

Database Systems LAB # 04

Oracle 11g installation & SQL's Basics

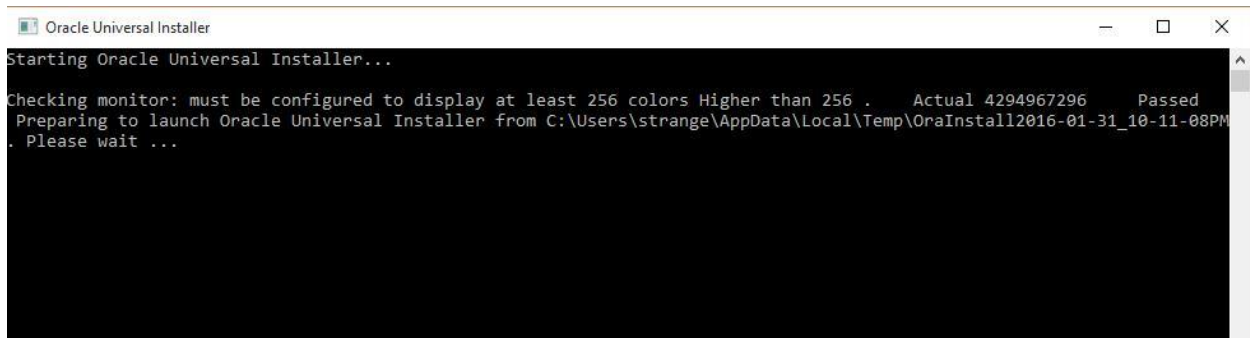


