMS that combines a DBMS and an application generator is \_\_\_\_\_.  
 1) Microsoft's SQL Server      2) Microsoft's Access  
 3) IBM's DB2      4) Oracle Corporation's Oracle
50. You have run an SQL statement that asked the DBMS to display data in a table named USER\_TABLES. The results include columns of data labeled "TableName," "NumberOfColumns" and "PrimaryKey." You are looking at \_\_\_\_\_.  
 \_\_\_\_\_.

**ECET(CSE-II)**

51. The relational database environment has all of the following components except  
 1) user data.                    2) metadata                    3) A report                    4) indexes  
 1) users                        2) separate files            3) database                    4) query languages
52. Database management systems are intended to  
 1) eliminate data redundancy  
 2) establish relationship among records in different files  
 3) manage file access    4) all of the above
53. One approach to standardization storing of data?  
 1) MIS                            2) structured programming  
 3) CODASYL specification                                    4) none of the above
54. The language used application programs to request data from the DBMS is referred to as the  
 1) DML                            2) DDL  
 3) query language    4) any of the above
55. The highest level in the hierarchy of data organization is called  
 1) data bank                    2) data base                    3) data file                            4) data record
56. Choose the RDBMS which supports full fledged client server application development  
 1) dBase V                    2) Oracle 7.1                    3) FoxPro 2.1                    4) Ingress
57. Report generators are used to  
 1) store data input by a user                                    2) retrieve information from files  
 3) answer queries    4) both 1 and 2
58. A form defined  
 1) where data is placed on the screen                            2) the width of each field  
 3) both 1 and 2    4) none of the above
59. A top-to-bottom relationship among the items in a database is established by a  
 1) hierarchical schema            2) network schema  
 3) relational schema    4) all of the above
60. The management information system (MIS) structure with one main computer system is called  
 a  
 1) hierarchical MIS structure                                    2) distributed MIS structure  
 3) centralized MIS structure                                    4) decentralized MIS structure
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 3) answer queries
68. A form defined  
 1) where data is placed on the screen  
 3) both 1 and 2
69. A top-to-bottom relationship among the items in a database is established by a  
 1) hierarchical schema  
 3) relational schema
70. The management information system (MIS) structure with one main computer system is called a  
 1) hierarchical MIS structure  
 3) centralized MIS structure
71. Which of the following hardware component is the most important to the operation of database management system?  
 1) high resolution video display  
 3) high speed, large capacity disk
72. Batch processing is appropriate if  
 1) large computer system is available  
 3) only a few transactions are involved
73. Large collection of files are called  
 1) fields  
 2) records  
 3) database  
 4) sectors
74. Which of the following is not a relational database?  
 1) dBase IV  
 2) 4th Dimension  
 3) FoxPro  
 4) Reflex
75. In order to use a record management system  
 1) you need to understand the low level details of how information is stored  
 2) you need to understand the model the record management system uses  
 3) bother 1 and 2  
 4) none of the above
76. Sort/Report generators  
 1) are faster than index/report generators  
 2) require more disk space than indexed/report generators  
 3) do not need to sort before generating report  
 4) both 1 and 2
77. If a piece of data is stored in two places in the database, then  
 1) storage space is wasted  
 2) changing the data in one spot will cause data inconsistency  
 3) it can be more easily accessed  
 4) both 1 and 2
78. An audit trail  
 1) is used to make backup copies  
 2) is the recorded history of operations performed on a file  
 3) can be used to restore lost information  
 4) none of the above
- Database Management System and Design MCQ Set 2**
79. Which of the following fields in a student file can be used as a primary key?  
 1) class  
 3) GPA  
 2) Social Security Number  
 4) Major
80. Which of the following is not an advantage of the database approach

- 1) Elimination of data redundancy      2) Ability of associate deleted data  
 3) increased security      4) all of the above
81. Which of the following contains a complete record of all activity that affected the contents of a database during a certain period of time?  
 1) report writer      2) query language  
 3) data manipulation language      4) transaction log
82. In the DBMS approach, application programs perform the  
 1) storage function      2) processing functions  
 3) access control      4) all of the above
83. A set of programs that handle a firm's database responsibilities is called  
 1) database management system (DBMS)      2) database processing system (DBPS)  
 3) data management system (DMS)      4) all of above
84. Which is the make given to the database management system which is able to handle full text data, image data, audio and video?  
 1) full media      2) graphics media      3) multimedia      4) hypertext
85. A record management system  
 1) can handle many files of information at a time  
 2) can be used to extract information stored in a computer file  
 3) always uses a list as its model      4) both 1 and 2
86. A command that lets you change one or more fields in a record is  
 1) insert      2) modify      3) lookup      4) none of above
87. A transparent DBMS  
 1) can not hide sensitive information from users  
 2) keeps its logical structure hidden from users  
 3) keeps its physical structure hidden from users      4) both 1 and 3
88. A file produced by a spreadsheet  
 1) is generally stored on disk in an ASCII text format  
 2) can be used as is by the DBMS  
 3) both 1 and 2      4) none of the above

