Practical #1

Objective: ***Create tables and specify the Questionnaires in SQL.***

Theory & Concepts:

Introduction about SQL-

SQL (Structured Query Language) is a nonprocedural language, you specify what you want, not how to get it. A block structured format of English key words is used in this Query language. It has the following components.

DDL (Data Definition Language)-

The SQL DDL provides command for defining relation schemas, deleting relations and modifying relation schema.

DML (DATA Manipulation Language)-

It includes commands to insert tuples into, delete tuples from and modify tuples in the database.

View definition-

The SQL DDL includes commands for defining views.

Transaction Control- SQL includes for specifying the beginning and ending of transactions.

Embedded SQL and Dynamic SQL-

Embedded and Dynamic SQL define how SQL statements can be embedded with in general purpose programming languages, such as C, C++, JAVA, COBOL, Pascal and Fortran.

Integrity-

The SQL DDL includes commands for specifying integrity constraints that the datastored in the database must specify. Updates that violate integrity constraints are allowed.

Authorization-

The SQL DDL includes commands for specifying access rights to relations and views.

Data Definition Language-

The SQL DDL allows specification of not only a set of relations but also informationabout each relation, including-

- Schema for each relation
- The domain of values associated with each attribute.
- The integrity constraints.
- The set of indices to be maintained for each relation.
- The security and authorization information for each relation.

- The physical storage structure of each relation on disk.

Domain types in SQL-

The SQL standard supports a variety of built in domain types, including-

- Char (n) - A fixed length character length string with user specified length.
- Varchar (n) - A variable character length string with user specified maximumlength n.
- Int- An integer.
- Small integer- A small integer.
- Numeric (p, d)-A Fixed point number with user defined precision.
- Real, double precision- Floating point and double precision floating point numbers with machine dependent precision.
- Float (n) - A floating point number, with precision of at least n digits.
- Date- A calendar date containing a (four digit) year, month and day of the month.
- Time- The time of day, in hours, minutes and seconds Eg. Time '09:30:00'.
- Number- Number is used to store numbers (fixed or floating point).

DDL statement for creating a table-

Syntax-

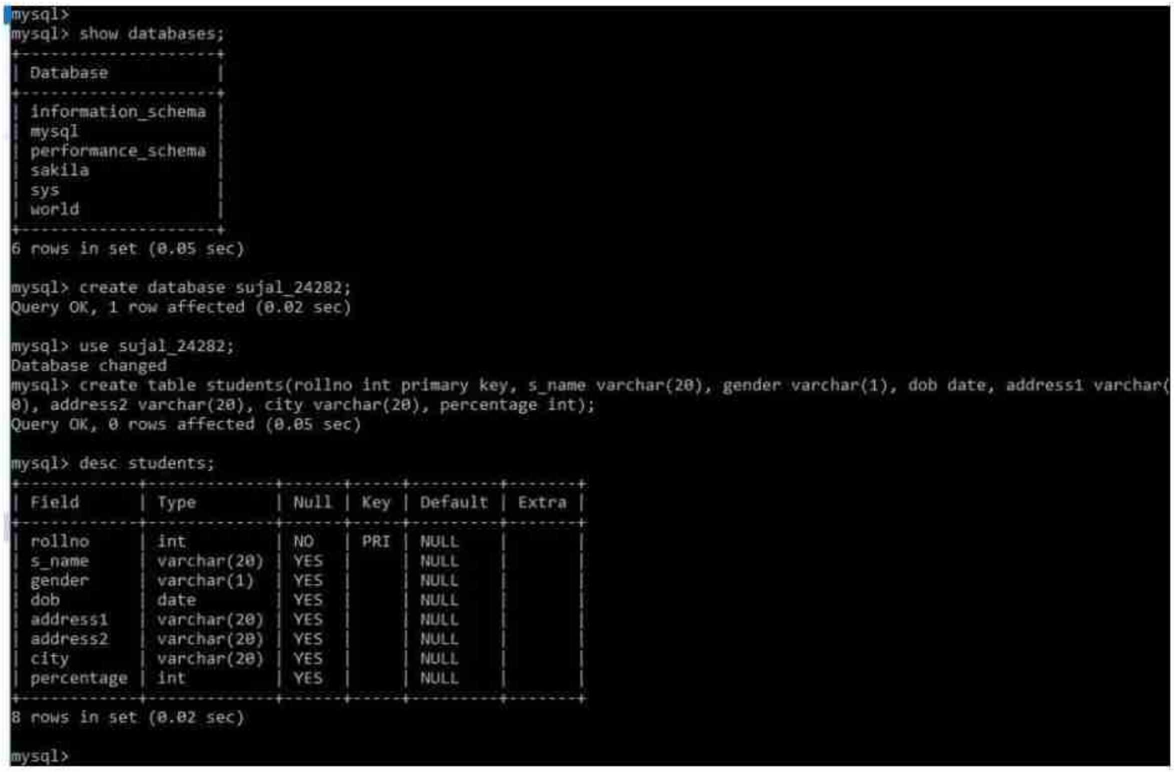
```
 Create table tablename
(columnname datatype(size), columnname datatype(size));
```

Creating a table from a table-

Syntax-

```
 CREATE TABLE TABLENAME
[(columnname, columnname, ………)]
AS SELECT columnname, columnname......... FROM tablename;
```

OUTPUT:-



```
mysql>
mysql> show databases;
+--------------------+
| Database           |
+--------------------+
| information_schema |
| mysql              |
| performance_schema |
| sakila             |
| sys                |
| world              |
+--------------------+
6 rows in set (0.05 sec)

mysql> create database sujal_24282;
Query OK, 1 row affected (0.02 sec)

mysql> use sujal_24282;
Database changed
mysql> create table students(rollno int primary key, s_name varchar(20), gender varchar(1), dob date, address1 varchar(
0), address2 varchar(20), city varchar(20), percentage int);
Query OK, 0 rows affected (0.05 sec)

mysql> desc students;
+------------+-------------+------+-----+---------+-------+
| Field      | Type        | Null | Key | Default | Extra |
+------------+-------------+------+-----+---------+-------+
| rollno     | int         | NO   | PRI | NULL    |       |
| s_name     | varchar(20) | YES  |     | NULL    |       |
| gender     | varchar(1)  | YES  |     | NULL    |       |
| dob        | date        | YES  |     | NULL    |       |
| address1   | varchar(20) | YES  |     | NULL    |       |
| address2   | varchar(20) | YES  |     | NULL    |       |
| city       | varchar(20) | YES  |     | NULL    |       |
| percentage | int         | YES  |     | NULL    |       |
+------------+-------------+------+-----+---------+-------+
8 rows in set (0.02 sec)

mysql>
```

Practical #2

Performing insertion, deletion, modification, altering and updating operations on the records based on conditions.

Insertion of data into tables-

Syntax-

```
 INSERT INTO tablename
[(columnname, columnname,
………)]Values(expression,
expression);
```

Inserting data into a table from another table:

Syntax-

```
INSERT INTO tablename
SELECT columnname, columnname,
…….FROM tablename;
```

Insertion of selected data into a table from another table:

Syntax-

```
 INSERT INTO tablename
SELECT columnname, columnname……..
FROM tablename
WHERE columnname= expression;
```

Retrieving of data from the tables-

Syntax-

```
 SELECT * FROM tablename;
```

The retrieving of specific columns from a table-

Syntax-

```
 SELECT columnname, columnname,
….FROM tablename;
```

Elimination of duplicates from the select statement-

Syntax-

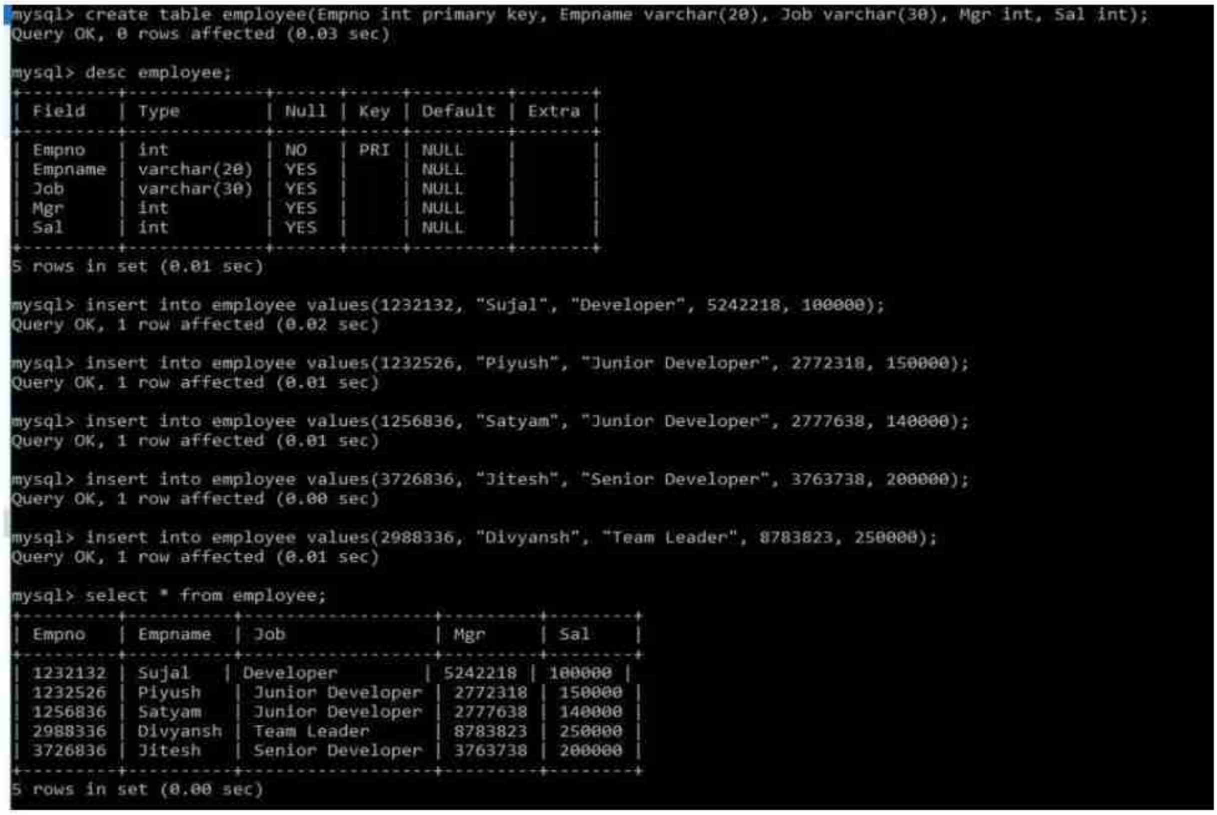
```
SELECT DISTINCT columnname,
columnnameFROM tablename;
```

Selecting a data set from table data-

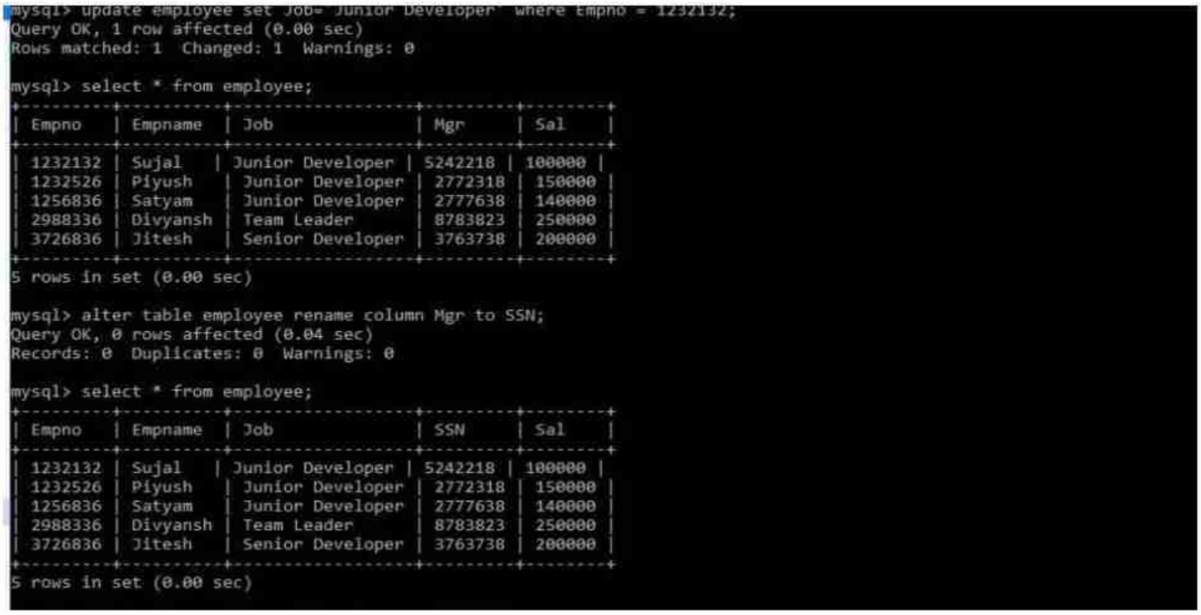
Syntax-

SELECT columnname,
columnnameFROM tablename
WHERE searchcondition;

OUTPUT:-



```
mysql> create table employee(Empno int primary key, Empname varchar(20), Job varchar(30), Mgr int, Sal int);
Query OK, 0 rows affected (0.03 sec)

mysql> desc employee;
+---------+-------------+------+-----+---------+-------+
| Field   | Type        | Null | Key | Default | Extra |
+---------+-------------+------+-----+---------+-------+
| Empno   | int         | NO   | PRI | NULL    |       |
| Empname | varchar(20) | YES  |     | NULL    |       |
| Job     | varchar(30) | YES  |     | NULL    |       |
| Mgr     | int         | YES  |     | NULL    |       |
| Sal     | int         | YES  |     | NULL    |       |
+---------+-------------+------+-----+---------+-------+
5 rows in set (0.01 sec)

mysql> insert into employee values(1232132, "Sujal", "Developer", 5242218, 100000);
Query OK, 1 row affected (0.02 sec)

mysql> insert into employee values(1232526, "Piyush", "Junior Developer", 2772318, 150000);
Query OK, 1 row affected (0.01 sec)

mysql> insert into employee values(1256836, "Satyam", "Junior Developer", 2777638, 140000);
Query OK, 1 row affected (0.01 sec)

mysql> insert into employee values(3726836, “Jitesh", “Senior Developer", 3763738, 200000);
Query OK, 1 row affected (0.00 sec)

mysql> insert into employee values(2988336, "Divyansh", "Team Leader", 8783823, 250000);
Query OK, 1 row affected (0.01 sec)

mysql> select * from employee;
+---------+----------+------------------+---------+--------+
| Empno   | Empname  | Job              | Mgr     | Sal    |
+---------+----------+------------------+---------+--------+
| 1232132 | Sujal    | Developer        | 5242218 | 100000 |
| 1232526 | Piyush   | Junior Developer | 2772318 | 150000 |
| 1256836 | Satyam   | Junior Developer | 2777638 | 140000 |
| 2988336 | Divyansh | Team Leader      | 8783823 | 250000 |
| 3726836 | Jitesh   | Senior Developer | 3763738 | 200000 |
+---------+----------+------------------+---------+--------+
5 rows in set (0.00 sec)
```



```
mysql> update employee set Job= 'Junior Developer' where Empno = 1232132;
Query OK, 1 row affected (0.00 sec)
Rows matched: 1  Changed: 1  Warnings: 0

mysql> select * from employee;
+---------+----------+------------------+---------+--------+
| Empno   | Empname  | Job              | Mgr     | Sal    |
+---------+----------+------------------+---------+--------+
| 1232132 | Sujal   | Junior Developer | 5242218 | 100000 |
| 1232526 | Piyush   | Junior Developer | 2772318 | 150000 |
| 1256836 | Satyam   | Junior Developer | 2777638 | 140000 |
| 2988336 | Divyansh | Team Leader      | 8783823 | 250000 |
| 3726836 | Jitesh   | Senior Developer | 3763738 | 200000 |
+---------+----------+------------------+---------+--------+
5 rows in set (0.00 sec)

mysql> alter table employee rename column Mgr to SSN;
Query OK, 0 rows affected (0.04 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> select * from employee;
+---------+----------+------------------+---------+--------+
| Empno   | Empname  | Job              | SSN     | Sal    |
+---------+----------+------------------+---------+--------+
| 1232132 | Sujal   | Junior Developer | 5242218 | 100000 |
| 1232526 | Piyush   | Junior Developer | 2772318 | 150000 |
| 1256836 | Satyam   | Junior Developer | 2777638 | 140000 |
| 2988336 | Divyansh | Team Leader      | 8783823 | 250000 |
| 3726836 | Jitesh   | Senior Developer | 3763738 | 200000 |
+---------+----------+------------------+---------+--------+
5 rows in set (0.00 sec)
```