Figure 1: Oracle Universal Installer

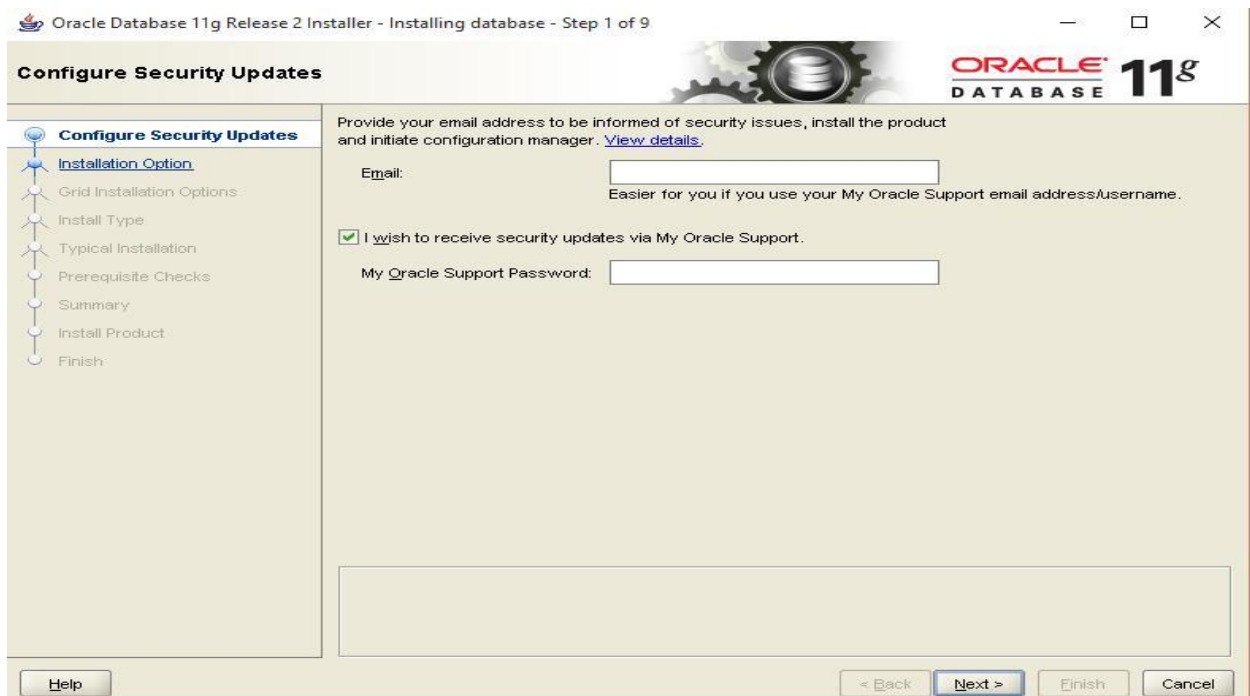
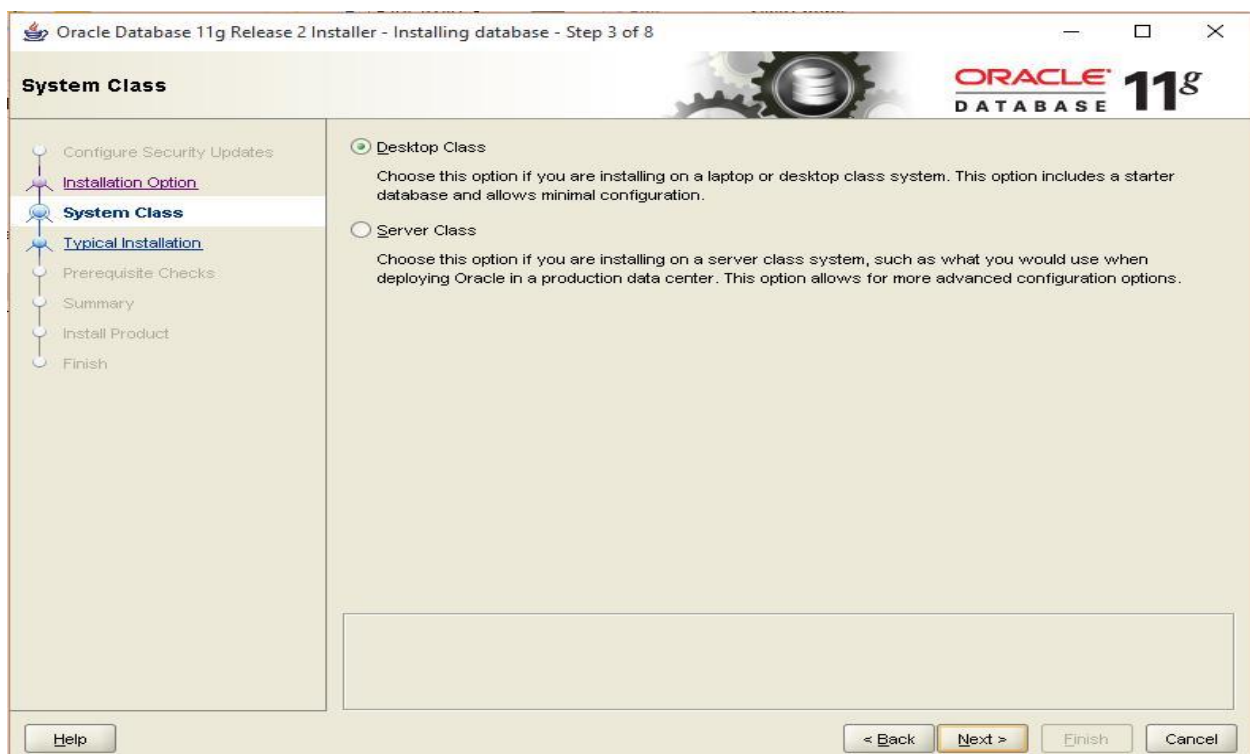