**Database Management System and Design MCQ Set 1**

89. The ascending order of a data hierarchy is:  
 1) bit-byte-record-field-file-database      2) byte-bit-field-record-file-database  
 3) bit-byte-field-record-file-database      4) bit-byte-file-record-field-database
90. Which of the following is true of a network structure?  
 1) It is a physical representation of the data  
 2) It allows a many-to-many relationship  
 3) It is conceptually simple  
 4) It will be dominant data base of the future
91. Which of the following is a problem of file management system?  
 1) difficult to update      2) lack of data independence  
 3) data redundancy      4) all of above
92. One data dictionary software package is called  
 1) DB/DC dictionary      2) TOTAL      3) ACCESS      4) Datapac
93. The function of a database is ...  
 1) to check all input data  
 2) to collect and organize input data      3) to check all spelling  
 4) to output data

- ECE I (CSE II)**
- RDBMS**
94. What is the language used by most of the DBMSs for helping their users to access data?  
 1) High level language 2) SQL 3) Query Language 4) 4GL
95. The model for a record management system might be  
 1) handwritten list 2) a Rolodex card file 3) a business form 4) all of above
96. Primitive operations common to all record management system include  
 1) print 2) sort 3) look-up 4) all of above
97. In a large DBMS  
 1) each user can "see" only a small part of the entire database  
 2) each subschema contains every field in the logical schema  
 3) each user can access every subschema 4) all of above
98. Information can be transferred between the DBMS and a  
 1) spreadsheet program 2) word processor program  
 3) graphics program 4) all of the above
99. What is Cartesian product  
 1) group function  
 2) the result of join select statement with no where clause  
 3) a special feature of oracle server 4) none of the above
100. Who proposed Twelve commandments off DDBMS  
 1) C.J. Date 2) Richard Elison 3) Sudersan 4) All of them

### PRACTICE SET - I KEY

01) 2	02) 1	03) 2	04) 4	05) 1	06) 3	07) 2	08) 1	09) 3	10) 3
11) 2	12) 3	13) 3	14) 1	15) 1	16) 1	17) 1	18) 2	19) 1	20) 4
21) 4	22) 3	23) 3	24) 4	25) 3	26) 1	27) 2	28) 2	29) 4	30) 3
31) 2	32) 2	33)	34)	35)	36)	37) 1	38) 2	39) 3	40) 1
41) 3	42) 4	43) 1	44) 3	45) 1	46) 1	47) 1	48) 2	49) 2	50) 2
51) 2	52) 4	53) 3	54) 1	55) 2	56) 2	57) 4	58) 1	59) 1	60) 3
61) 2	62) 4	63) 3	64) 1	65) 2	66) 1	67) 4	68) 1	69) 1	70) 3
71) 3	72) 4	73) 3	74) 4	75) 2	76) 2	77) 4	78) 2	79) 2	80) 4
81) 4	82) 2	83) 4	84) 3	85) 2	86) 2	87) 3	88) 1	89) 3	90) 2
91) 4	92) 1	93) 3	94) 3	95) 4	96) 3	97) 1	98) 4	99) 2	100) 1

### PRACTICESET- II

01. Which of the following is not considered to be a basic element of an enterprise-class database system?  
 1) Users 2) Database applications  
 3) DBMS 4) COBOL programs
02. The DBMS that is most difficult to use is \_\_\_\_\_.  
 1) Microsoft's SQL Server 2) Microsoft's Access  
 3) IBM's DB2 4) Oracle Corporation's Oracle
03. Every time attribute A appears, it is matched with the same value of attribute B, but not the same value of attribute C. Therefore, it is true that:  
 1) A '! B. 2) A '! C. 3) A '! (B,C). 4) (B,C) '! A.