Q1. Create the following tables:

i) **client_master**

columnname	datatype	size
client_no	varchar2	6
name	varchar2	20
address1	varchar2	30
address2	varchar2	30
city	varchar2	15
state	varchar2	15
pincode	number	6
bal_due	number	10,2

ii) Product_master

Columnname	datatype	size
Product_no	varchar2	
Description	varchar2	
Profit_percent	number	
Unit_measure	varchar2	
Qty_on_hand	number	
Reoder_lvlnumber		
Sell_price	number	
Cost_price	number	

Q2- Insert the following data into their respective tables:

Client No	Name	City	Pincode	State	Balance Due
0001	Ivan	Bombay	400054	Maharashtra	15000
0002	Vandana	Madras	780001	Tamilnadu	0
0003	Pramada	Bombay	400057	Maharashtra	5000
0004	Basu	Bombay	400056	Maharashtra	0
0005	Ravi	Delhi	100001		2000
0006	Rukmini	Bombay	400050	Maharashtra	0

Data for Product Master:

Product No.	Description	Profit %	Unit Measure	Qty_on_ hand	Reorder _lvl	Selling Price	Cost Price
P00001	1.44floppies	5	piece	100	20	525	500
P03453	Monitors	6	piece	10	3	12000	11200
P06734	Mouse	5	piece	20	5	1050	500
P07865	1.22 floppies	5	piece	100	20	525	500
P07868	Keyboards	2	piece	10	3	3150	3050
P07885	CD Drive	2.5	piece	10	3	5250	5100
P07965	540 HDD	4	piece	10	3	8400	8000
P07975	1.44 Drive	5	piece	10	3	1050	1000
P08865	1.22 Drive	5	piece	2	3	1050	1000

Q3:- On the basis of above two tables answer the following Questionries:

i) Find out the names of all the clients.

ii) Retrieve the list of names and cities of all the clients.

iii) List the various products available from the product_master table.

iv) List all the clients who are located in Bombay.

v) Display the information for client no 0001 and 0002.

vi) Find the products with description as '1.44 drive' and '1.22 Drive'.

vii) Find all the products whose sell price is greater then 5000.

viii) Find the list of all clients who stay in in city 'Bombay' or city 'Delhi' or'Madras'.

ix) Find the product whose selling price is greater than 2000 and less than orequal to 5000.

x) List the name, city and state of clients not in the state of 'Maharashtra'.

Practical #3

Objective:- To Manipulate the Operations on the table.

DML (Data Manipulation Language) Data manipulation is

- The retrieval of information stored in the database.
- The insertion of new information into the database.
- The deletion of information from the database.
- The modification of information stored by the appropriate data model. There arebasically two types.

(i) **Procedural DML**:- require a user to specify what data are needed and howto get those data.

(ii) **Non Procedural DML** : require a user to specify what data are neededwithout specifying how to get those data.

Updating the content of a table:

In creation situation we may wish to change a value in table without changing all valuesin the tuple . For this purpose the update statement can be used.

Update table name
Set columnname = expression, columnname
=expression……Where columnname = expression;

Deletion Operation:-

A delete query is expressed in much the same way as Query. We can delete whole tuple (rows) we can delete values on only particulars attributes.

Deletion of all rows

Syntax:

Delete from tablename :

Deletion of specified number of rows

Syntax:

Delete from table
name Where search
condition ;

Computation in expression lists used to select data

+	Addition	- Subtraction
*	multiplication	** exponentiation
/ Division		() Enclosed operation

Renaming columns used with Expression Lists: - The default output column names canbe renamed by the user if required

Syntax:

Select column name
resul
t_columnname,
Columnname
resul
t_columnname,
From table name;

Logical Operators:

The logical operators that can be used in SQL sentenced are

AND	all of must be included
OR	any of may be included
NOT	none of could be included

Range Searching: Between operation is used for range searching.

Pattern Searching:

The most commonly used operation on string is pattern matching using the operation'like' we describe patterns by using two special characters.

- Percent (%) ; the % character matches any substring we consider the followingexamples.
- 'Perry %' matches any string beginning with perry
- '% idge % matches any string containing' idge as substring.
- ' - - - ' matches any string exactly three characters.
- ' - - - % matches any string of at least of three characters.

Oracle functions:

Functions are used to manipulate data items and return result. function follow the format of function _name (argument1, argument2 ..) .An arrangement is user defined variable or constant. The structure of function is such that it accepts zero or more arguments.

Examples:

Avg return average value of n

Syntax:

Avg ([distinct/all]n)

Min return minimum value of expr.

Syntax:

MIN((distinct/all)expr)

Count Returns the no of rows where expr is not null

Syntax:

Count ([distinct/all)expr]
Count (*)   Returns the no rows in the table, including duplicates and
those with nulls.Max   Return max value of expr

Syntax:

Max ([distinct/all]expr)
Sum   Returns sum of values of n

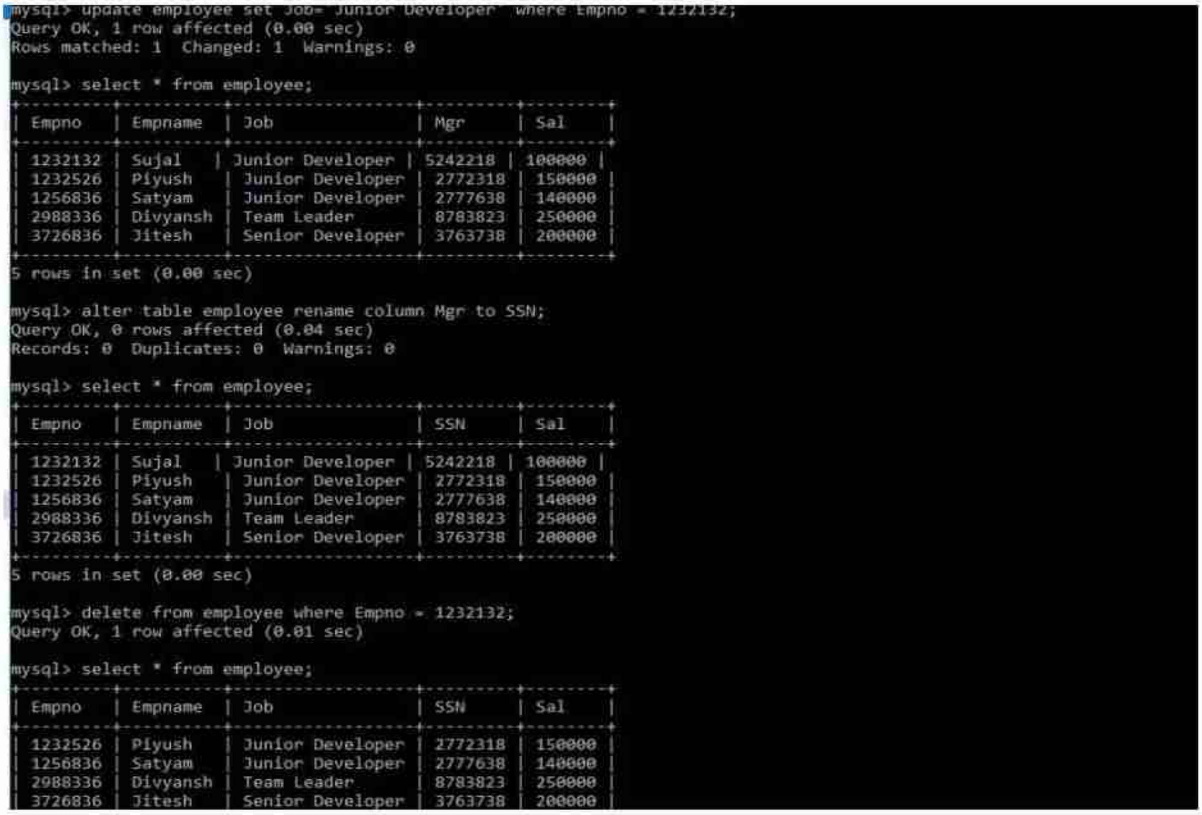
Syntax:
Sum ([distinct/all]n)

Sorting of data in table

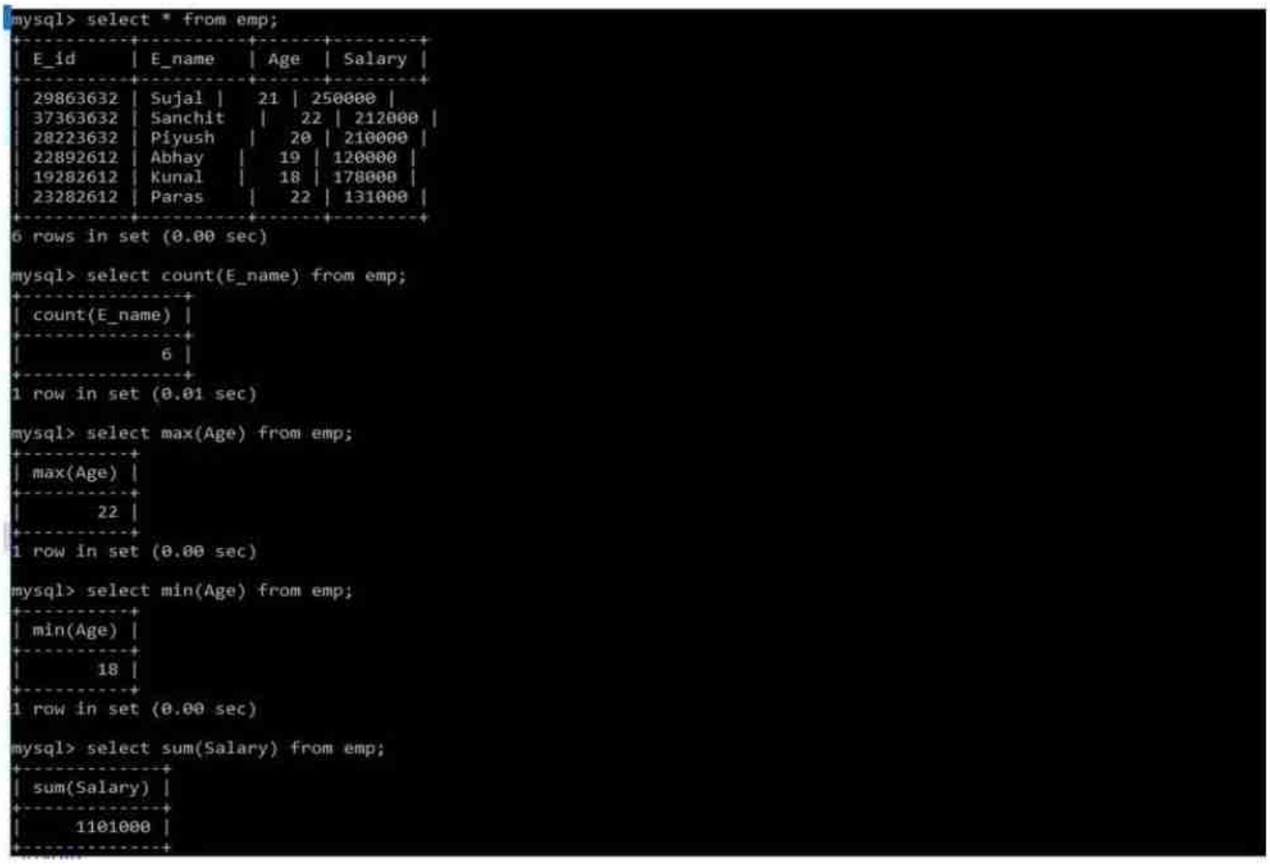
Syntax:

Select
columnname,
columnnameFrom
table
Order by columnname;

OUTPUT:-



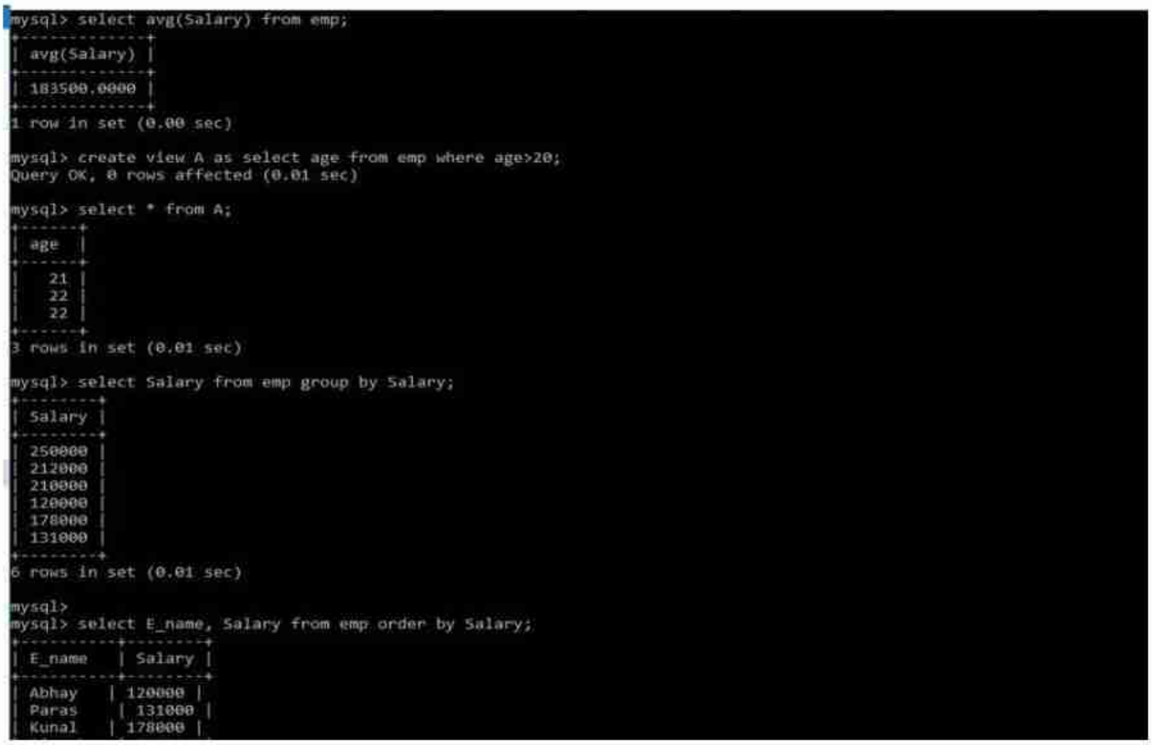
```
mysql> update employee set Job='Junior Developer' where Empno = 1232132;
Query OK, 1 row affected (0.00 sec)
Rows matched: 1  Changed: 1  Warnings: 0

mysql> select * from employee;
+---------+----------+-------------------+---------+--------+
| Empno   | Empname  | Job               | Mgr     | Sal    |
+---------+----------+-------------------+---------+--------+
| 1232132 | Sujal    | Junior Developer | 5242218 | 100000 |
| 1232526 | Piyush   | Junior Developer  | 2772318 | 150000 |
| 1256836 | Satyam   | Junior Developer  | 2777638 | 140000 |
| 2988336 | Divyansh | Team Leader       | 8783823 | 250000 |
| 3726836 | Jitesh   | Senior Developer  | 3763738 | 200000 |
+---------+----------+-------------------+---------+--------+
5 rows in set (0.00 sec)

mysql> alter table employee rename column Mgr to SSN;
Query OK, 0 rows affected (0.04 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> select * from employee;
+---------+----------+-------------------+---------+--------+
| Empno   | Empname  | Job               | SSN     | Sal    |
+---------+----------+-------------------+---------+--------+
| 1232132 | Sujal    | Junior Developer | 5242218 | 100000 |
| 1232526 | Piyush   | Junior Developer  | 2772318 | 150000 |
| 1256836 | Satyam   | Junior Developer  | 2777638 | 140000 |
| 2988336 | Divyansh | Team Leader       | 8783823 | 250000 |
| 3726836 | Jitesh   | Senior Developer  | 3763738 | 200000 |
+---------+----------+-------------------+---------+--------+
5 rows in set (0.00 sec)

mysql> delete from employee where Empno = 1232132;
Query OK, 1 row affected (0.01 sec)

mysql> select * from employee;
+---------+----------+-------------------+---------+--------+
| Empno   | Empname  | Job               | SSN     | Sal    |
+---------+----------+-------------------+---------+--------+
| 1232526 | Piyush   | Junior Developer  | 2772318 | 150000 |
| 1256836 | Satyam   | Junior Developer  | 2777638 | 140000 |
| 2988336 | Divyansh | Team Leader       | 8783823 | 250000 |
| 3726836 | Jitesh   | Senior Developer  | 3763738 | 200000 |
```