Figure 2: Oracle Database 11 g Installation Step 1 of 9

*Figure 3: Installation Options**Figure 4: System Class*

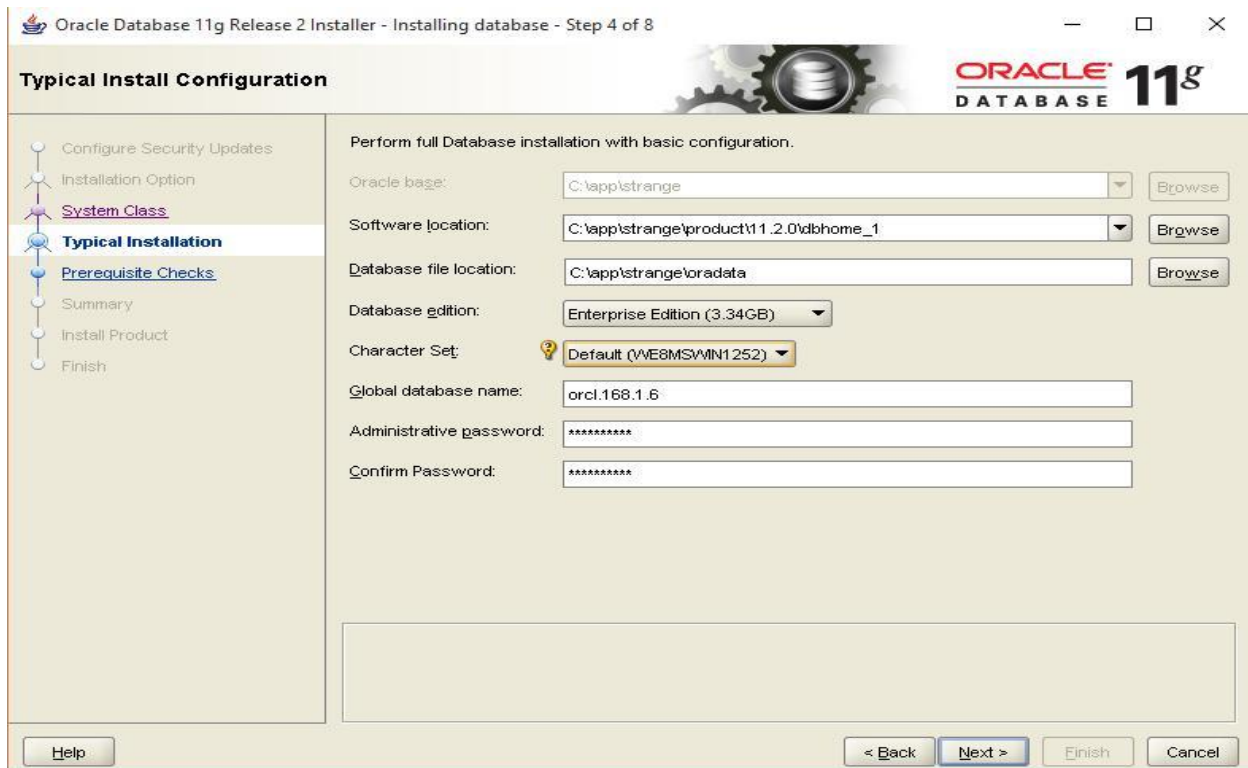


