Handout - RDBMS and SQL

1. SQL
   SQL is an English like language consisting of commands to store, retrieve, maintain & regulate access to your database.

2. Why a database is called as relational database model?

A database model represents the relationship between one or more databases. The relationship is known as the relational database model. It is an extension of the normal databases without relations. It provides flexibility and allows one database to be in relation with another database. It can access the data from many databases at one time over the network.

3. Date Functions
   Date Functions are ADD_MONTHS, LAST_DAY, NEXT_DAY, MONTHS_BETWEEN & SYSDATE.

4. What are entities and attributes referring to?

Table consists of some properties that are known as attributes. These consist of the representation of entity in the table. They are represented by columns in the table. Entity is referred to the store data about any particular thing. It is the smallest unit inside the table.

5. What do you understand by relation in relational database model?

Relation in the relational database model is defined as the set of tuples that have the same attributes. Tuple represents an object and also the information that the object contains. Objects are basically instances of classes and used to hold the larger picture. Relation is described as a table and is organized in rows and columns. The data referenced by the relation come in the same domain and have the same constraints as well. Relations in the relational database model can be modified using the commands like insert, delete etc.

6. What is the difference between base and derived relation?

Relational database means the relationship between different databases. In relational database user can store and access all the data through the tables which are related to each other. Relationship between the store data is called base relations and implementation of it is called as tables. Whereas, relations which don't store the data, but can be found out by applying relational operations on other relations are called as derived relations. When these are implemented they are termed as views or queries. Derived relations are more useful then base relation, as they can have more information from many relations, but they act as a single relation.

7. What is database?

A database is a logically coherent collection of data with some inherent meaning, representing some aspect of real world and which is designed, built and populated with data for a specific purpose.

8. What is a Database system?

The database and DBMS software together is called as Database system.

9. Character Functions
   Character Functions are INITCAP, UPPER, LOWER, SUBSTR & LENGTH. Additional functions are GREATEST & LEAST. Group Functions returns results based upon groups of rows rather than one result per row, use group functions. They are AVG, COUNT, MAX, MIN & SUM.

10. COLUMN
    COLUMN command define column headings & format data values.

11. BREAK
    BREAK command clarify reports by suppressing repeated values, skipping lines & allowing for controlled break points.

12. COMPUTE
    command control computations on subsets created by the BREAK command.

13. What are the advantages of DBMS?

1. Redundancy is controlled.
2. Unauthorised access is restricted.
3. Providing multiple user interfaces.
4. Enforcing integrity constraints.
5. Providing backup and recovery.

14. What are the disadvantage in File Processing System?

1. Data redundancy and inconsistency.
2. Difficult in accessing data.
3. Data isolation.
4. Data integrity.
5. Concurrent access is not possible.
6. Security Problems.

15. Describe the three levels of data abstraction?

The are three levels of abstraction:

1. Physical level: The lowest level of abstraction describes how data are stored.
2. Logical level: The next higher level of abstraction, describes what data are stored in database and what relationship among those data.
3. View level: The highest level of abstraction describes only part of entire database.

16. Define the "integrity rules"?

There are two Integrity rules.

1. Entity Integrity: States that "Primary key cannot have NULL value"
2. Referential Integrity: States that "Foreign Key can be either a NULL value or should be Primary Key value of other relation.

17. What is Data Independence?

Data independence means that "the application is independent of the storage structure and access strategy of data". In other words, The ability to modify the schema definition in one level should not affect the schema definition in the next higher level.
Two types of Data Independence:

1. Physical Data Independence: Modification in physical level should not affect the logical level.
2. Logical Data Independence: Modification in logical level should affect the view level.

NOTE: Logical Data Independence is more difficult to achieve

18. What is a view? How it is related to data independence?

A view may be thought of as a virtual table, that is, a table that does not really exist in its own right but is instead derived from one or more underlying base table. In other words, there is no stored file that direct represents the view instead a definition of view is stored in data dictionary.

Growth and restructuring of base tables is not reflected in views. Thus the view can insulate users from the effects of restructuring and growth in the database. Hence accounts for logical data independence.

19. What is Data Model?

A collection of conceptual tools for describing data, data relationships data semantics and constraints.