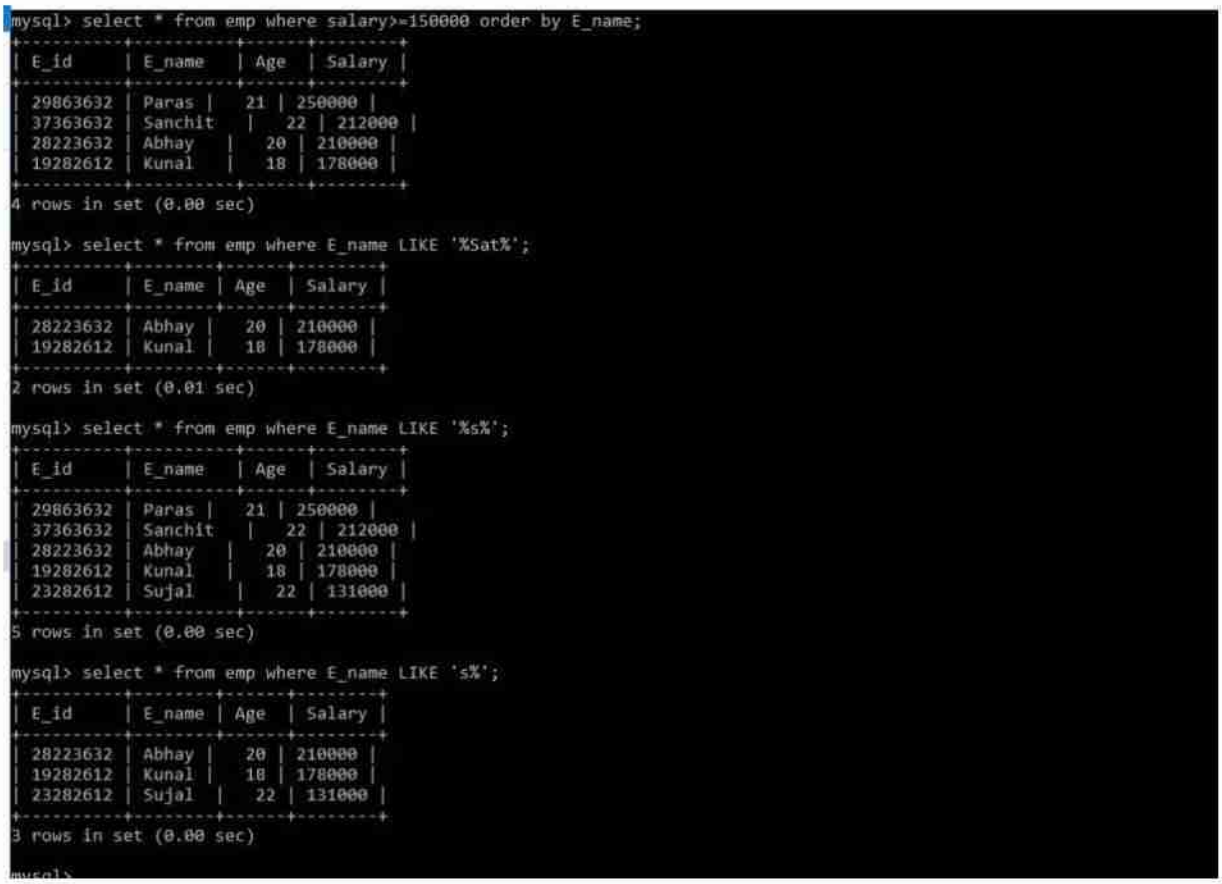
```
mysql> select * from emp;
+----------+----------+------+--------+
| E_id     | E_name   | Age  | Salary |
+----------+----------+------+--------+
| 29863632 | Sujal |   21 | 250000 |
| 37363632 | Sanchit   |   22 | 212000 |
| 28223632 | Piyush   |   20 | 210000 |
| 22892612 | Abhay    |   19 | 120000 |
| 19282612 | Kunal    |   18 | 178000 |
| 23282612 | Paras    |   22 | 131000 |
+----------+----------+------+--------+
6 rows in set (0.00 sec)

mysql> select count(E_name) from emp;
+---------------+
| count(E_name) |
+---------------+
|             6 |
+---------------+
1 row in set (0.01 sec)

mysql> select max(Age) from emp;
+----------+
| max(Age) |
+----------+
|       22 |
+----------+
1 row in set (0.00 sec)

mysql> select min(Age) from emp;
+----------+
| min(Age) |
+----------+
|       18 |
+----------+
1 row in set (0.00 sec)

mysql> select sum(Salary) from emp;
+-------------+
| sum(Salary) |
+-------------+
|     1101000 |
+-------------+
```

Question.1 Using the table client master and product master answer the followingQuestionnaires.

i. Change the selling price of '1.44 floppy drive to Rs.1150.00
ii. Delete the record with client 0001 from the client master table.
iii. Change the city of client_no'0005' to Bombay.
iv. Change the bal_due of client_no '0001, to 1000.
v. Find the products whose selling price is more than 1500 and also find the newselling price as original selling price *15.
vi. Find out the clients who stay in a city whose second letter is a.
vii. Find out the name of all clients having 'a' as the second letter in their names.
viii. List the products in sorted order of their description.
ix. Count the total number of orders
x. Calculate the average price of all the products.
xi. Calculate the minimum price of products.
xii. Determine the maximum and minimum prices . Rename the tittle as 'max_price'and min_price respectively.
xiii. Count the number of products having price greater than or equal to 1500.



```
mysql> select avg(Salary) from emp;
+-------------+
| avg(Salary) |
+-------------+
| 183500.0000 |
+-------------+
1 row in set (0.00 sec)

mysql> create view A as select age from emp where age>20;
Query OK, 0 rows affected (0.01 sec)

mysql> select * from A;
+------+
| age  |
+------+
|   21 |
|   22 |
|   22 |
+------+
3 rows in set (0.01 sec)

mysql> select Salary from emp group by Salary;
+--------+
| Salary |
+--------+
| 250000 |
| 212000 |
| 210000 |
| 120000 |
| 178000 |
| 131000 |
+--------+
6 rows in set (0.01 sec)

mysql>
mysql> select E_name, Salary from emp order by Salary;
+----------+--------+
| E_name   | Salary |
+----------+--------+
| Abhay    | 120000 |
| Paras     | 131000 |
| Kunal    | 178000 |
```



```
mysql> select * from emp where salary>=150000 order by E_name;
+----------+----------+------+--------+
| E_id     | E_name   | Age  | Salary |
+----------+----------+------+--------+
| 29863632 | Paras |   21 | 250000 |
| 37363632 | Sanchit   |   22 | 212000 |
| 28223632 | Abhay    |   20 | 210000 |
| 19282612 | Kunal    |   18 | 178000 |
+----------+----------+------+--------+
4 rows in set (0.00 sec)

mysql> select * from emp where E_name LIKE '%Sat%';
+----------+--------+------+--------+
| E_id     | E_name | Age  | Salary |
+----------+--------+------+--------+
| 28223632 | Abhay |   20 | 210000 |
| 19282612 | Kunal |   18 | 178000 |
+----------+--------+------+--------+
2 rows in set (0.01 sec)

mysql> select * from emp where E_name LIKE '%s%';
+----------+----------+------+--------+
| E_id     | E_name   | Age  | Salary |
+----------+----------+------+--------+
| 29863632 | Paras |   21 | 250000 |
| 37363632 | Sanchit   |   22 | 212000 |
| 28223632 | Abhay    |   20 | 210000 |
| 19282612 | Kunal    |   18 | 178000 |
| 23282612 | Sujal     |   22 | 131000 |
+----------+----------+------+--------+
5 rows in set (0.00 sec)

mysql> select * from emp where E_name LIKE 's%';
+----------+--------+------+--------+
| E_id     | E_name | Age  | Salary |
+----------+--------+------+--------+
| 28223632 | Abhay |   20 | 210000 |
| 19282612 | Kunal |   18 | 178000 |
| 23282612 | Sujal  |   22 | 131000 |
+----------+--------+------+--------+
3 rows in set (0.00 sec)

mysql>
```

Practical .4

Objective:- To Implement the structure of the table

Modifying the Structure of Tables- Alter table command is used to changing the structure of a table. Using the alter table clause you cannot perform the following tasks:

(i) change the name of table
(ii) add a column
(iii) drop a column
(iv) decrease the size of a table if table data exists.

The following tasks you can perform through alter table command.

(i) **Adding new columns**:

Syntax

ALTER TABLE tablename
ADD (newcolumnname newdatatype (size));

(ii) Modifying existing table

Syntax:
ALTER TABLE tablename
MODIFY (newcolumnname newdatatype (size));

***NOTE*:** Oracle not allow constraints defined using the alter table, if the data in the table,violates such constraints.

Removing/Deleting Tables- Following command is used for removing or deleting atable.

Syntax:
DROP TABLE tablename:

Defining Integrity constraints in the ALTER TABLE command-

You can also define integrity constraints using the constraint clause in the ALTER TABLE command. The following examples show the definitions of several integrityconstraints.

Add PRIMARY KEY-

(1) Syntax:
ALTER TABLE tablename
ADD PRIMARY KEY (columnname);

(2) **Add FOREIGN KEY**-

Syntax:

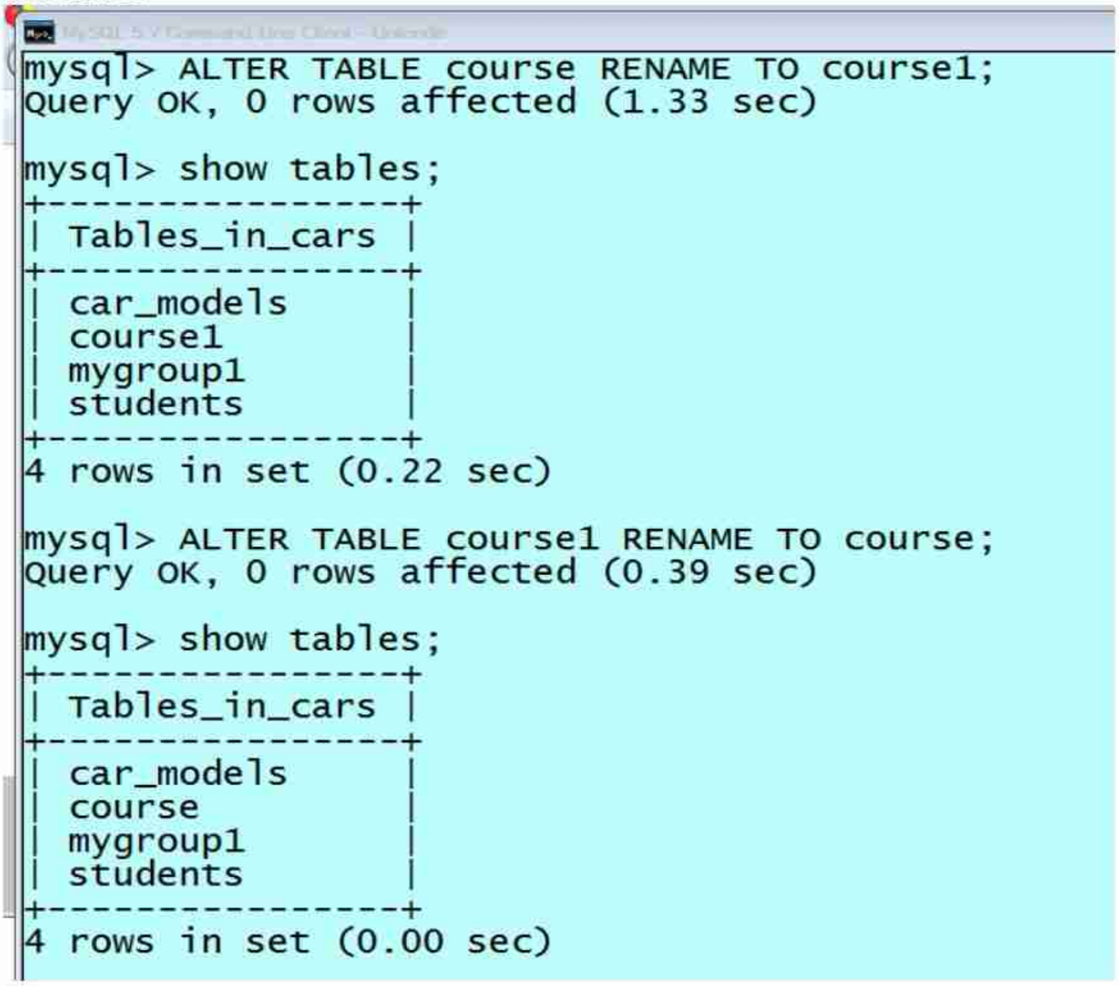
ALTER TABLE tablename
ADD CONSTRAINT constraintname
FOREIGN KEY(columnname) REFERENCES tablename;Dropping integrity constraints in the ALTER TABLE command:

You can drop an integrity constraint if the rule that if enforces is no longer true or if theconstraint is no longer needed. Drop the constraint using the ALTER TABLE commandwith the DROP clause. The following examples illustrate the dropping of integrity constraints.