Figure 5: Typical Installation

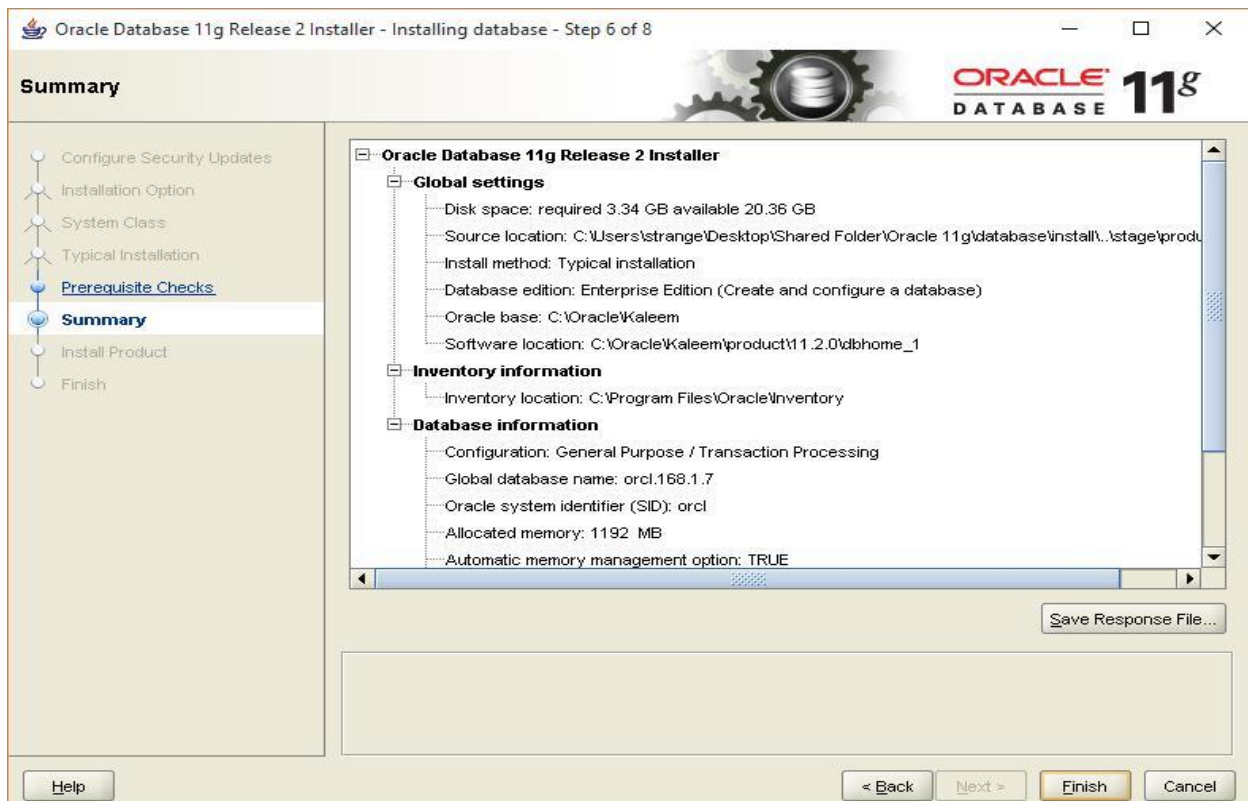


Figure 6: Prerequisites Checks