04. The different classes of relations created by the technique for preventing anomalies are called:  
 1) normal forms.  
 2) referential integrity constraints.  
 3) functional dependencies.  
 4) None of the above is correct.
05. A relation is in this form if it is in BCNF and has no multivalued dependencies:  
 1) second normal form.  
 2) third normal form.  
 3) fourth normal form.  
 4) domain/key normal form.
06. Row is synonymous with the term:  
 1) record.  
 2) relation.  
 3) column.  
 4) field.
07. The primary key is selected from the:  
 1) composite keys.  
 2) determinants.  
 3) candidate keys.  
 4) foreign keys.
08. Which of the following is a group of one or more attributes that uniquely identifies a row?  
 1) Key  
 2) Determinant  
 3) Tuple  
 4) Relation
09. When the values in one or more attributes being used as a foreign key must exist in another set of one or more attributes in another table, we have created a(n):  
 1) transitive dependency.  
 2) insertion anomaly.  
 3) referential integrity constraint.  
 4) normal form.
10. A relation is considered a:  
 1) Column.  
 2) one-dimensional table.  
 3) two-dimensional table.  
 4) three-dimensional table.
11. In the relational model, relationships between relations or tables are created by using:  
 1) composite keys.  
 2) determinants.  
 3) candidate keys.  
 4) foreign keys.
12. A functional dependency is a relationship between or among:  
 1) tables.  
 2) rows.  
 3) relations.  
 4) attributes.
13. Table is synonymous with the term:  
 1) record.  
 2) relation.  
 3) column.  
 4) field.
14. Which of the following is not a restriction for a table to be a relation?  
 1) The cells of the table must contain a single value.  
 2) All of the entries in any column must be of the same kind.  
 3) The columns must be ordered.  
 4) No two rows in a table may be identical.
15. For some relations, changing the data can have undesirable consequences called:  
 1) referential integrity constraints.  
 2) modification anomalies.  
 3) normal forms.  
 4) transitive dependencies.
16. A key:  
 1) must always be composed of two or more columns.  
 2) can only be one column.  
 3) identifies a row.  
 4) identifies a column.
17. An attribute is a(n):  
 1) column of a table.  
 2) two dimensional table  
 3) row of a table.  
 4) key of a table.
18. A relation in this form is free of all modification anomalies.  
 1) First normal form  
 2) Second normal form  
 3) Third normal form  
 4) Domain/key normal form
19. If attributes A and B determine attribute C, then it is also true that:  
 1) A '! C.  
 2) B '! C.

- 3) (A,B) is a composite determinant.  
A tuple is a(n):  
1) column of a table.  
3) row of a table.
- 4) C is a determinant.  
2) two dimensional table.  
4) key of a table.
20. If attribute A determines both attributes B and C, then it is also true that:  
1) A  $\nmid$  B.      2) B  $\nmid$  A.      3) C  $\nmid$  A.      4) (B,C)  $\nmid$  A.
21. One solution to the multivalued dependency constraint problem is to:  
1) split the relation into two relations, each with a single theme.  
2) change the theme.      3) create a new theme.      4) add a composite key.
22. Which of the following indicates the maximum number of entities that can be involved in a relationship?  
1) Minimum cardinality      2) Maximum cardinality  
3) ERD      4) Greater Entity Count (GEC)
23. Which type of entity cannot exist in the database unless another type of entity also exists in the database, but does not require that the identifier of that other entity be included as part of its own identifier?  
1) Weak entity      2) Strong entity  
3) ID-dependent entity      4) ID-independent entity
24. In a one-to-many relationship, the entity that is on the one side of the relationship is called a(n) \_\_\_\_\_ entity.  
1) parent      2) child      3) instance      4) subtype
25. Which type of entity represents an actual occurrence of an associated generalized entity?  
1) Supertype entity      2) Subtype entity  
3) Archetype entity      4) Instance entity
26. A recursive relationship is a relationship between an entity and \_\_\_\_\_.  
1) itself      2) a subtype entity      3) an archetype entity      4) an instance entity
27. Which of the following indicates the minimum number of entities that must be involved in a relationship?  
1) Minimum cardinality      2) Maximum cardinality  
3) ERD      4) Greater Entity Count (GEC)
28. Which of the following refers to something that can be identified in the users' work environment, something that the users want to track?  
1) Entity      2) Attribute      3) Identifier      4) Relationship
29. In which of the following is a single-entity instance of one type related to many entity instances of another type?  
1) One-to-One Relationship      2) One-to-Many Relationship  
3) Many-to-Many Relationship      4) Composite Relationship
30. Which of the following refers to an entity in which the identifier of one entity includes the identifier of another entity?  
1) Weak entity      2) Strong entity  
3) ID-dependent entity      4) ID-independent entity
31. Which type of entity is related to two or more associated entities that each contain specialized attributes that apply to some but not all of the instances of the entity?  
1) Supertype entity      2) Subtype entity      3) Archetype entity      4) Instance entity
32. An attribute that names or identifies entity instances is a(n):  
1) entity.      2) attribute.      3) identifier.      4) relationship.