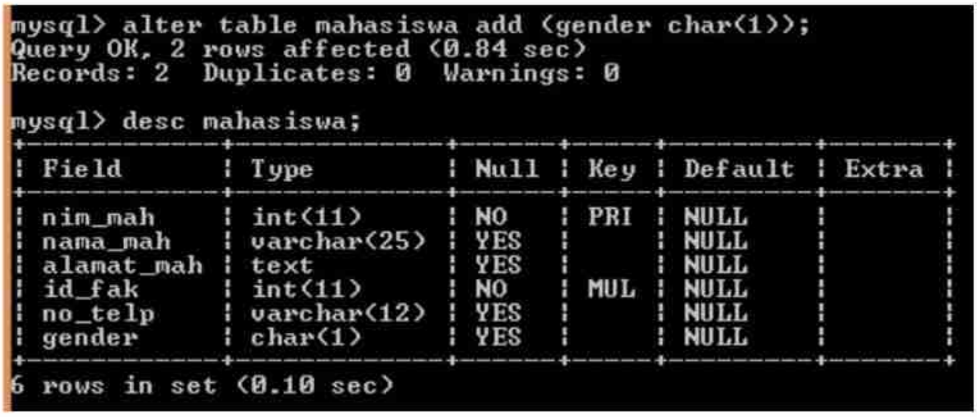
(1) **DROP the PRIMARY KEY**-Syntax:
ALTER TABLE tablenameDROP PRIMARY KEY

(2) **DROP FOREIGN KEY**-Syntax:
ALTER TABLE tablename
DROP CONSTRAINT constraintname;

OUTPUT:-



```
mysql> ALTER TABLE course RENAME TO course1;
Query OK, 0 rows affected (1.33 sec)

mysql> show tables;
+----------------+
| Tables_in_cars |
+----------------+
| car_models     |
| course1        |
| mygroup1       |
| students       |
+----------------+
4 rows in set (0.22 sec)

mysql> ALTER TABLE course1 RENAME TO course;
Query OK, 0 rows affected (0.39 sec)

mysql> show tables;
+----------------+
| Tables_in_cars |
+----------------+
| car_models     |
| course         |
| mygroup1       |
| students       |
+----------------+
4 rows in set (0.00 sec)
```



```
mysql> alter table mahasiswa add (gender char(1));
Query OK, 2 rows affected (0.84 sec)
Records: 2  Duplicates: 0  Warnings: 0

mysql> desc mahasiswa;
+-----------+-------------+------+-----+---------+-------+
| Field     | Type        | Null | Key | Default | Extra |
+-----------+-------------+------+-----+---------+-------+
| nim_mah   | int(11)     | NO   | PRI | NULL    |       |
| nama_mah  | varchar(25) | YES  |     | NULL    |       |
| alamat_mah| text        | YES  |     | NULL    |       |
| id_fak    | int(11)     | NO   | MUL | NULL    |       |
| no_telp   | varchar(12) | YES  |     | NULL    |       |
| gender    | char(1)     | YES  |     | NULL    |       |
+-----------+-------------+------+-----+---------+-------+
6 rows in set (0.10 sec)
```

Question 1. Create the following tables:

<u>Challan_Header</u>

Column name	**data type**	**size**	**Attributes**
Challan_no	varchar2	6	Primary key
s_order_no	varchar2	6	Foreign key references s_order_no of sales_order table
challan_date	date		not null
billed_yn	char	1	values ('Y','N'). Default 'N'

Table Name : Challan_Details

Column name	**data type**	**size**	**Attributes**
Challan_no	varchar2	6	Primary key/Foreign key references Product_no of product_master
Qty_disp	number	4,2	not null

Q2. Insert the following values into the challan header and challan_details tables:

(i)	Challan No	S_order No	Challan Date	Billed
	CH9001	019001	12-DEC-95	Y
	CH865	046865	12-NOV-95	Y
	CH3965	010008	12-OCT-95	Y

Data for challan_details table

Challan No	**Product No**	**Qty Disp**
CH9001	P00001	4
CH9001	P07965	1
CH9001	P07885	1
CH6865	P07868	3
CH6865	P03453	4
CH6865	P00001	10
CH3965	P00001	5
CH3965	P07975	2

Answer the following Questionries

Q1. Make the primary key to client_no in client_master.
Q2. Add a new column phone_no in the client_master table.
Q3. Add the not null constraint in the product_master table with the columns description,profit percent , sell price and cost price.
Q4. Change the size of client_no field in the client_master table.
Q5. Select product_no, description where profit percent is between 20 and 30 bothinclusive.

Practical #5

Objective:- To Implement the restrictions on the table.

Data constraints: Besides the cell name, cell length and cell data type there are other parameters i.e. other data constrains that can be passed to the DBA at check creationtime. The constraints can either be placed at column level or at the table level.

i. **Column Level Constraints:** If the constraints are defined along with the column definition, it is called a column level constraint.
ii. **Table Level Constraints:** If the data constraint attached to a specify cell in atable reference the contents of another cell in the table then the user will have to use table level constraints.

Null Value Concepts:- while creating tables if a row locks a data value for particular column that value is said to be null . Column of any data types may contain null values unless the column was defined as not null when the table was created

Syntax:

Create table tablename

(columnname data type (size) not null ……)

Primary Key: primary key is one or more columns is a table used to uniquely identity 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 composite primary key.

Syntax: primary key as a column constraint
Create table tablename
(columnname datatype (size) primary key,….)
Primary key as a table constraint
Create table tablename
(columnname datatype (size), columnname datatype(
size)…Primary key (columnname,columnname));

Default value concept: At the line of cell creation a default value can be assignedto it. When the user is loading a record with values and leaves this cell empty, the DBA will automatically load this cell with the default value specified. The data type of the default value should match the data type of the column

Syntax:
Create table tablename
(columnname datatype (size) default value,….);

Foreign Key Concept : Foreign key represents relationship between tables. A

foreign key is column whose values are derived from the primary key of the same of some other table . the existence of foreign key implies that the table with foreign key is related to the primary key table from which the foreign key is derived .A foreign key must have corresponding primary key value in the primarykey table to have meaning.
Foreign key as a column constraint

Syntax :
Create table table name
(columnname datatype (size) references another table name);

Foreign key as a table constraint:

Syntax :

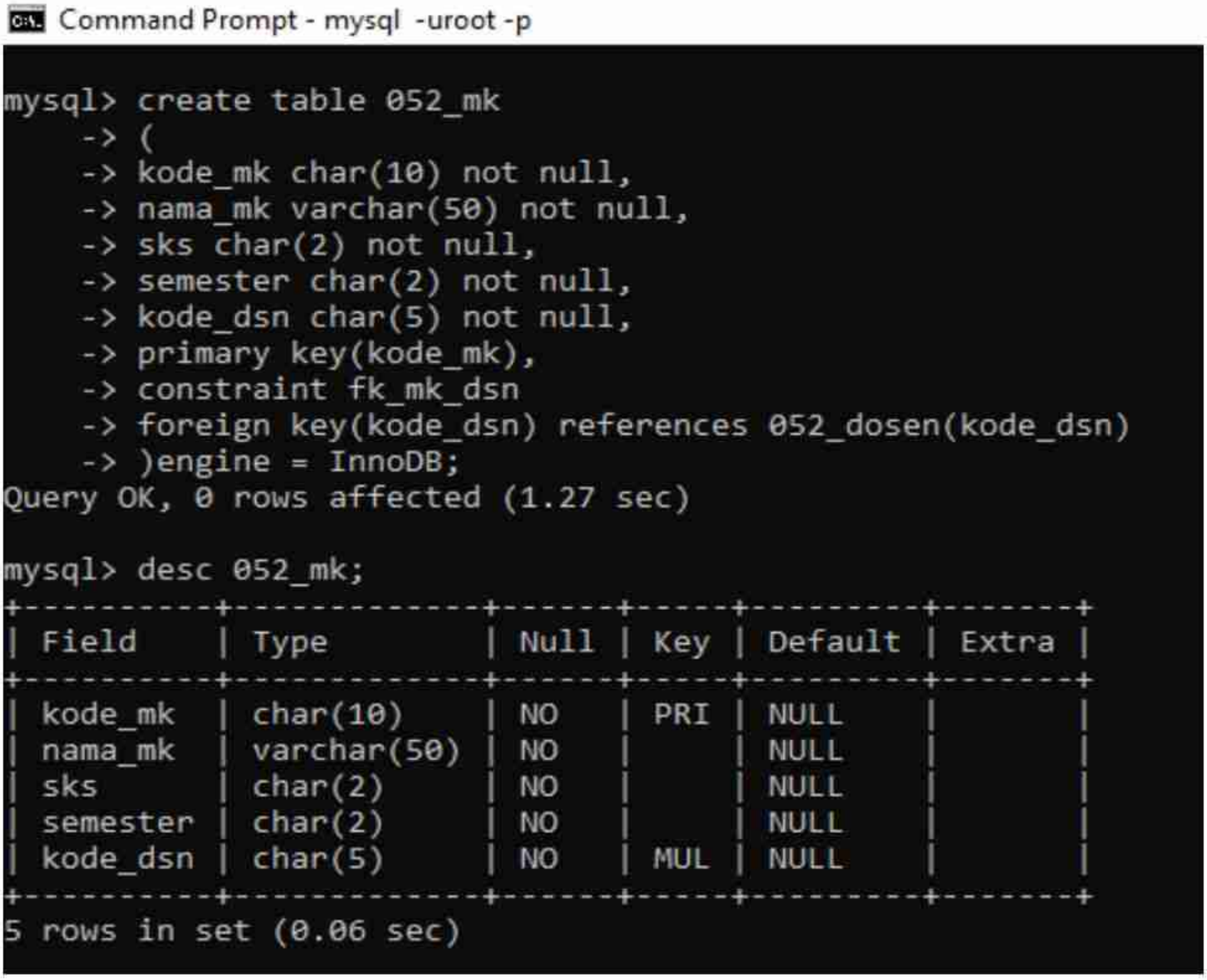
Create table name
(columnname datatype
(size)….primary key
(columnname);
foreign key (columnname)references table name);

Check Integrity Constraints: Use the check constraints when you need to enforce integrity rules that can be evaluated based on a logical expression following are a few examples of appropriate check constraints.

- A check constraints name column of the client_master so that the name is entered in upper case.
- A check constraint on the client_no column of the client _master so thatno client_no value starts with 'c'

Syntax:
Create table tablename
(columnname datatype (size) CONSTRAINT
constraintname)Check (expression));

OUTPUT:-



Command Prompt - mysql -uroot -p

```
mysql> create table 052_mk
    -> (
    -> kode_mk char(10) not null,
    -> nama_mk varchar(50) not null,
    -> sks char(2) not null,
    -> semester char(2) not null,
    -> kode_dsn char(5) not null,
    -> primary key(kode_mk),
    -> constraint fk_mk_dsn
    -> foreign key(kode_dsn) references 052_dosen(kode_dsn)
    -> )engine = InnoDB;
Query OK, 0 rows affected (1.27 sec)

mysql> desc 052_mk;
+----------+-------------+------+-----+---------+-------+
| Field    | Type        | Null | Key | Default | Extra |
+----------+-------------+------+-----+---------+-------+
| kode_mk  | char(10)    | NO   | PRI | NULL    |       |
| nama_mk  | varchar(50) | NO   |     | NULL    |       |
| sks      | char(2)     | NO   |     | NULL    |       |
| semester | char(2)     | NO   |     | NULL    |       |
| kode_dsn | char(5)     | NO   | MUL | NULL    |       |
+----------+-------------+------+-----+---------+-------+
5 rows in set (0.06 sec)
```

Question.1 Create the following tables:

Columnname	Datatype	Size	Attributes
Salesman_no	varchar2	6	Primary key/first letter must start with 's'
Sal_name	varchar2	20	Not null
Address	varchar2		Not null
City	varchar2	20	
State	varchar2	20	
Pincode	Number	6	
Sal_amt	Number	8,2	Not null, cannot be 0
Tgt_to_get	Number	6,2	Not null, cannot be 0
Ytd_sales	Number	6,2	Not null, cannot be 0
Remarks	Varchar2	30	

i. Sales_order

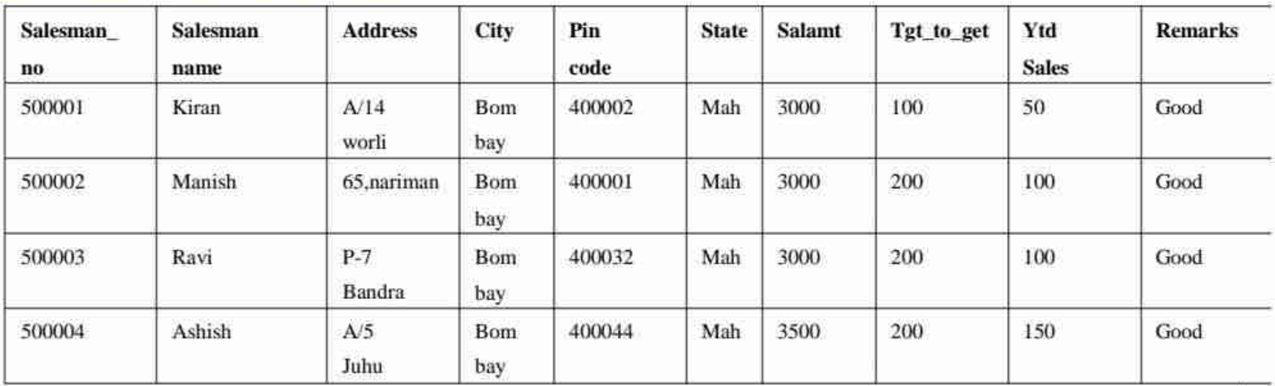
Columnname	Datatype	Size	Attributes
S_order_no	varchar2	6	Primary/first letter must be 0
S_order_date	Date	6	Primary key reference clientno of client_master table
Client_no	Varchar2	25	
Dely_add	Varchar2	6	
Salesman_no	Varchar2	6	Foreign key references salesman_no of salesman_master table
Dely_type	Char	1	Delivery part(p)/full(f),default f
Billed_yn	Char	1	
Dely_date	Date		Can not be lessthan s_order_date
Order_status	Varchar2	10	Values ('in process';'fulfilled';back order';'canceled

I. Sales_order_details

Column	Datatype	Size	Attributes
S_order_no	Varchar2	6	Primary key/foreign key references s_order_no of sales_order
Product_no	Varchar2	6	Primary key/foreign key references product_no of product_master
Qty_order	Number	8	
Qty_disp	Number	8	
Product_rate	Number	10,2	

Insert the following data into their respective tables using insert statement:

Data for sales_man master table



Salesman_ no	Salesman name	Address	City	Pin code	State	Salamt	Tgt_to_get	Ytd Sales	Remarks
500001	Kiran	A/14 worli	Bom bay	400002	Mah	3000	100	50	Good
500002	Manish	65,nariman	Bom bay	400001	Mah	3000	200	100	Good
500003	Ravi	P-7 Bandra	Bom bay	400032	Mah	3000	200	100	Good
500004	Ashish	A/5 Juhu	Bom bay	400044	Mah	3500	200	150	Good

(ii)

Data for salesorder table:

S_orderno	S_orderdate	Client no	Dely type	Bill yn	Salesman no	Delay date	Orderstatus
019001	12-jan-96	0001	F	N	50001	20-jan-96	Ip
019002	25-jan-96	0002	P	N	50002	27-jan-96	C
016865	18-feb-96	0003	F	Y	500003	20-feb-96	F
019003	03-apr-96	0001	F	Y	500001	07-apr-96	F
046866	20-may-96	0004	P	N	500002	22-may-96	C
010008	24-may-96	0005	F	N	500004	26-may-96	Ip

(i)

Data for sales_order_details table:

S_order no	Product no	Qty ordered	Qty disp	Product_rate
019001	P00001	4	4	525
019001	P07965	2	1	8400
019001	P07885	2	1	5250
019002	P00001	10	0	525
046865	P07868	3	3	3150
046865	P07885	10	10	5250
019003	P00001	4	4	1050
019003	P03453	2	2	1050
046866	P06734	1	1	12000
046866	P07965	1	0	8400
010008	P07975	1	0	1050
010008	P00001	10	5	525

Practical #6

Objective:- To implement the concept of Joins

Joint Multiple Table (Equi Join): Sometimes we require to treat more than one table asthough manipulate data from all the tables as though the tables were not separate object but one single entity. To achieve this we have to join tables. Tables are joined on column that have dame data type and data with in tables.