20. What is E-R model?

This data model is based on real world that consists of basic objects called entities and of relationship among these objects. Entities are described in a database by a set of attributes.

21. What is an Entity?

It is a 'thing' in the real world with an independent existence.

22. What is an Entity type?

It is a collection (set) of entities that have same attributes.

23. What is an Entity set?

It is a collection of all entities of particular entity type in the database.

24. What is Weak Entity set?

An entity set may not have sufficient attributes to form a primary key, and its primary key compromises of its partial key and primary key of its parent entity, then it is said to be Weak Entity set.

25. What is an attribute?

It is a particular property, which describes the entity.

26. What is a Relation Schema and a Relation?

A relation Schema denoted by R(A1, A2, ..., An) is made up of the relation name R and the list of attributes Ai that it contains. A relation is defined as a set of tuples. Let r be the relation which contains set tuples (t1, t2, t3, ..., tn). Each tuple is an ordered list of n-values t=(v1,v2, ..., vn).

27. What is degree of a Relation?

It is the number of attribute of its relation schema.

28. What is Relationship?

It is an association among two or more entities.

29. SET
    SET command changes the system variables affecting the report environment.

30. SPOOL
    SPOOL command creates a print file of the report.

31. JOIN
    JOIN is the form of SELECT command that combines info from two or more tables.
    Types of Joins are Simple (Equijoin & Non-Equijoin), Outer & Self join.
    Equijoin returns rows from two or more tables joined together based upon a equality condition in the WHERE clause.
    Non-Equijoin returns rows from two or more tables based upon a relationship other than the equality condition in the WHERE clause.
    Outer Join combines two or more tables returning those rows from one table that have no direct match in the other table.
    Self Join joins a table to itself as though it were two separate tables.

32. Union
    Union is the product of two or more tables.

33. Intersect
    Intersect is the product of two tables listing only the matching rows.

34. Minus
    Minus is the product of two tables listing only the non-matching rows.

35. Correlated Subquery
    Correlated Subquery is a subquery that is evaluated once for each row processed by the parent statement. Parent statement can be Select, Update or Delete. Use CRSQ to answer multipart questions whose answer depends on the value in each row processed by parent statement.

36. Multiple columns
    Multiple columns can be returned from a Nested Subquery.

37. Sequences
    Sequences are used for generating sequence numbers without any overhead of locking.
    Drawback is that after generating a sequence number if the transaction is rolled back, then that sequence number is lost.

38. Synonyms
Synonyms is the alias name for table, views, sequences & procedures and are created for reasons of Security and Convenience.
Two levels are Public - created by DBA & accessible to all the users. Private - Accessible to creator only. Advantages are referencing without specifying the owner and Flexibility to customize a more meaningful naming convention.

39. Indexes
Indexes are optional structures associated with tables used to speed query execution and/or guarantee uniqueness. Create an index if there are frequent retrieval of fewer than 10-15% of the rows in a large table and columns are referenced frequently in the WHERE clause. Implied tradeoff is query speed vs. update speed. Oracle automatically update indexes. Concatenated index max. is 16 columns.

40. Order of SQL statement execution
Where clause, Group By clause, Having clause, Order By clause & Select.

41. Transaction
Transaction is defined as all changes made to the database between successive commits.

42. Commit
Commit is an event that attempts to make data in the database identical to the data in the form. It involves writing or posting data to the database and committing data to the database. Forms check the validity of the data in fields and records during a commit. Validity check are uniqueness, consistency and db restrictions.

43. Rollback
Rollback causes work in the current transaction to be undone.

44. Savepoint
Savepoint is a point within a particular transaction to which you may rollback without rolling back the entire transaction.

45. Locking
Locking are mechanisms intended to prevent destructive interaction between users accessing data. Locks are used to achieve.

46. Consistency
Consistency : Assures users that the data they are changing or viewing is not changed until the are thro' with it.