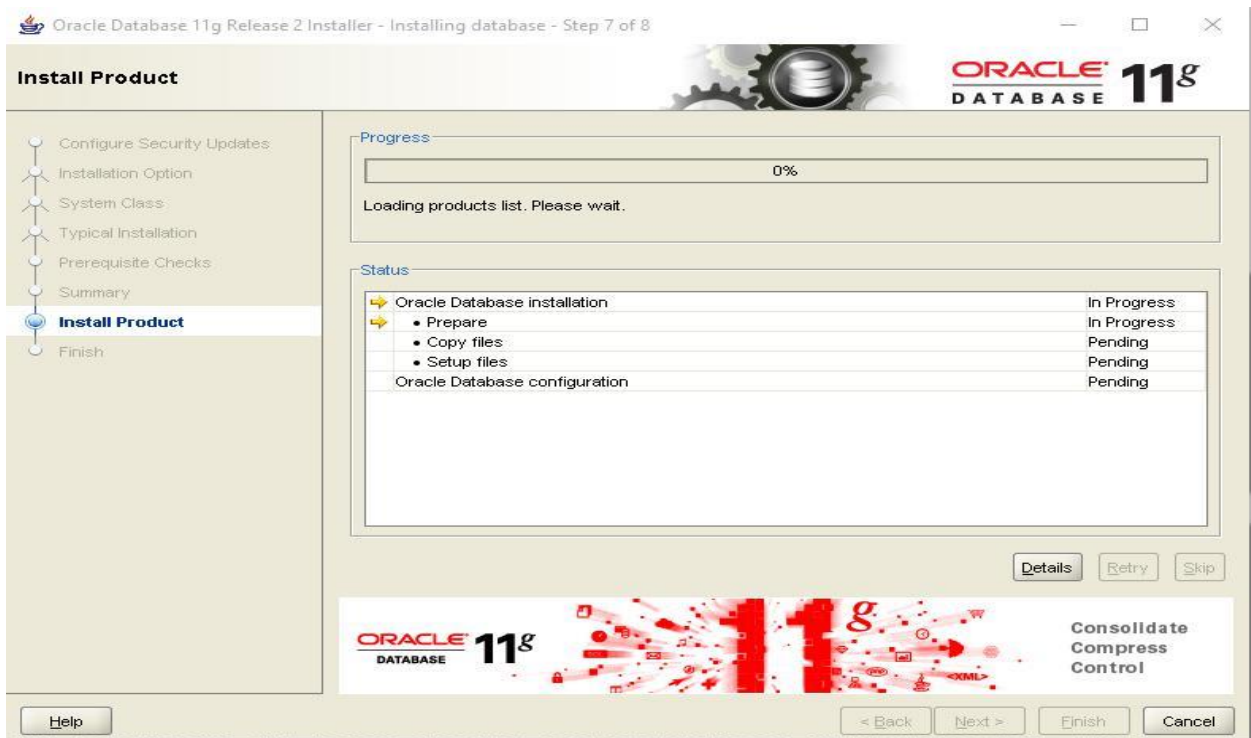


Figure 7: Install Products

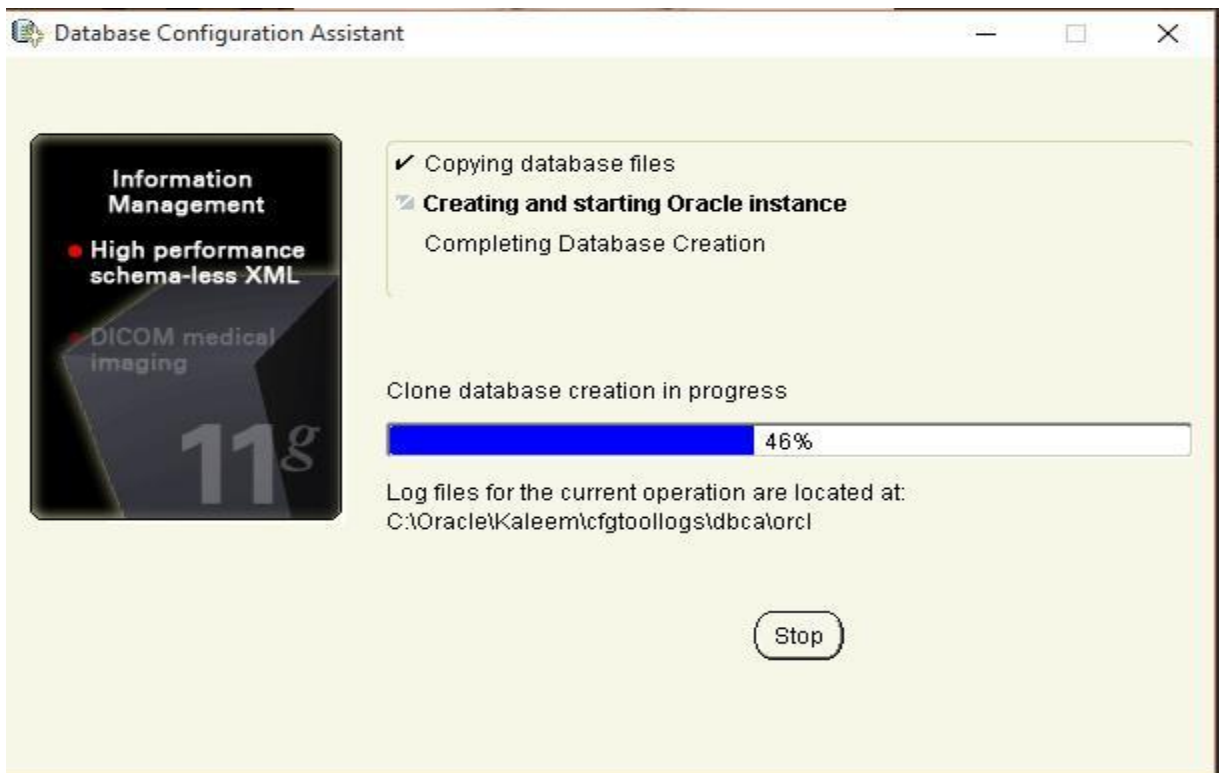


Figure 8: Database Configuration Assistant