The tables that have to be joined are specified in the FROM clause and the joining attributes in the WHERE clause.

Algorithm for JOIN in SQL:

1. Cartesian product of tables (specified in the FROM clause)
2. Selection of rows that match (predicate in the WHERE clause)
3. Project column specified in the SELECT clause.

1. Cartesian product:-

Consider two table student and
courseSelect B.*,P.*
FROM student B, course P;

2. INNER JOIN:

Cartesian product followed by
selectionSelect B.*,P.*
FROM student B, Course P WHERE
B.course # P.course # ;

3. LEFT OUTER JOIN:

LEFT OUTER JOIN = Cartesian product + selection but include rows from the left table which are unmatched pat nulls in the values of attributes belonging to th esecond table

Exam:
Select B.*,P*
FROM student B left join course pON
B.course # P.course #;

4. RIGHT OUTER JOIN:

RIGHT OUTER JOIN = Cartesian product + selection but include rows fromright table which are unmatched

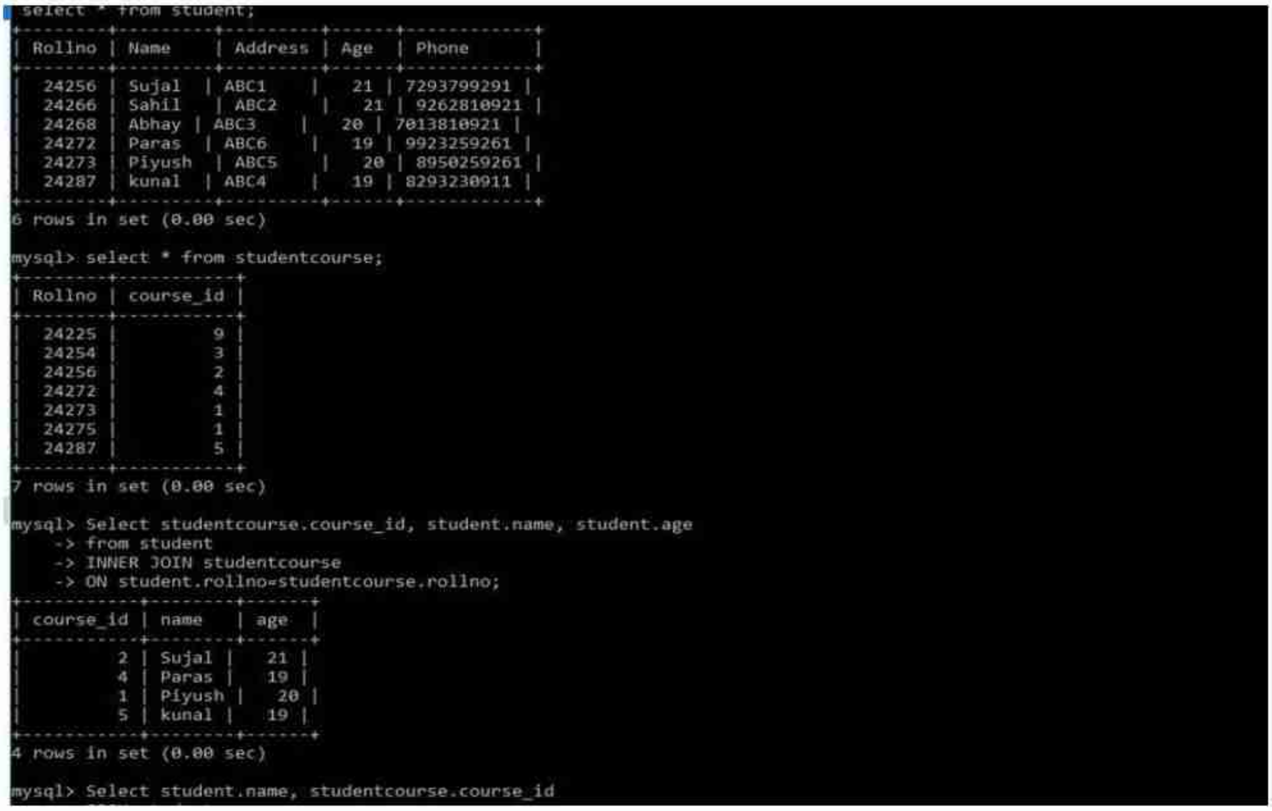
Exam:

Select B.*,P.*
From student B RIGHT JOIN course P
B.course# = P course # ;

5. FULL OUTER JOIN

Exam
Select B.*,P.*
From student B FULL JOIN course POn
B.course # = P course # ;

OUTPUT:-

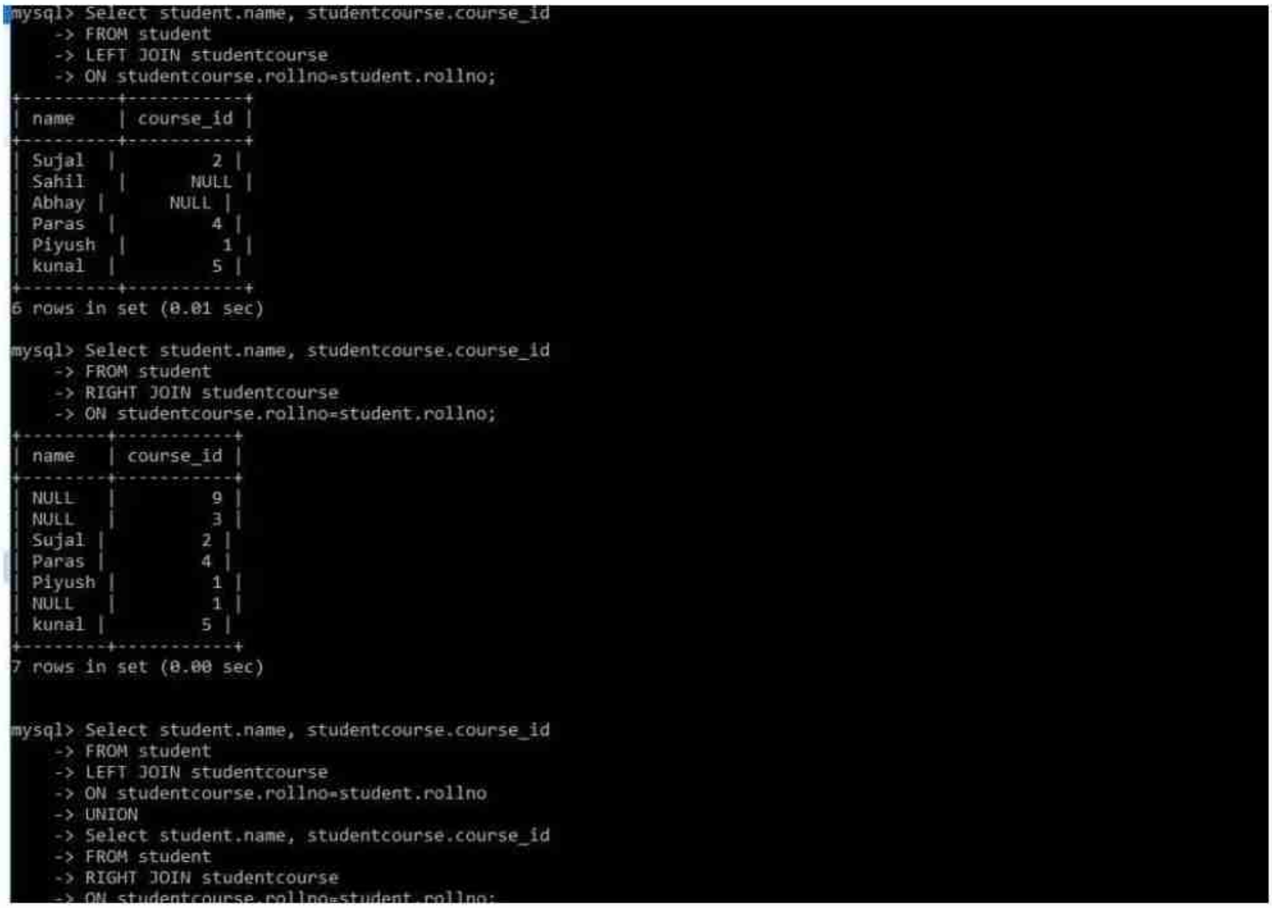


```
select * from student;
+--------+--------+---------+------+------------+
| Rollno | Name   | Address | Age  | Phone      |
+--------+--------+---------+------+------------+
|  24256 | Sujal  | ABC1    |   21 | 7293799291 |
|  24266 | Sahil  | ABC2    |   21 | 9262810921 |
|  24268 | Abhay  | ABC3    |   20 | 7013810921 |
|  24272 | Paras  | ABC6    |   19 | 9923259261 |
|  24273 | Piyush | ABC5    |   20 | 8950259261 |
|  24287 | kunal  | ABC4    |   19 | 8293230911 |
+--------+--------+---------+------+------------+
6 rows in set (0.00 sec)

mysql> select * from studentcourse;
+--------+-----------+
| Rollno | course_id |
+--------+-----------+
|  24225 |         9 |
|  24254 |         3 |
|  24256 |         2 |
|  24272 |         4 |
|  24273 |         1 |
|  24275 |         1 |
|  24287 |         5 |
+--------+-----------+
7 rows in set (0.00 sec)

mysql> Select studentcourse.course_id, student.name, student.age
    -> from student
    -> INNER JOIN studentcourse
    -> ON student.rollno=studentcourse.rollno;
+-----------+--------+------+
| course_id | name   | age  |
+-----------+--------+------+
|         2 | Sujal  |   21 |
|         4 | Paras  |   19 |
|         1 | Piyush |   20 |
|         5 | kunal  |   19 |
+-----------+--------+------+
4 rows in set (0.00 sec)

mysql> Select student.name, studentcourse.course_id
```

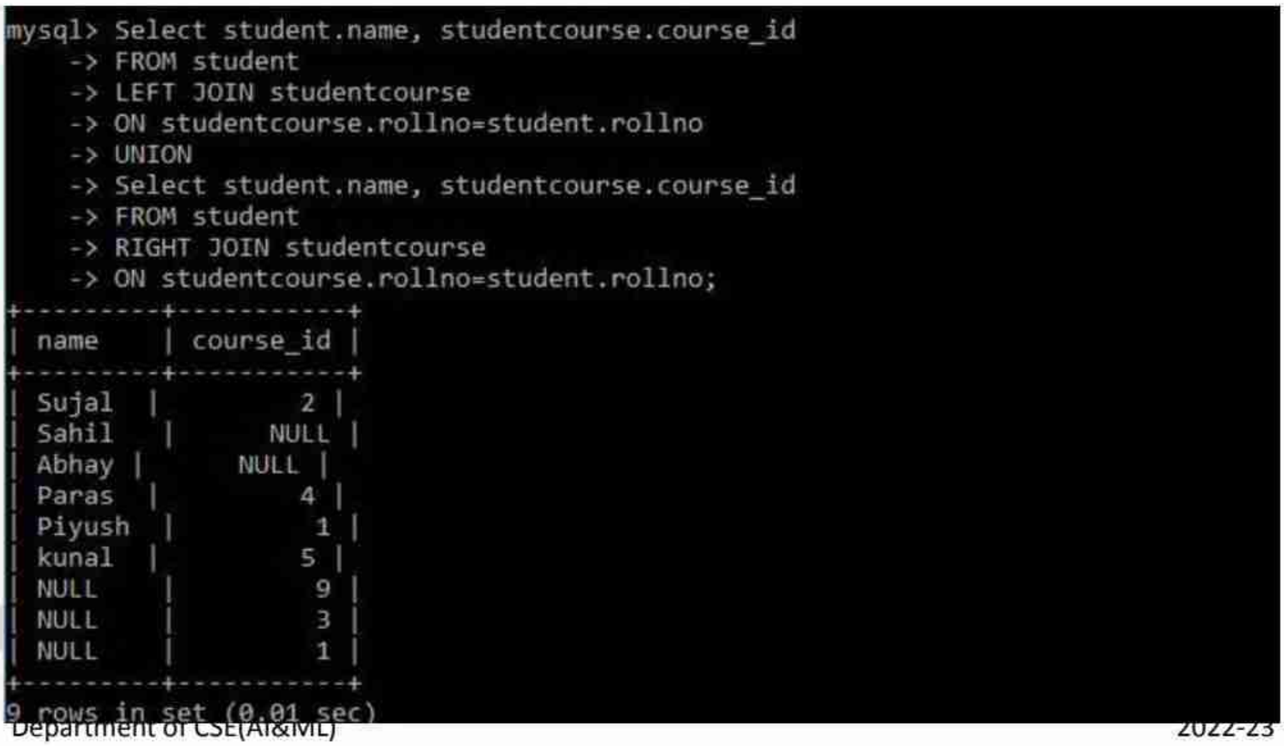
Answer the following Queries:

1. Find out the product which has been sold to 'Ivan Sayross.'
2. Find out the product and their quantities that will have do delivered.
3. Find the product_no and description of moving products.
4. Find out the names of clients who have purchased 'CD DRIVE'
5. List the product_no and s_order_no of customers haaving qty ordered less than 5from the order details table for the product "1.44 floppies".
6. Find the products and their quantities for the orders placed by 'Vandan Saitwal 'and "Ivan Bayross".
7. Find the products and their quantities for the orders placed by client_no "C00001" and "C00002"
8. Find the order No,, Client No and salesman No. where a client has been receivedby more than one salesman.

9. Display the s_order_date in the format “dd-mm-yy” e.g. “12- feb-96”
10. Find the date , 15 days after date.



```
mysql> Select student.name, studentcourse.course_id
    -> FROM student
    -> LEFT JOIN studentcourse
    -> ON studentcourse.rollno=student.rollno;
+--------+-----------+
| name   | course_id |
+--------+-----------+
| Sujal  |         2 |
| Sahil   |      NULL |
| Abhay |      NULL |
| Paras  |         4 |
| Piyush  |         1 |
| kunal  |         5 |
+--------+-----------+
6 rows in set (0.01 sec)

mysql> Select student.name, studentcourse.course_id
    -> FROM student
    -> RIGHT JOIN studentcourse
    -> ON studentcourse.rollno=student.rollno;
+--------+-----------+
| name   | course_id |
+--------+-----------+
| NULL   |         9 |
| NULL   |         3 |
| Sujal |         2 |
| Paras |         4 |
| Piyush |         1 |
| NULL   |         1 |
| kunal |         5 |
+--------+-----------+
7 rows in set (0.00 sec)


mysql> Select student.name, studentcourse.course_id
    -> FROM student
    -> LEFT JOIN studentcourse
    -> ON studentcourse.rollno=student.rollno
    -> UNION
    -> Select student.name, studentcourse.course_id
    -> FROM student
    -> RIGHT JOIN studentcourse
    -> ON studentcourse.rollno=student.rollno;
```



```
mysql> Select student.name, studentcourse.course_id
    -> FROM student
    -> LEFT JOIN studentcourse
    -> ON studentcourse.rollno=student.rollno
    -> UNION
    -> Select student.name, studentcourse.course_id
    -> FROM student
    -> RIGHT JOIN studentcourse
    -> ON studentcourse.rollno=student.rollno;
+--------+-----------+
| name   | course_id |
+--------+-----------+
| Sujal  |         2 |
| Sahil   |      NULL |
| Abhay |      NULL |
| Paras  |         4 |
| Piyush  |         1 |
| kunal  |         5 |
| NULL    |         9 |
| NULL    |         3 |
| NULL    |         1 |
+--------+-----------+
9 rows in set (0.01 sec)
```

Practical # 7

Objective:- To implement the concept of grouping of Data.