34. Properties that describe the characteristics of entities are called:  
 1) entities.      2) attributes.      3) identifiers.      4) relationships.
35. In which of the following can many entity instances of one type be related to many entity instances of another type?  
 1) One-to-One Relationship      2) One-to-Many Relationship  
 3) Many-to-Many Relationship      4) Composite Relationship
36. Entities of a given type are grouped into a(n):  
 1) database.      2) entity class.      3) attribute.      4) ERD.
37. Which of the following is NOT a basic element of all versions of the E-R model?  
 1) Entities      2) Attributes      3) Relationships      4) Primary keys
38. In which of the following is a single-entity instance of one type of related to a single-entity instance of another type?  
 1) One-to-One Relationship      2) One-to-Many Relationship  
 3) Many-to-Many Relationship      4) Composite Relationship
39. Entities can be associated with one another in which of the following?  
 1) Entities      2) Attributes      3) Identifiers      4) Relationships
40. Which type of entity has its relationship to another entity determined by an attribute in that other entity called a discriminator?  
 1) Supertype entity      2) Subtype entity      3) Archetype entity      4) Instance entity
41. Which type of entity represents a logical generalization whose actual occurrence is represented by a second, associated entity?  
 1) Supertype entity      2) Subtype entity      3) Archetype entity      4) Instance entity
42. In a one-to-many relationship, the entity that is on the many side of the relationship is called a(n) \_\_\_\_\_ entity.  
 1) parent      2) child      3) instance      4) subtype
43. The SQL command to create a table is:  
 1) MAKE TABLE.      2) ALTER TABLE.      3) DEFINE TABLE.      4) CREATE TABLE.
44. A \_\_\_\_\_ is a stored program that is attached to a table or a view.  
 1) pseudofile      2) embedded SELECT statement  
 3) trigger      4) None of the above is correct.
45. The DROP TABLE statement:  
 1) deletes the table structure only.  
 2) deletes the table structure along with the table data.  
 3) works whether or not referential integrity constraints would be violated.  
 4) is not an SQL statement.
46. SQL views can be used to hide:  
 1) columns and rows only.      2) complicated SQL syntax only.  
 3) both of the above can be hidden by an SQL view.  
 4) None of the above is correct.
47. The SQL statement to create a view is:  
 1) CREATE VIEW.      2) MAKE VIEW.      3) SELECT VIEW.      4) INSERT VIEW.
48. To update an SQL view, the DBMS must be able to associate the column(s) to be updated with:  
 1) a particular column in a particular underlying table.  
 2) a particular column in a particular row.  
 3) a particular row in a particular underlying table.

49. 4) None of the above is correct.  
 Which of the following is NOT a type of SQL constraint?  
 1) PRIMARY KEY  
 2) FOREIGN KEY  
 3) ALTERNATE KEY  
 4) UNIQUE
50. A \_\_\_\_\_ is a program that performs some common action on database data and that is stored in the database.  
 1) trigger  
 2) stored procedure  
 3) pseudofile  
 4) None of the above is correct.
51. Which constraint requires that the binary relationship indicate all combinations that must appear in the ternary relationship?  
 1) MUST COVER  
 2) MUST NOT  
 3) Both of the above.  
 4) None of the above is correct.
52. Each entity is represented as a(n):  
 1) tuple.  
 2) table.  
 3) attribute.  
 4) file
53. For every relationship, how many possible sets of minimum cardinalities are there?  
 1) Two  
 2) Three  
 3) Four  
 4) Six
54. If a relationship has a cascade updates constraint, then if \_\_\_\_\_ in the parent table is changed, then the same change will automatically be made to any corresponding foreign key value.  
 1) the primary key  
 2) any alternate key  
 3) a surrogate key  
 4) a foreign key
55. Which of the following column properties would be used to specify that cells in a column must contain a monetary value that is less than another monetary value in the same row?  
 1) Null status  
 2) Data type  
 3) Default value  
 4) Data constraints
56. What type of failure occurs when Oracle fails due to an operating system or computer hardware failure?  
 1) Application failure  
 2) Instance Failure  
 3) Media Failure  
 4) Rollback failure
57. Which statement about sequences is not true?  
 1) A sequence is an object that generates a sequential series of unique numbers.  
 2) Sequences are most often used to provide values for surrogate keys.  
 3) *NextVal* and *CurrVal* are both sequence methods.  
 4) Sequences guarantee valid surrogate key values.
58. Which prefixes are available to Oracle triggers?  
 1) :new only  
 2) :old only  
 3) Both :new and :old  
 4) Neither :new nor :old
59. In creating a procedure, you may get a message if you have compile errors. Which of the following is true?  
 1) The line numbers reported match the line numbers you see in your text editor.  
 2) SQL\*Plus will automatically show the errors to you.  
 3) To see the errors, enter SHOW ERRORS in SQL\*Plus.  
 4) If there are no syntax errors, you will receive the message "NO ERRORS."
60. Which of the following is not true about indexes?  
 1) Indexes are created to enforce uniqueness on columns.  
 2) Indexes are created to enable fast retrieval by column values.  
 3) Columns that are frequently used with equal conditions in WHERE clauses are good candidates for indexes.  
 4) Indexes are created with the ALTER TABLE command.