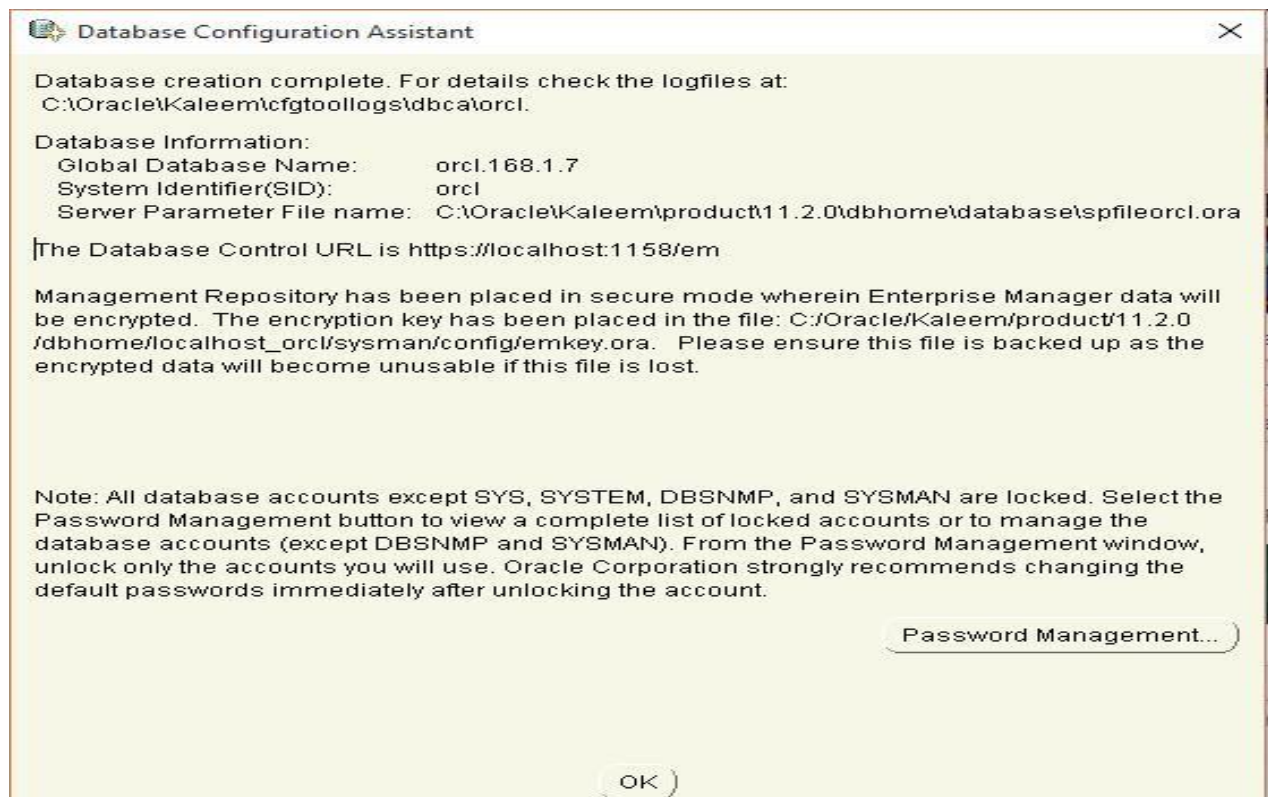


Figure 9: Database Configuration Assistant



Figure 10: Password Management

SQL:

SQL (Structured Query Language) is a database computer language designed for the retrieval and management of data in relational database management systems (RDBMS), database schema creation and modification, and database object access control management. SQL is a standard supported by all the popular relational database management systems in the market place. The basis data structure in RDBMS is a table. SQL provides you the features to define tables, define constraints on tables, query for data in table, and change the data in table by adding, modifying, and removing data. SQL also supports grouping of data in multiple rows, combining tables and other features. All these put together, SQL is a high-level query language standard to access and alter data in RDBMS.

Querying can be used to: To retrieve existing data from database.

Get all data from the table

Get selected columns from the table.

Get selected rows from the table.

Get selected columns of selected rows from the table.

Get computed columns using char, number, data functions, general functions, and aggregating functions.

Get data in multiple rows grouped on an aggregating function applied on one or more columns.

Select specific aggregating data on multiple rows using having clause. Apply set operations like

Union and Intersection on data sets of the same cardinality and type.

Get data from multiple tables using Cartesian product, equality join, un-equal join, and outer join.

Create views on physical data.

Various Data Types:

1. Character Data types:

Char – fixed length character string that can varies between 1-2000 bytes

VarChar / Varchar2 – variable length character string, size ranges from 1-4000 bytes.it saves the disk space(only length of the entered value will be assigned as the size of column)

Long - variable length character string, maximum size is 2 GB

2. Number Data types:

Can store +ve,-ve,zero,fixed point,floating point with 38 precision.

Number – {p=38,s=0}

Number(p) - fixed point

Number(p,s) –floating point (p=1 to 38,s= -84 to 127)

| Input Data | Specified As | Stored As |
|--------------|--------------|------------|
| 7,456,123.89 | NUMBER | 7456123.89 |
| 7,456,123.89 | NUMBER(*,1) | 7456123.9 |
| 7,456,123.89 | NUMBER(9) | 7456124 |
| 7,456,123.89 | NUMBER(9,2) | 7456123.89 |
| 7,456,123.89 | NUMBER(9,1) | 7456123.9 |

3.Date Data type: used to store date and time in the table.

DB uses its own format of storing in fixed length of 7 bytes for century, date, month, year, hour, minutes, seconds.

Default data type is “dd-mon-yy”

And many more.

Data Definition Language (DDL) commands in RDBMS.

It is used to communicate with database. DDL is used to:

Create an object

Alter the structure of an object

To drop the object created.

The commands used are:

Create

Alter

Drop

Truncate

CREATE TABLE

It is used to create a table

Syntax:

Create table tablename (column_name1 data_type constraints, column_name2 data_type constraints ...)

1. CREATE TABLE Emp (EmpNo number(5), EName VarChar(15), Job Char(10) CONSTRAINT Unik1 UNIQUE, DeptNo number(3) CONSTRAINT FKKey2 REFERENCES DEPT(DeptNo));
2. Create table prog20 (pname varchar2(20) not null, doj date not null, dob date not null, sex varchar(1) not null, prof1 varchar(20), prof2 varchar(20), salary number(7,2) not null);

Rules:

1. Oracle reserved words cannot be used.
3. Underscore, numerals, letters are allowed but not blank space.
3. Maximum length for the table name is 30 characters.
4. 2 different tables should not have same name.
5. We should specify a unique column name.
6. We should specify proper data type along with width.
7. We can include “not null” condition when needed. By default it is ‘null’.