Grouping Data From Tables:

There are circumstances where we would like to apply the aggregate function not only toa single set of tuples, but also to a group of sets of tuples, we specify this wish in SQL using the group by clause. The attribute or attributes given in the group by clause areused to form group. Tuples with the same value on all attributes in the group by clauseare placed in one group.

Syntax:

```
SELECT columnname, columnnameFROM
tablename
GROUP BY columnname;
```

At times it is useful to state a condition that applies to groups rather than to tuples. For example we might be interested in only those branches where the average account balance is more than 1200. This condition does not apply to a single tuple, rather it applies to each group constructed by the GROUP BY clause. To express such Questionry, we use the having clause of SQL. SQL applies predicates in the having maybe used.

Syntax:

```
SELECT columnname, columnname
FROM tablename
GROUP BY columnname;HAVING searchcondition;
```

Answer the following Queries:

Q1.- Print the description and total quantity sold for each product. Q2.- Find the value of each product sold.

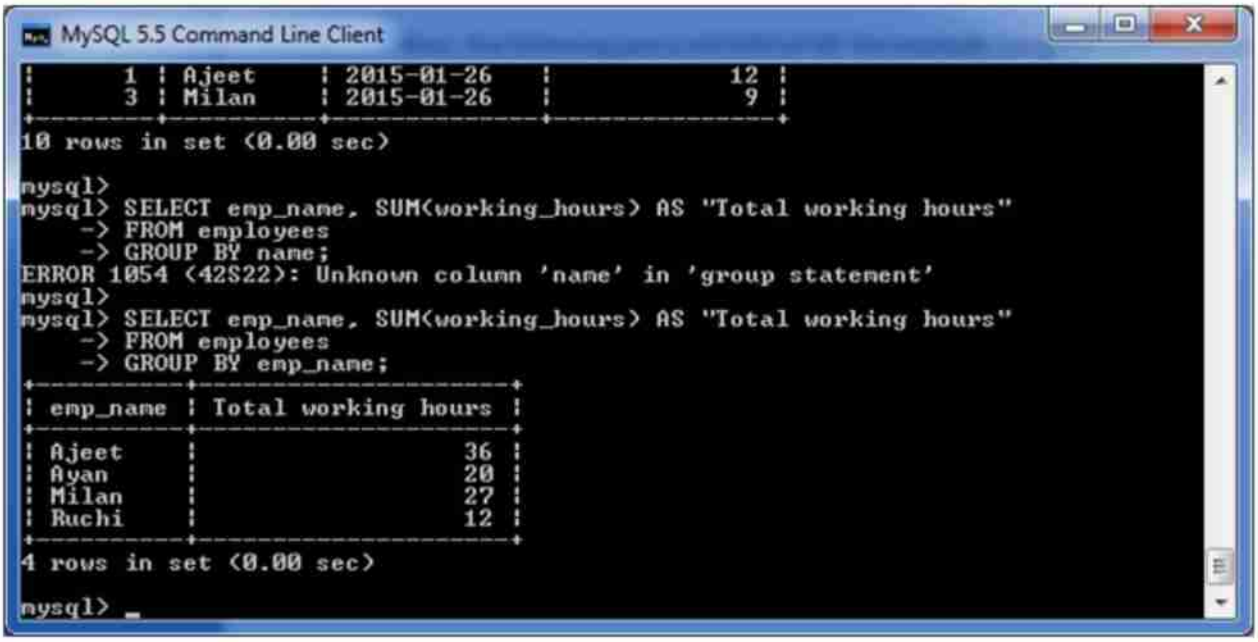
Q3.- Calculate the average quantity sold for each client that has a maximum order value of 15000.

Q4.- Find out the products which has been sold to Ivan. Q5.- Find the names of clients who have 'CD Drive'.
Q6.- Find the products and their quantities for the orders placed by 'Vandana' and 'Ivan'.

Q7.- Select product_no, total qty_ordered for each product.

Q8.- Select product_no, product description and qty ordered for each product. Q9.- Display the order number and day on which clients placed their order.
Q10.- Display the month and Date when the order must be delivered.

OUTPUT:-



```
|       1 | Ajeet    | 2015-01-26   |               12 |
|       3 | Milan    | 2015-01-26   |                9 |
+---------+----------+--------------+------------------+
10 rows in set (0.00 sec)

mysql>
mysql> SELECT emp_name, SUM(working_hours) AS "Total working hours"
    -> FROM employees
    -> GROUP BY name;
ERROR 1054 (42S22): Unknown column 'name' in 'group statement'
mysql>
mysql> SELECT emp_name, SUM(working_hours) AS "Total working hours"
    -> FROM employees
    -> GROUP BY emp_name;
+----------+---------------------+
| emp_name | Total working hours |
+----------+---------------------+
| Ajeet    |                  36 |
| Ayan     |                  20 |
| Milan    |                  27 |
| Ruchi    |                  12 |
+----------+---------------------+
4 rows in set (0.00 sec)

mysql> _
```

Practical #8

Objective:- To implement the concept of SubQueries.

SubQueries:- A subQuery is a form of an SQL statement that appears inside another SQL statement. It also termed as nested Query. The statement containing a subQuery called a parent statement. The rows returned by the subQuery are used by the following statement.
It can be used by the following commands:

1. To insert records in the target table.
2. To create tables and insert records in this table.
3. To update records in the target table.
4. To create view.
5. To provide values for the condition in the WHERE , HAVING IN ,SELECT,UPDATE, and DELETE statements.

Exam:-
Creating clientmaster table from oldclient_master, table

```
Create table client_master
AS SELECT * FROM oldclient_master;
```

Using the Union, Intersect and Minus Clause:

Union Clause:

The user can put together multiple Queries and combine their output using the union clause . The union clause merges the output of two or more Queries into a single set of rows and column. The final output of union clause will be

Output: = Records only in Query one + records only in Query two + A single set of records with is common in the both Queries.

Syntax:

```
SELECT
columnname,
columnameFROM
tablename 1
UNION
SELECT columnname,
columnnameFrom
tablename2;
```

Intersect Clause: The use can put together multiple Queries and their output using the interest clause. The final output of the interest clause will be :

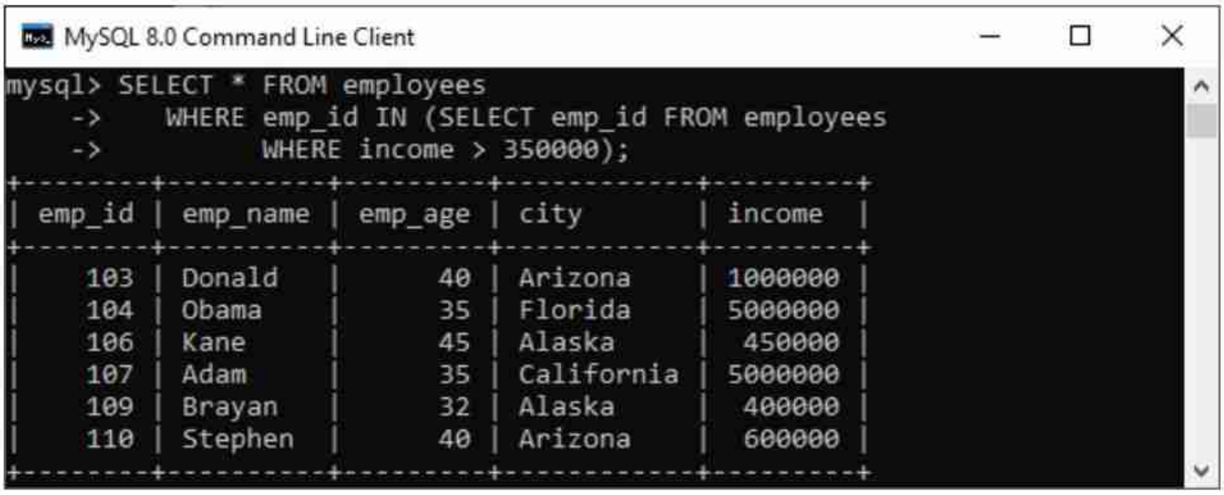
Output =A single set of records which are common

in both QueriesSyntax:

SELECT columnname, columnnameFROM tablename 1
INTERSECT
SELECT columnname, columnnameFROM tablename
2;

MINUS CLAUSE:- The user can put together multiple Queries and combine their output = records
only in
Query one
Syntax:
SELECT columnname, columnnameFROM tablename ;
MINUS
SELECT columnname, columnnameFROM tablename ;

OUTPUT:-



```
mysql> SELECT * FROM employees
    ->    WHERE emp_id IN (SELECT emp_id FROM employees
    ->          WHERE income > 350000);
+--------+----------+---------+------------+---------+
| emp_id | emp_name | emp_age | city       | income  |
+--------+----------+---------+------------+---------+
|    103 | Donald   |      40 | Arizona    | 1000000 |
|    104 | Obama    |      35 | Florida    | 5000000 |
|    106 | Kane     |      45 | Alaska     |  450000 |
|    107 | Adam     |      35 | California | 5000000 |
|    109 | Brayan   |      32 | Alaska     |  400000 |
|    110 | Stephen  |      40 | Arizona    |  600000 |
+--------+----------+---------+------------+---------+
```

Answer the following Queries:

Question.

1. Find the product_no and description of non- moving products.
2. Find the customer name, address, city and pincode for the client who has placedorder no “019001”
3. Find the client names who have placed order before the month of may 96.
4. Find out if product “1.44 Drive” is ordered by only client and print the client_noname to whom it was sold.
5. find the names of client who have placed orders worth Rs.10000 or more.
6. Select the orders placed by ‘Rahul Desai”
7. Select the names of persons who are in Mr. Pradeep’s department and who havealso worked on an inventory control system.
8. Select all the clients and the salesman in the city of Bombay.
9. Select salesman name in “Bombay” who has atleast one client located at“Bombay”
10. Select the product_no, description, qty_on-hand,cost_price of non_moving itemsin the product_master table.

Practical # 9

Objective:- To implement the concept of Indexes and views.

Indexes- An index is an ordered list of content of a column or group of columns in a table.An index created on the single column of the table is called simple index. When multiple table columns are included in the index it is called composite index.

Creating an Index for a table:-

Syntax (Simple)

```
CREATE
INDEX
index_nameON
tablename(colu
mn name);
```

Composite Index:-

```
CREATE INDEX index_name
ON tablename(columnname,columnname);
```

Creating an UniQuestion Index:-

```
CREATE UNIQUESTION INDEX
indexfilenameON
tablename(columnname);
```

Dropping Indexes:-

An index can be dropped by using DROP INDEX

SYNTAX:-

```
DROP INDEX indexfilename;
```

Views:-

Logical data is how we want to see the current data in our database. Physical data is how this data is actually placed in our database.

Views are masks placed upon tables. This allows the programmer to develop a method via which we can display predetermined data to users according to our desire.

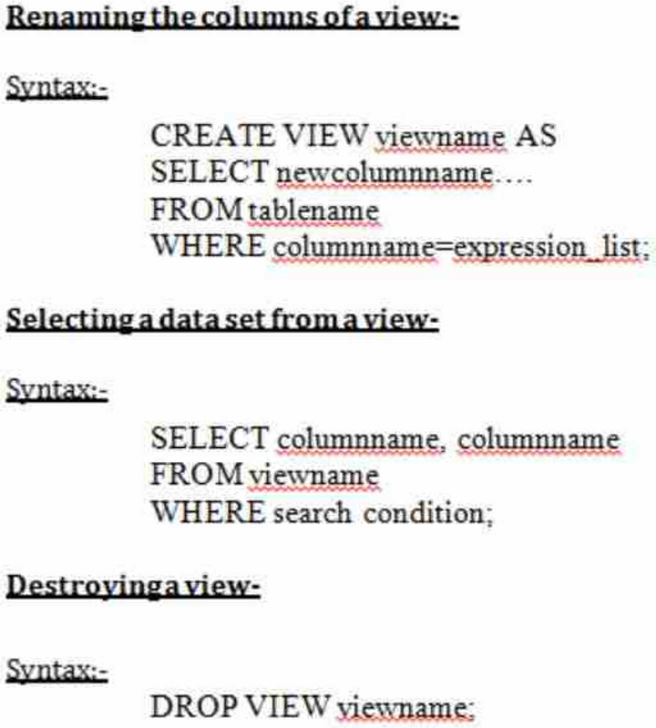
Views may be created fore the following reasons:

1. The DBA stores the views as a definition only. Hence there is no duplication of data.
2. Simplifies Queries.
3. Can be Queried as a base table itself.
4. Provides data security.
5. Avoids data redundancy.

Creation of Views:-

Syntax:-

```
CREATE VIEW viewname AS SELECT
columnname,columnnameFROM tablename
WHERE columnname=expression_list;
```



Renaming the columns of a view:-

Syntax:-

```
CREATE VIEW viewname AS
SELECT newcolumnname….
FROM tablename
WHERE columnname=expression_list;
```

Selecting a data set from a view-

Syntax:-

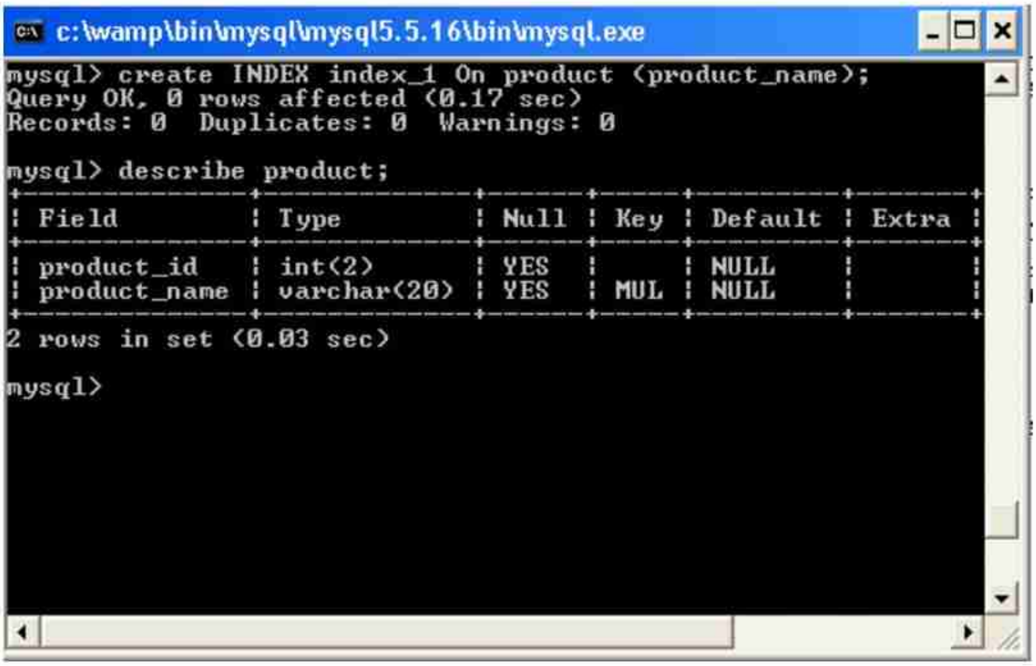
```
SELECT columnname, columnname
FROM viewname
WHERE search condition;
```