61. Which of the following is **not** true of SQL views?  
 1) Oracle views cannot use the ORDER BY clause in view definitions.  
 2) Oracle views are created using the standard SQL-92 CREATE VIEW command.  
 3) Oracle views can be queried.  
 4) The SQL-92 standard does not allow the use of the ORDER BY clause in view definitions.
62. SQL\*Plus will finish the statement and execute it when the user types in this:  
 1) A left slash (\ ) followed by [Enter].  
 2) A colon ( : ) followed by [Enter].  
 3) A semicolon ( ; ) followed by [Enter].  
 4) A period ( . ) followed by [Enter].
63. Which of the following is NOT an Oracle-supported trigger?  
 1) BEFORE            2) DURING            3) AFTER            4) INSTEAD OF
64. After a table has been created, its structure can be modified using the SQL command:  
 1) UPDATE TABLE [TableName].  
 2) MODIFY TABLE [TableName].  
 3) ALTER TABLE [TableName].  
 4) CHANGE TABLE [TableName].
65. Which of the following is **not** true about modifying table columns?  
 1) You can drop a column at any time.  
 2) You can add a column at any time as long as it is a NULL column.  
 3) You can increase the number of characters in character columns or the number of digits in numeric columns  
 4) You cannot increase or decrease the number of decimal places.
66. If a denormalization situation exists with a one-to-one binary relationship, which of the following is true?  
 1) All fields are stored in one relation.  
 2) All fields are stored in two relations.  
 3) All fields are stored in three relations.  
 4) All fields are stored in four relations.
67. Selecting a data type involves which of the following?  
 1) Maximize storage space            2) Represent most values  
 3) Improve data integrity            4) All of the above.
68. What is the best data type definition for Oracle when a field is alphanumeric and has a length that can vary?  
 1) VARCHAR2            2) CHAR            3) LONG            4) NUMBER
69. If a denormalization situation exists with a many-to-many or associative binary relationship, which of the following is true?  
 1) All fields are stored in one relation.  
 2) All fields are stored in two relations.  
 3) All fields are stored in three relations.  
 4) All fields are stored in four relations.
70. Which of the following is an advantage of partitioning?  
 1) Complexity            2) Inconsistent access speed  
 3) Extra space            4) Security

### PRACTICE SET - II KEY

01) 4	02) 4	03) 1	04) 1	05) 3	06) 1	07) 3	08) 1	09) 3	10) 3
11) 4	12) 4	13) 2	14) 3	15) 2	16) 3	17) 1	18) 4	19) 3	20) 3
21) 1	22) 1	23) 2	24) 1	25) 1	26) 4	27) 1	28) 1	29) 1	30) 2
31) 3	32) 1	33) 3	34) 2	35) 3	36) 2	37) 4	38) 1	39) 4	40) 2
41) 3	42) 2	43) 4	44) 3	45) 2	46) 3	47) 1	48) 3	49) 3	50) 2

## PRACTICE SET - III

01. For what purposes are views used?  
 1) To hide columns only  
 3) To hide complicated SQL statements only      4) All of the above are uses for SQL views.
02. What is an SQL virtual table that is constructed from other tables?  
 1) Just another table      2) A view      3) A relation      4) Query results
03. When using the SQL INSERT statement:  
 1) rows can be modified according to criteria only.  
 2) rows cannot be copied in mass from one table to another only.  
 3) rows can be inserted into a table only one at a time only.  
 4) rows can either be inserted into a table one at a time or in groups.
04. What is not an advantage of stored procedures?  
 1) Greater security      2) SQL can be optimized  
 3) Code sharing      4) Increased network traffic
05. A reason for using an SQL view to hide columns is:  
 1) to simplify a result only.      2) to prevent the display of sensitive data only.  
 3) to accomplish both of the above.  
 4) None of the above are reasons for using an SQL view.
06. Which of the following is an SQL trigger supported by Oracle?  
 1) BEFORE      2) INSTEAD OF      3) AFTER      4) All of the above.
07. The SQL ALTER statement can be used to:  
 1) change the table structure.      2) change the table data.  
 3) add rows to the table.      4) delete rows from the table.
08. What SQL structure is used to limit column values of a table?  
 1) The LIMIT constraint      2) The CHECK constraint      3) The VALUE constraint      4) None of the above is correct.
09. Which is NOT one of the most common types of SQL CHECK constraints?  
 1) System date      2) Range checks      3) Lists of values      4) Comparing one column value to another within the same table
10. What is an advantage of placing computations in SQL views?  
 1) To save users from having to write an expression.  
 2) To ensure that the results are consistent.  
 3) To accomplish both of the above.  
 4) None of the above is correct - computations cannot be placed in a view.
11. Views constructed from SQL SELECT statements that conform to the SQL-92 standard may not contain:  
 1) GROUP BY.      2) WHERE.      3) ORDER BY.      4) FROM.
12. You can add a row using SQL in a database with which of the following?  
 1) ADD      2) CREATE      3) INSERT      4) MAKE
13. The command to remove rows from a table 'CUSTOMER' is:  
 1) REMOVE FROM CUSTOMER ...      2) DROP FROM CUSTOMER ...