ALTER TABLE

Alter command is used to:

1. Add a new column.
2. Modify the existing column definition.
3. To include or drop integrity constraint.

Syntax: alter table tablename add/modify (attribute data type (size));

Example:

1. *Alter table emp add (phone_no char (20));*
2. *Alter table emp modify(phone_no number (10));*
3. *ALTER TABLE EMP ADD CONSTRAINT Pkey1 PRIMARY KEY (EmpNo);*
4. *ALTER TABLE EMP ADD CONSTRAINT Pkey1;*

DROP TABLE

It will delete the table structure provided the table should be empty.

Example: *drop table prog20;* Here prog20 is table name

TRUNCATE TABLE

If there is no further use of records stored in a table and the structure has to be retained then the records alone can be deleted.

Syntax: TRUNCATE TABLE <TABLE NAME>;

Example: Truncate table customer;

DESC

This is used to view the structure of the table.

Example: *desc emp;*

INTEGRITY CONSTRAINT

An integrity constraint is a mechanism used by oracle to prevent invalid data entry into the table. It has enforcing the rules for the columns in a table. The types of the integrity constraints are:

- a) Domain Integrity
- b) Entity Integrity
- c) Referential Integrity

- a) **Domain Integrity** this constraint sets a range and any violations that takes place will prevent the user from performing the manipulation that caused the breach. It includes:

Not Null constraint:

While creating tables, by default the rows can have null value. the enforcement of not null constraint in a table ensure that the table contains values.

Principle of null values:

Setting null value is appropriate when the actual value is unknown, or when a value would not be meaningful.

A null value is not equivalent to a value of zero.

A null value will always evaluate to null in any expression.

When a column name is defined as not null, that column becomes a mandatory i.e., the user has to enter data into it.

Not null Integrity constraint cannot be defined using the alter table command when the table contain rows.

Example:

Create table cust(custid number(6) not null, name char(10));
Alter table cust modify (name not null);

This command will ensure that the user enters a value for the custid,name columns on the cust table, failing which it returns an error message.

Check Constraint:

Check constraint can be defined to allow only a particular range of values when the manipulation violates this constraint, the record will be rejected. Check condition cannot contain sub queries.

Example:

Create table student (regno number (6), mark number (3) constraint b check (mark >=0 and mark <=100));
Alter table student add constraint b2 check (length (regno)<=4));

b) Entity Integrity

Maintains uniqueness in a record. An entity represents a table and each row of a table represents an instance of that entity. To identify each row in a table uniquely we need to use this constraint.

There are 2 entity constraints:

a) Unique key constraint

It is used to ensure that information in the column for each record is unique, as with telephone or driver's license numbers. It prevents the duplication of value with rows of a specified column in a set of column. A column defined with the constraint can allow null value.

If unique key constraint is defined in more than one column i.e., combination of column can be specified. Maximum combination of columns that a composite unique key can contain is 16.

Example:

Create table cust(custid number(6) constraint uni unique, name char(10));
Alter table cust add(constraint c unique(custid));

PRIMARY KEY CONSTRAINT

A primary key avoids duplication of rows and does not allow null values. Can be defined on one or more columns in a table and is used to uniquely identify each row in a table. These values should never be changed and should never be null. A table should have only one primary key. If a primary key constraint is assigned to more than one column or combination of column is said to be composite primary key, which can contain 16 columns.

Example:

Create table stud(regno number(6) constraint primary key, name char(20));

Note: Can't be defined using alter command when there is records in the table having null values.

c) Referential Integrity

It enforces relationship between tables. To establish parent-child relationship between 2 tables having a common column definition, we make use of this constraint. To implement this, we should define the column in the parent table as primary key and same column in the child table as foreign key referring to the corresponding parent entry.

Foreign key

A column or combination of column included in the definition of referential integrity, which would refer to a referenced key.

Referenced key

It is a unique or primary key upon which is defined on a column belonging to the parent table.