Destroying a view-

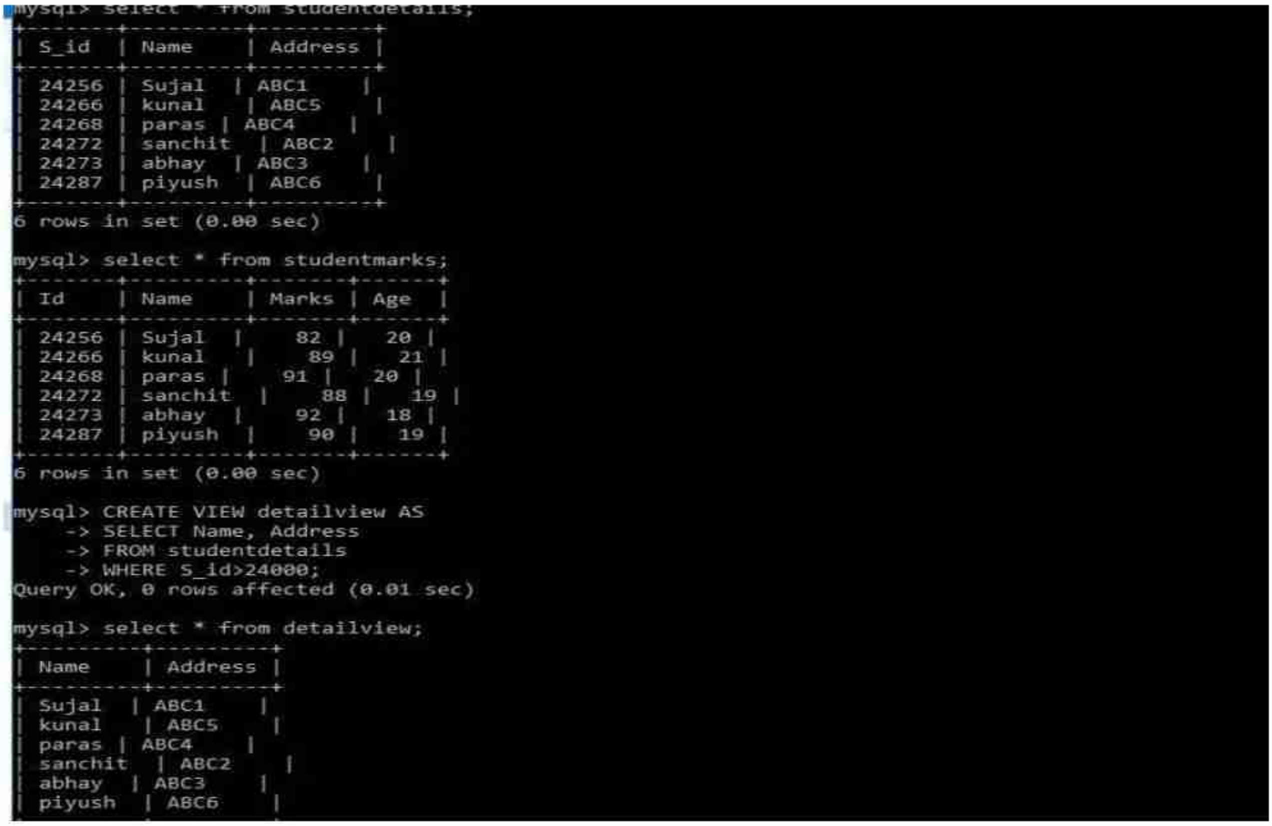
Syntax:-

```
DROP VIEW viewname;
```

OUTPUT:-



```
mysql> create INDEX index_1 On product (product_name);
Query OK, 0 rows affected (0.17 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> describe product;
+--------------+-------------+------+-----+---------+-------+
| Field        | Type        | Null | Key | Default | Extra |
+--------------+-------------+------+-----+---------+-------+
| product_id   | int(2)      | YES  |     | NULL    |       |
| product_name | varchar(20) | YES  | MUL | NULL    |       |
+--------------+-------------+------+-----+---------+-------+
2 rows in set (0.03 sec)

mysql>
```



```
mysql> select * from studentdetails;
+-------+---------+---------+
| S_id  | Name     | Address |
+-------+---------+---------+
| 24256 | Sujal  | ABC1    |
| 24266 | kunal   | ABC5    |
| 24268 | paras | ABC4    |
| 24272 | sanchit  | ABC2    |
| 24273 | abhay  | ABC3    |
| 24287 | piyush  | ABC6    |
+-------+---------+---------+
6 rows in set (0.00 sec)

mysql> select * from studentmarks;
+-------+---------+-------+------+
| Id    | Name     | Marks | Age  |
+-------+---------+-------+------+
| 24256 | Sujal  |    82 |   20 |
| 24266 | kunal   |    89 |   21 |
| 24268 | paras |    91 |   20 |
| 24272 | sanchit  |    88 |   19 |
| 24273 | abhay  |    92 |   18 |
| 24287 | piyush  |    90 |   19 |
+-------+---------+-------+------+
6 rows in set (0.00 sec)

mysql> CREATE VIEW detailview AS
    -> SELECT Name, Address
    -> FROM studentdetails
    -> WHERE S_id>24000;
Query OK, 0 rows affected (0.01 sec)

mysql> select * from detailview;
+---------+---------+
| Name     | Address |
+---------+---------+
| Sujal  | ABC1    |
| kunal   | ABC5    |
| paras | ABC4    |
| sanchit  | ABC2    |
| abhay  | ABC3    |
| piyush  | ABC6    |
```

Answer the following Questions

Q1. Create an index on the table client_master, field client_no.

Q2. Create an index on the sales_order, field s_order_no.

Q3. Create an composite index on the sales_order_details table for the columns s_order_no and product_no.

Q4. Create an composite index ch_index on challan_header table for the columns challan no and s_order_no.

Q5. Create an uniQuestion index on the table salesman_master, field salesman_no.

Q6. Drop index ch_index on table challan_header.

Q7. Create view on salesman_master whose sal_amt is less than 3500.

Q8. Create a view client_view on client_master and rename the columns as name, add1, add2, city, pcode, state respectively.

Q9. Select the client names from client_view who lives in city 'Bombay'.

Q10. Drop the view client_view.

Practical # 10

Objective:- To implement the basics of PL/SQL.

Introduction – PL/SQL bridges the gap between database technology and procedural programming languages. It can be thought of as a development tool that extends the facilities of Oracles SQL database language. Via PL/SQL you can insert, delete, update and retrieve table data as well as writing loops or branching to another block of code.

PL/SQL Block structure-

DECLARE
Declarations of memory variables used later BEGIN
SQL executable statements for manipulating table data. EXCEPTIONS
SQL and/or PL.SQL code to handle errors.END;

Displaying user Messages on the screen – Any programming tool requires a method through which messages can be displayed to the user.

dbms_output is a package that includes a number of procedure and functions that accumulate information in a buffer so that it can be retrieved later. These functions canalso be used to display message to the user.
put_line: put a piece of information in the buffer followed by a end of line marker. It canalso be used to display message to the user.
Setting the server output on:

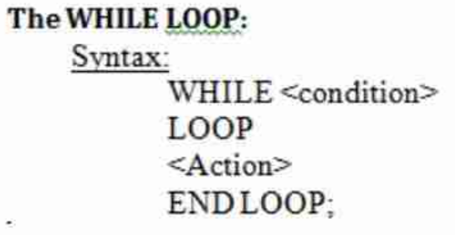
SET SERVER OUTPUT ON:

Example: Write the following code in the PL/SQL block to display message to userDBMS_OUTPUT.PUT_LINE(‘Display user message’);

Conditional control in PL/SQL-

Syntax:

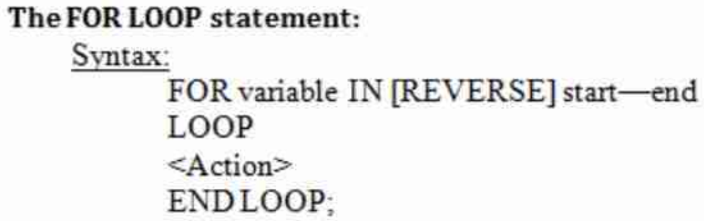
```
IF <condition> THEN
<Action> ELSEIF<condition>
<Action>
ELSE
<Action>ENDIF;
```



The WHILE LOOP:

Syntax:

```
WHILE <condition>
LOOP
<Action>
END LOOP;
```

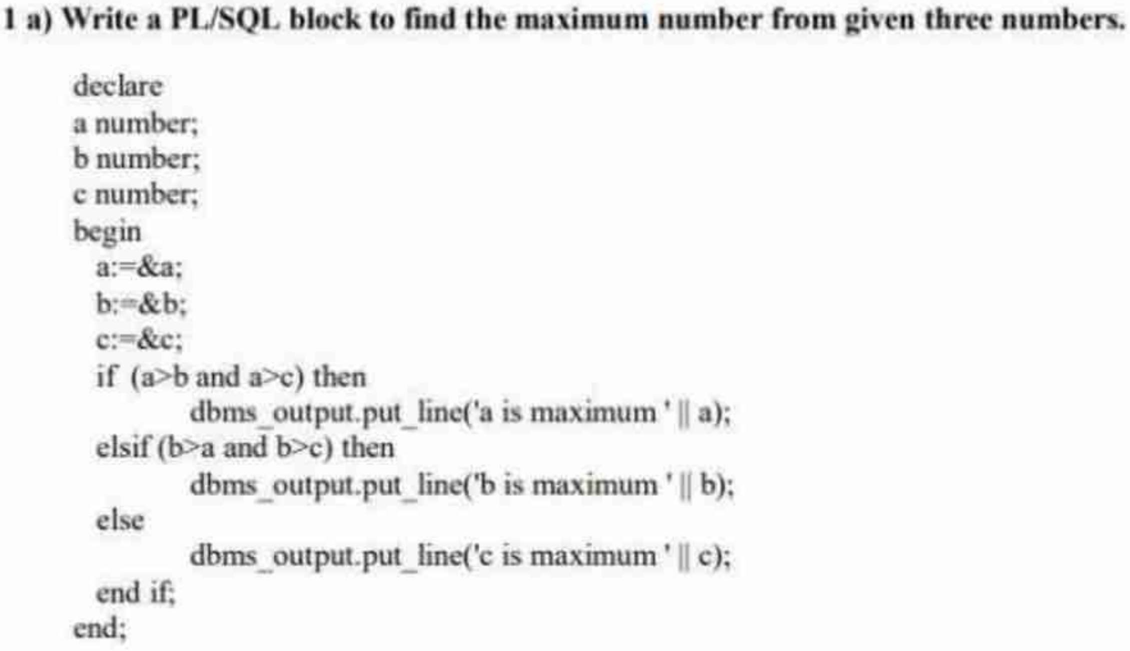


The FOR LOOP statement:

Syntax:

```
FOR variable IN [REVERSE] start—end
LOOP
<Action>
END LOOP;
```

The GOTO statement: The goto statement allows you to change the flow of controlwithin a PL/SQL Block.



1 a) Write a PL/SQL block to find the maximum number from given three numbers.

```
declare
a number;
b number;
c number;
begin
  a:=&a;
  b:=&b;
  c:=&c;
  if  (a>b and a>c) then
          dbms_output.put_line('a is maximum ' || a);
  elsif (b>a and b>c) then
          dbms_output.put_line('b is maximum ' || b);
  else
          dbms_output.put_line('c is maximum ' || c);
  end if;
end;
```

OUTPUT:-

```
19   21   8
 b is maximum 21
```

Q1. WAP in PL/SQL for addition of two numbers.

Q2. WAP in PL/SQL for addition of 1 to 100 numbers.

Q3. WAP in PL/SQL to check the given number is even or odd.

Q4. WAP in PL/SQL to inverse a number, eg. Number 5639 when inverted must be display output 9365.

Q5. WAP in PL/SQL for changing the price of product ‘P00001’ to 4000 if the price is less than 4000 in product_master table. The change is recorded in the old_price_table along with product_no and the date on which the price was changed last.

MINI PROJECT(Sample)

ROADWAY TRAVELS

"Roadway Travels" is in business since 1977 with several buses connecting different places in India. Its main office is located in Hyderabad.

The company wants to computerize its operations in the following areas:

Reservations
Ticketing
Cancellations

Reservations :

Reservations are directly handeled by booking office.reservations can be made 60 days in advance in either cash or credit. In case the ticket is not available,a wait listed ticket is issued to the customer. This ticket is confirmed against the cancellation.

Cancellation and modification:

Cancellations are also directly handed at the booking office. Cancellation charges will be charged.

Wait listed tickets that do not get confirmed are fully refunded.

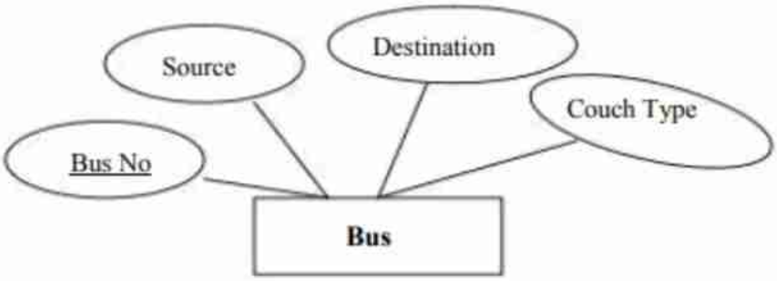
AIM: Analyze the problem and come with the entities in it. Identify what Data has to be persisted in the databases.