14. 3) DELETE FROM CUSTOMER WHERE ... 4) UPDATE FROM CUSTOMER ...  
 1) The SQL WHERE clause:  
 2) limits the column data that are returned.  
 3) Both 1 and 2 are correct.  
 4) Neither 1 nor 2 are correct.
15. Which of the following is the original purpose of SQL?  
 1) To specify the syntax and semantics of SQL data definition language  
 2) To specify the syntax and semantics of SQL manipulation language  
 3) To define the data structures  
 4) All of the above.
16. The wildcard in a WHERE clause is useful when?  
 1) An exact match is necessary in a SELECT statement.  
 2) An exact match is not possible in a SELECT statement.  
 3) An exact match is necessary in a CREATE statement.  
 4) An exact match is not possible in a CREATE statement.
17. A view is which of the following?  
 1) A virtual table that can be accessed via SQL commands  
 2) A virtual table that cannot be accessed via SQL commands  
 3) A base table that can be accessed via SQL commands  
 4) A base table that cannot be accessed via SQL commands
18. The command to eliminate a table from a database is:  
 1) REMOVE TABLE CUSTOMER;      2) DROP TABLE CUSTOMER;  
 3) DELETE TABLE CUSTOMER;      4) UPDATE TABLE CUSTOMER;
19. ON UPDATE CASCADE ensures which of the following?  
 1) Normalization      2) Data Integrity      3) Materialized Views  
 4) All of the above.
20. SQL data definition commands make up a(n) \_\_\_\_\_.  
 1) DDL      2) DML      3) HTML      4) XML
21. Which of the following is valid SQL for an Index?  
 1) CREATE INDEX ID;      2) CHANGE INDEX ID;  
 3) ADD INDEX ID;      4) REMOVE INDEX ID;
22. The SQL keyword(s) \_\_\_\_\_ is used with wildcards.  
 1) LIKE only      2) IN only      3) NOT IN only      4) IN and NOT IN
23. Which of the following is the correct order of keywords for SQL SELECT statements?  
 1) SELECT, FROM, WHERE      2) FROM, WHERE, SELECT  
 3) WHERE, FROM, SELECT      4) SELECT, WHERE, FROM
24. A subquery in an SQL SELECT statement is enclosed in:  
 1) braces — {...}.      2) CAPITAL LETTERS.  
 3) parenthesis — (...).      4) brackets — [...].
25. The result of a SQL SELECT statement is a(n) \_\_\_\_\_.  
 1) report      2) form      3) file      4) table
26. Which of the following are the five built-in functions provided by SQL?  
 1) COUNT, SUM, AVG, MAX, MIN      2) SUM, AVG, MIN, MAX, MULT  
 3) SUM, AVG, MULT, DIV, MIN      4) SUM, AVG, MIN, MAX, NAME
27. In an SQL SELECT statement querying a single table, according to the SQL-92 standard the asterisk (\*) means that:  
 1) all columns of the table are to be returned.  
 2) all records meeting the full criteria are to be returned.

- 3) all records with even partial criteria met are to be returned.  
 4) None of the above is correct.
28. The HAVING clause does which of the following?  
 1) Acts like a WHERE clause but is used for groups rather than rows.  
 2) Acts like a WHERE clause but is used for rows rather than columns.  
 3) Acts like a WHERE clause but is used for columns rather than groups.  
 4) Acts EXACTLY like a WHERE clause.
29. The SQL -92 wildcards are \_\_\_\_\_ and \_\_\_\_\_.  
 1) asterisk (\*); percent sign (%)      2) percent sign (%); underscore (\_)  
 3) underscore(\_); question mark (?)    4) question mark (?); asterisk (\*)
30. To remove duplicate rows from the results of an SQL SELECT statement, the \_\_\_\_\_ qualifier specified must be included.  
 1) ONLY      2) UNIQUE      3) DISTINCT      4) SINGLE
31. The benefits of a standard relational language include which of the following?  
 1) Reduced training costs      2) Increased dependence on a single vendor  
 3) Applications are not needed.    4) All of the above.
32. Which of the following do you need to consider when you make a table in SQL?  
 1) Data types      2) Primary keys      3) Default values      4) All of the above.
33. SQL query and modification commands make up a(n) \_\_\_\_\_.  
 1) DDL      2) DML      3) HTML      4) XML
34. When three or more AND and OR conditions are combined, it is easier to use the SQL keyword(s):  
 1) LIKE only.      2) IN only.  
 3) NOT IN only.    4) Both IN and NOT IN.
35. The Microsoft Access wildcards are \_\_\_\_\_ and \_\_\_\_\_.  
 1) asterisk (\*); percent sign (%)    2) percent sign (%); underscore (\_)  
 3) underscore(\_); question mark (?)    4) question mark (?); asterisk (\*)
36. Find the SQL statement below that is equal to the following: SELECT NAME FROM CUSTOMER WHERE STATE = 'VA';  
 1) SELECT NAME IN CUSTOMER WHERE STATE IN ('VA');  
 2) SELECT NAME IN CUSTOMER WHERE STATE = 'VA';  
 3) SELECT NAME IN CUSTOMER WHERE STATE = 'V';  
 4) SELECT NAME FROM CUSTOMER WHERE STATE IN ('VA');
37. Which one of the following sorts rows in SQL?  
 1) SORT BY      2) ALIGN BY      3) ORDER BY      4) GROUP BY
38. To sort the results of a query use:  
 1) SORT BY.      2) GROUP BY.  
 3) ORDER BY.      4) None of the above is correct.
39. To define what columns should be displayed in an SQL SELECT statement:  
 1) use FROM to name the source table(s) and list the columns to be shown after SELECT.  
 2) use USING to name the source table(s) and list the columns to be shown after SELECT.  
 3) use SELECT to name the source table(s) and list the columns to be shown after USING.  
 4) use USING to name the source table(s) and list the columns to be shown after WHERE.
40. SQL can be used to:  
 1) create database structures only.  
 3) modify database data only.      2) query database data only.  
                                         4) All of the above can be done by SQL.