47. Integrity
Assures database data and structures reflects all changes made to them in the correct sequence. Locks ensure data integrity and maximum concurrent access to data. Commit statement releases all locks. Types of locks are given below.
Data Locks protects data i.e. Table or Row lock.
Dictionary Locks protects the structure of database object i.e. ensures table's structure does not change for the duration of the transaction.
Internal Locks & Latches protects the internal database structures. They are automatic.
Exclusive Lock allows queries on locked table but no other activity is allowed.
Share Lock allows concurrent queries but prohibits updates to the locked tables.
Row Share allows concurrent access to the locked table but prohibits for a exclusive table

lock.
Row Exclusive same as Row Share but prohibits locking in shared mode.
Shared Row Exclusive locks the whole table and allows users to look at rows in the table but prohibit others from locking the table in share or updating them.
Share Update are synonymous with Row Share.

48. Deadlock
Deadlock is a unique situation in a multi user system that causes two or more users to wait indefinitely for a locked resource. First user needs a resource locked by the second user and the second user needs a resource locked by the first user. To avoid dead locks, avoid using exclusive table lock and if using, use it in the same sequence and use Commit frequently to release locks.

49. Mutating Table
Mutating Table is a table that is currently being modified by an Insert, Update or Delete statement. Constraining Table is a table that a triggering statement might need to read either directly for a SQL statement or indirectly for a declarative Referential Integrity constraints. Pseudo Columns behaves like a column in a table but are not actually stored in the table. E.g. Currval, Nextval, Rowid, Rownum, Level etc.

50. The most important DDL statements in SQL are:
CREATE TABLE - creates a new database table
ALTER TABLE - alters (changes) a database table
DROP TABLE - deletes a database table
CREATE INDEX - creates an index (search key)
DROP INDEX - deletes an index

51. Operators used in SELECT statements.
= Equal
<> or != Not equal
> Greater than
< Less than
>= Greater than or equal
<= Less than or equal
BETWEEN an inclusive range
LIKE Search for a pattern

52. The SELECT INTO Statement is most often used to create backup copies of tables or for archiving records.

SELECT column_name(s) INTO newtable [IN externaldatabase] FROM source
SELECT column_name(s) INTO newtable [IN externaldatabase] FROM source WHERE column_name operator value

53. The INSERT INTO Statements:

INSERT INTO table_name VALUES (value1, value2,....)
INSERT INTO table_name (column1, column2,...) VALUES (value1, value2,....)

54. The Update Statement:

UPDATE table_name SET column_name = new_value WHERE column_name = some_value

55. The Delete Statements:

    DELETE FROM table_name WHERE column_name = some_value
    Delete All Rows:
    DELETE FROM table_name or DELETE * FROM table_name

56. Sort the Rows:

    SELECT column1, column2, ... FROM table_name ORDER BY columnX, columnY, ..
    SELECT column1, column2, ... FROM table_name ORDER BY columnX DESC
    SELECT column1, column2, ... FROM table_name ORDER BY columnX DESC, columnY ASC

57. The IN operator may be used if you know the exact value you want to return for at least one of the columns.

    SELECT column_name FROM table_name WHERE column_name IN (value1,value2,..)

58. BETWEEN ... AND
    SELECT column_name FROM table_name WHERE column_name BETWEEN value1 AND value2 The values can be numbers, text, or dates.

59. What is the use of CASCADE CONSTRAINTS?
    When this clause is used with the DROP command, a parent table can be dropped even when a child table exists.

60. Why does the following command give a compilation error?
    DROP TABLE &TABLE_NAME;

Variable names should start with an alphabet. Here the table name starts with an '&' symbol.

61. State true or false. !=, <>, ^= all denote the same operation?
    True.

62. State true or false. EXISTS, SOME, ANY are operators in SQL?
    True.

63. What operator performs pattern matching?
    LIKE operator.

64. What is the use of the DROP option in the ALTER TABLE command?
    It is used to drop constraints specified on the table.

65. What operator tests column for the absence of data?
    IS NULL operator.

66. Which is the subset of SQL commands used to manipulate Oracle Database structures, including tables?
    Data Definition Language (DDL)

67. What is the use of DESC in SQL?
    DESC has two purposes. It is used to describe a schema as well as to retrieve rows from table in descending order.

Explanation :
The query SELECT * FROM EMP ORDER BY ENAME DESC will display the output sorted on ENAME in descending order.