- ECET(CSE- II)**

41. The SQL statement that queries or reads data from a table is \_\_\_\_\_.  
1) SELECT      2) READ  
3) QUERY      4) None of the above is correct.

42. The SQL keyword BETWEEN is used:  
1) for ranges.  
2) to limit the columns displayed.  
3) as a wildcard.  
4) None of the above is correct.

43. A subquery in an SQL SELECT statement:  
1) can only be used with two tables.  
2) can always be duplicated by a join.  
3) has a distinct form that cannot be duplicated by a join.  
4) cannot have its results sorted using ORDER BY.

44. \_\_\_\_\_ was adopted as a national standard by ANSI in 1992.  
1) Oracle      2) SQL      3) Microsoft Access      4) Dbase

45. SQL is:  
1) a programming language.  
2) an operating system.  
3) a data sublanguage.  
4) a DBMS.

46. Needing to use more complicated SQL in database applications is a(n) \_\_\_\_\_ of normalization.  
1) advantage      2) disadvantage  
3) either an advantage or disadvantage  
4) neither an advantage nor disadvantage

47. Eliminating modification anomalies is a(n) \_\_\_\_\_ of normalization.  
1) advantage      2) disadvantage  
3) either an advantage or disadvantage  
4) neither an advantage nor disadvantage

48. Multivalued dependencies should \_\_\_\_\_ be eliminated.  
1) always      2) commonly      3) seldom      4) never

49. When assessing the table structure of an acquired set of tables with data, assessing the validity of possible referential integrity constraints on foreign keys is (part of) the:  
1) first step.      2) second step.      3) third step.      4) fourth step.

50. Using the SQL GROUP BY phrase with a SELECT statement can help detect which of the following problems?  
1) The multivalue, multicolumn problem      2) The inconsistent values problem  
3) The missing values problem      4) The general-purpose remarks column problem

## PRACTICE SET - III KEY

01) 4    02) 2    03) 4    04) 4    05) 3    06) 4    07) 1    08) 2    09) 1    10) 3  
 11) 3    12) 3    13) 3    14) 2    15) 4    16) 2    17) 1    18) 2    19) 2    20) 1  
 21) 1    22) 1    23) 2    24) 3    25) 4    26) 2    27) 1    28) 1    29) 2    30) 3  
 31) 1    32) 4    33) 2    34) 4    35) 4    36) 4    37) 3    38) 3    39) 1    40) 4  
 41) 1    42) 1    43) 3    44)      45) 3    46) 2    47) 1    48) 1    49) 3    50) 2

## SELF TEST

**SAIMEDHA**

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01. When assessing the table structure of an acquired set of tables with data, determining foreign keys is (part of) the:  
 1) first step.      2) second step.      3) third step.      4) fourth step.
02. Creating a read-only database is a task that is \_\_\_\_\_ assigned to beginning database professionals.  
 1) always      2) commonly      3) seldom      4) never
03. Each answer below shows example data from a table. Which answer is an example of the general-purpose remarks column problem?  
 1) Three columns have the values 534-2435, 534-7867, and 546-2356 in the same row.  
 2) Three rows have the values Brown Small Chair, Small Chair Brown, and Small Brown Chair in the same column.  
 3) Three rows have the values Brown, NULL, and Blue in the same column.  
 4) One row has the value "He is interested in a Silver Porsche from the years 1978-1988" in a column..
04. For a number of reasons, normalizations is not often an advantage for a(n) \_\_\_\_\_ database.  
 1) read-only      2) updateable      3) either a read-only or an updateable  
 4) None of the above is correct.
05. Most of the time, modification anomalies are serious enough that tables should be normalized into:  
 1) 1NF.      2) 2NF.      3) 3NF.      4) BCNF.
06. Each answer below shows example data from a table. Which answer is an example of the missing values problem?  
 1) Three columns have the values 534-2435, 534-7867, and 546-2356 in the same row.  
 2) Three rows have the values Brown Small Chair, Small Chair Brown, and Small Brown Chair in the same column.  
 3) Three rows have the values Brown, NULL, and Blue in the same column.  
 4) One row has the value "He is interested in a Silver Porsche from the years 1978-1988" in a column.
07. When assessing the table structure of an acquired set of tables with data, determining functional dependencies is (part of) the:  
 1) first step.      2) second step.      3) third step.      4) fourth step.
08. Each answer below shows example data from a table. Which answer is an example of the multivalue, multicolumn problem?  
 1) Three columns have the values 534-2435, 534-7867, and 546-2356 in the same row.  
 2) Three rows have the values Brown Small Chair, Small Chair Brown, and Small Brown Chair in the same column.  
 3) Three rows have the values Brown, NULL, and Blue in the same column.  
 4) One row has the value "He is interested in a Silver Porsche from the years 1978-1988" in a column.
09. When assessing the table structure of an acquired set of tables with data, counting the number of table rows is (part of) the:  
 1) first step.      2) second step.      3) third step.      4) fourth step.
10. If a table has been normalized so that all determinants are candidate keys, then that table is in:  
 1) 1NF.      2) 2NF.      3) 3NF.      4) BCNF.
11. Read-only databases are \_\_\_\_\_ updated.

## ECET(CSE-II)

12. Needing to assess the validity of assumed referential integrity constraints on foreign keys is a(n) \_\_\_\_\_ of normalization.
- 1) always
  - 2) commonly
  - 3) seldom
  - 4) never
13. When assessing the table structure of an acquired set of tables with data, determining primary keys is (part of) the:
- 1) first step.
  - 2) second step.
  - 3) third step.
  - 4) fourth step.
14. Normalization \_\_\_\_\_ data duplication.
- 1) eliminates
  - 2) reduces
  - 3) increases
  - 4) maximizes
15. Each answer below shows example data from a table. Which answer is an example of the inconsistent values problem?
- 1) Three columns have the values 534-2435, 534-7867, and 546-2356 in the same row.
  - 2) Three rows have the values Brown Small Chair, Small Chair Brown, and Small Brown Chair in the same column.
  - 3) Three rows have the values Brown, NULL, and Blue in the same column.
  - 4) One row has the value "He is interested in a Silver Porsche from the years 1978-1988" in a column.
16. Which of the following data constraints would be used to specify that the value of cells in a column must be one of a specific set of possible values?
- 1) A domain constraint
  - 2) A range constraint
  - 3) An intrarelationship constraint
  - 4) An interrelationship constraint
17. In a 1:N relationship, the foreign key is placed in:
- 1) either table without specifying parent and child tables.
  - 2) the parent table.
  - 3) the child table.
  - 4) either the parent table or the child table.
18. Which of the following column properties specifies whether or not cells in a column must contain a data value?
- 1) Null status
  - 2) Data type
  - 3) Default value
  - 4) Data constraints
19. A primary key should be defined as:
- 1) NULL.
  - 2) NOT NULL.
  - 3) Either of the above can be used.
  - 4) None of the above are correct.
20. Which of the following column properties would be used to specify that cells in a column must contain a monetary value?
- 1) Null status
  - 2) Data type
  - 3) Default value
  - 4) Data constraints
21. Which of the following situations requires the use of ID-dependent entities?
- 1) Association relationships only
  - 2) Multivalued attributes only
  - 3) Archetype/instance relationships only
  - 4) All of the above use ID dependent entities
22. A foreign key is:
- 1) a column containing the primary key of another table.
  - 2) used to define data types.
  - 3) used to define null status.
  - 4) all of the above are above correct.
23. Which of the following columns is(are) required in a table?
- 1) A foreign key
  - 2) An alternate key
  - 3) A primary key
  - 4) A surrogate key.

34. In a 1:1 relationship, the foreign key is placed in:  
 1) either table without specifying parent and child tables.  
 2) the parent table.  
 3) the child table.  
 4) either the parent table or the child table.
35. Which of the following column properties would be used to specify that cells in a column must be immediately filled with a monetary value of \$10,000?  
 1) Null status      2) Data type      3) Default value      4) Data constraints
36. The identifier of an entity will become the \_\_\_\_\_ of the new table.  
 1) foreign key      2) main attribute      3) primary key      4) identity key
37. Which of the following data constraints would be used to specify that the value of a cell in one column must be less than the value of a cell in another column in the same row of the same table?  
 1) A domain constraint      2) A range constraint  
 3) An intrarelation constraint      4) An interrelation constraint
38. A unique, DBMS-supplied identifier used as the primary key of a relation is called a(n):  
 1) primary key.      2) foreign key.      3) composite key.      4) surrogate key.
39. Which is **not** true about surrogate keys?  
 1) They are short.      2) They are fixed.  
 3) They have meaning to the user.      4) They are numeric.
40. For every relationship, how many possible types of actions are there when enforcing minimum cardinalities?  
 1) Two      2) Three      3) Four      4) Six

### SELF TEST KEY

01) 2	02) 2	03) 4	04) 1	05) 4	06) 3	07) 2	08) 1	09) 1	10) 4
11) 4	12) 4	13) 2	14) 1	15) 2	16) 1	17) 3	18) 1	19) 2	20) 2
21) 4	22) 1	23) 3	24) 1	25) 3	26) 3	27) 3	28) 4	29) 3	30) 4