The Following are the entities:

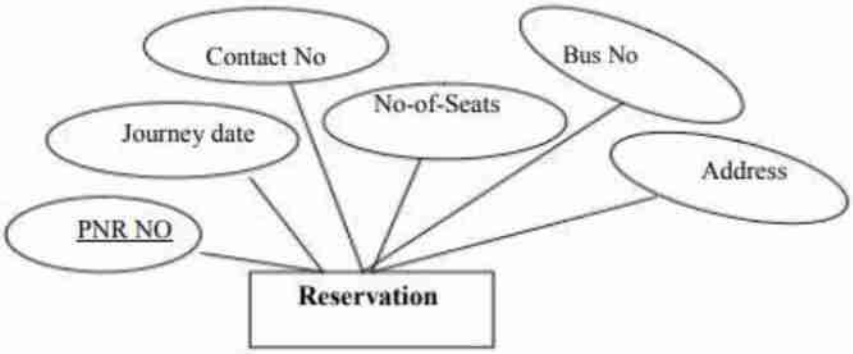
1 .Bus
2. Reservation
3. Ticket
4. Passenger
5. Cancellation

The attributes in the Entities:

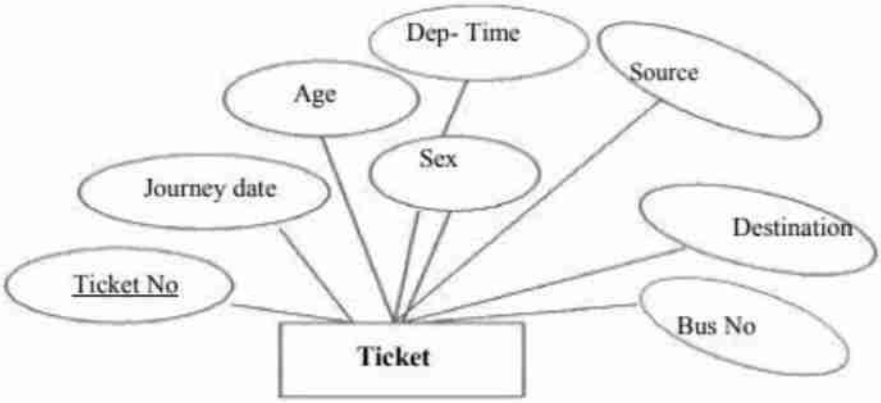
Bus:(Entity)



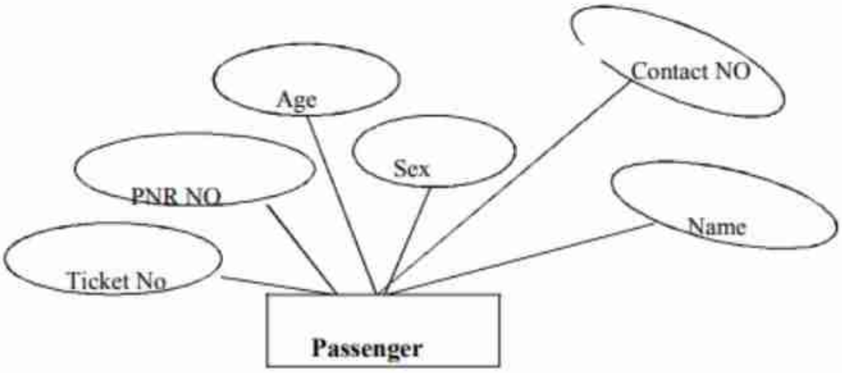
Reservation (Entity)



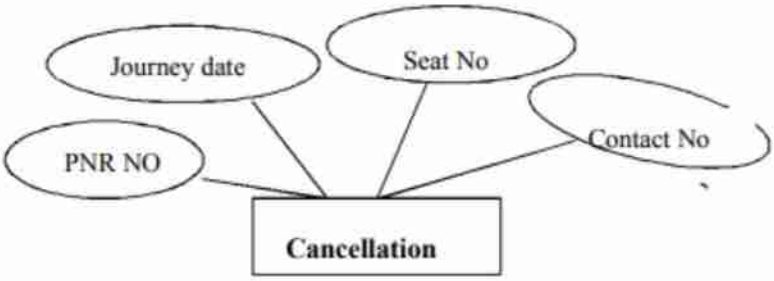
Ticket :(Entity)



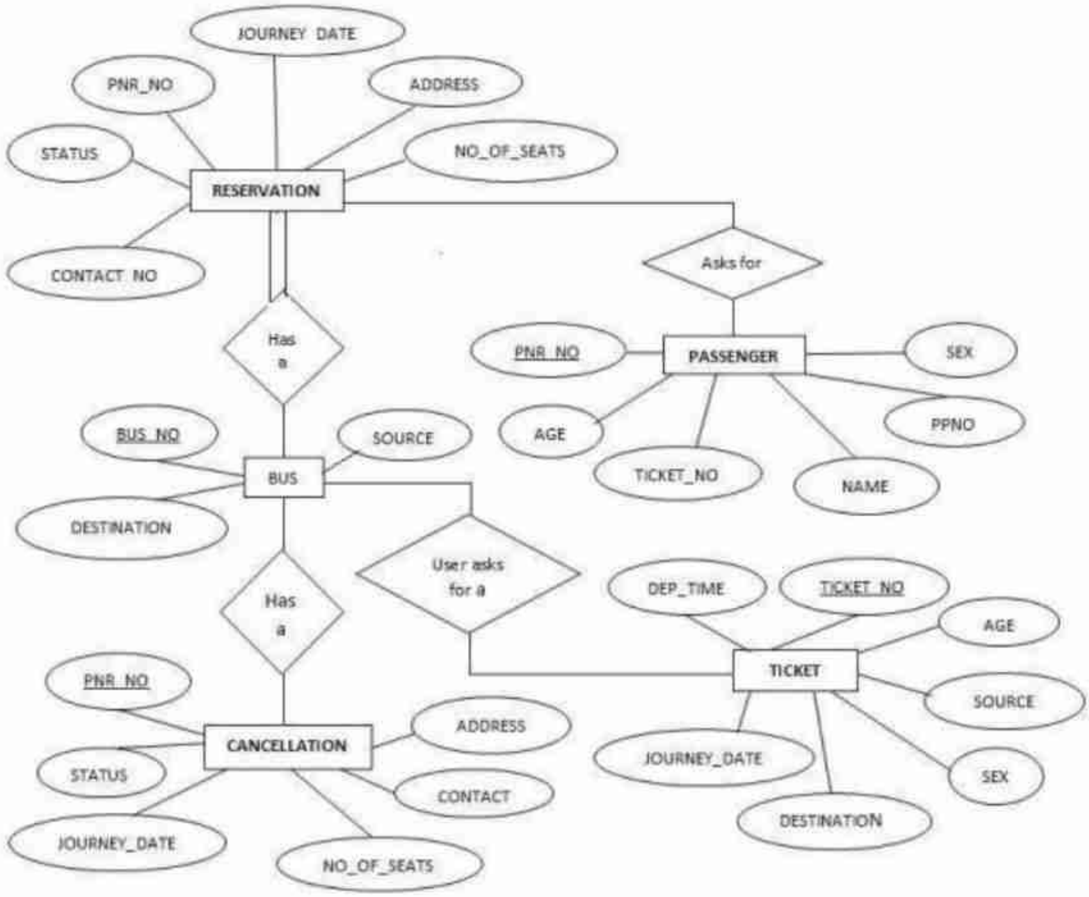
Passenger:



Cancellation (Entity)



Concept design with E-R Model:



The following are tabular representation of the above entities and relationships

BUS:

COLOUMN NAME	DATA TYPE	CONSTRAINT
Bus No	varchar2(10)	**Primary Key**
Source	varchar2(20)	
Destination	varchar2(20)	
Couch Type	varchar2(20)	

Reservation:

COLOUMN NAME	DATA TYPE	CONSTRAINT
PNRNo	number(9)	**Primary Key**
Journey date	Date	
No-of-seats	integer(8)	
Address	varchar2(50)	
Contact No	Number(9)	Should be equal to 10 numbers and not allow other than numeric
BusNo	varchar2(10)	**Foreign key**
Seat no	Number	

Ticket:

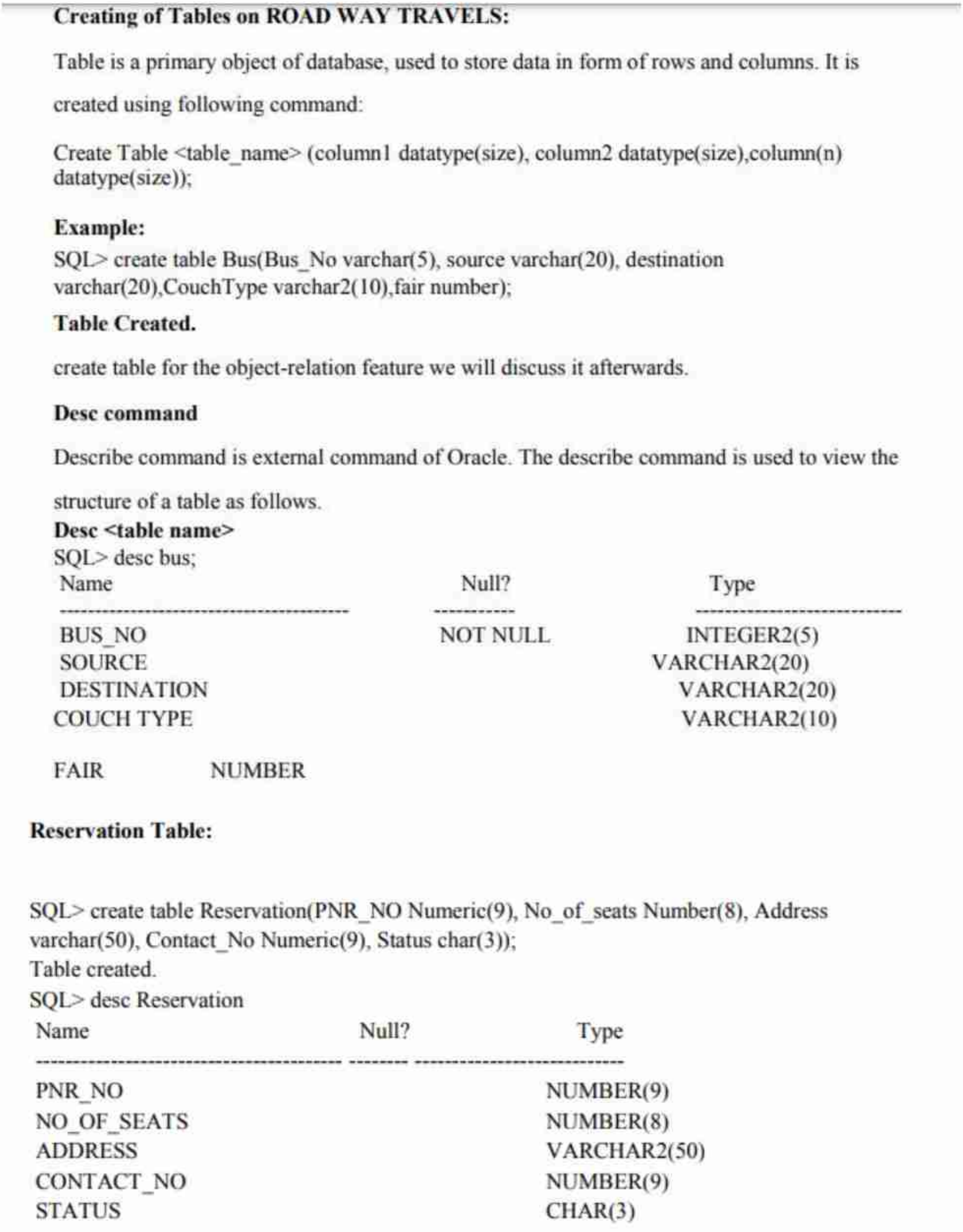
COLOUMN NAME	DATA TYPE	CONSTRAINT
Ticket_No	number(9)	**Primary Key**
Journey date	Date	
Age	int(4)	
Sex	Char(10)	
Source	varchar2(10)	
Destination	varchar2(10)	
Dep-time	varchar2(10)	
Bus No	Number2(10)	

Passenger:

COLOUMN NAME	DATA TYPE	CONSTRAINT
PNR No	Number(9)	**Primary Key**
Ticket No	Number(9)	Foreign key
Name	varchar2(15)	
Age	integer(4)	
Sex	char(10)	(Male/Female)
Contact no	Number(9)	Should be equal to 10 numbers and not allow other than numeric

Cancellation:

COLOUMN NAME	DATA TYPE	CONSTRAINT
PNR No	Number(9)	Foriegn-key
Journey-date	Date	
Seat no	Integer(9)	
Contact_No	Number(9)	Should be equal to 10 numbers and not allow other than numeric



Creating of Tables on ROAD WAY TRAVELS:

Table is a primary object of database, used to store data in form of rows and columns. It is created using following command:

Create Table <table_name> (column1 datatype(size), column2 datatype(size),column(n) datatype(size));

Example:

```
SQL> create table Bus(Bus_No varchar(5), source varchar(20), destination
varchar(20),CouchType varchar2(10),fair number);
```

Table Created.

create table for the object-relation feature we will discuss it afterwards.

Desc command

Describe command is external command of Oracle. The describe command is used to view the structure of a table as follows.

Desc <table name>

```
SQL> desc bus;
 Name                                   Null?           Type
 ----------------------------------     ----------      ------------------------
 BUS_NO                                  NOT NULL         INTEGER2(5)
 SOURCE                                                VARCHAR2(20)
 DESTINATION                                              VARCHAR2(20)
COUCH TYPE                                                VARCHAR2(10)

FAIR            NUMBER
```

Reservation Table:

```
SQL> create table Reservation(PNR_NO Numeric(9), No_of_seats Number(8), Address
varchar(50), Contact_No Numeric(9), Status char(3));
Table created.
SQL> desc Reservation
 Name                                  Null?          Type
 ------------------------------------- -------- -------------------------
 PNR_NO                                            NUMBER(9)
 NO_OF_SEATS                                       NUMBER(8)
 ADDRESS                                           VARCHAR2(50)
 CONTACT_NO                                        NUMBER(9)
 STATUS                                            CHAR(3)
```

Cancellation Table:

```
SQL> create table Cancellation(PNR_NO Numeric(9), No_of_seats Number(8), Address
varchar(50), Contact_No Numeric(9), Status char(3));
 Table created.
 SQL> desc Cancellation
  Name                                    Null?  Type
  --------------------------------------- -------- --------------------------
 PNR_NO                                     NUMBER(9)
 NO_OF_SEATS                               NUMBER(8)
 ADDRESS                                    VARCHAR2(50)
 CONTACT_NO                                NUMBER(9)
 STATUS                                     CHAR(3)
```

Ticket Table:

```
 SQL> create table Ticket(Ticket_No Numeric(9) primary key, age number(4), sex char(4)
 Not null, source varchar(2), destination varchar(20), dep_time varchar(4));
 Table created.
 SQL> desc Ticket
  Name                                     Null?          Type
  ---------------------------------------  --------       --------------------------
  TICKET_NO                                NOT NULL       NUMBER(9)
  AGE                                                       NUMBER(4)
  SEX                                      NOT NULL       CHAR(4)
  SOURCE                                                   VARCHAR2(2)
  DESTINATION                                             VARCHAR2(20)
  DEP_TIME                                                 VARCHAR2(4)
```

AIM: Applying Constraints on Road Way Travels Tables.

Constraints

Domain Integrit y constraints
Entity Integrity constraints
Referential Integrity constraint

Oracle allows programmers to define constraints

Column Level

Table Level

Example

```
 SQL> create table Ticket ( Ticket_No Numeric(9) , age number(4), sex char(4) Not null,
 source varchar(2), destination varchar(20), dep_time varchar(4));
Table created.
```

Check Constraint

```
SQL> create table Reservation(PNR_NO Numeric(9), No_of_seats Number(8), Address
varchar(50), Contact_No Numeric(10) constraint ck check(length(contact_no)=10), Status
char(3));
```

Table created.

Check constraint with alter command

```
SQL> alter table Ticket add constraint check_age check(age>18);
```

Table altered.

Unique Constraint

Example:

```
SQL> create table Ticket(Ticket_No Numeric(9) unique, age number(4), sex char(4) l, source
varchar(2), destination varchar(20), dep_time varchar(4));
```

Referential Integrity Constraint
References constraint defined at column level

Example:

```
SQL> create table Passenger(PNR_NO Numeric(9) references reservation  ,  Ticket_NO
Numeric(9) references ticket, Name varchar(20), Age Number(4), Sex char(10), PPNO
varchar(15));
```

Table created.

a) Insert command

Insert into <table name> values(a list of data values);

Insert into <table name>(column list) values(a list of data);

```
SQL> insert into emp_master (empno,ename,salary) values (1122,‘Smith’,8000); 1

row created.
```

Adding values in a table using Variable method.

```
SQL> insert into Passenger values(&PNR_NO,&TICKET_NO, '&Name', &Age, '&Sex',
'&PPNO');
Enter value for pnr_no: 1
Enter value for ticket_no: 1
Enter value for name: SACHIN
Enter value for age: 12
Enter value for sex: m
Enter value for ppno: sd1234
old    1: insert into Passenger values(&PNR_NO,&TICKET_NO, '&Name', &Age, '&Sex',

'&PPNO')

new  1: insert into Passenger values(1,1,'SACHIN',12,'m','sd1234')

1 row created.
```

Note:- Execute at least 20 queries

VIVA QUESTIONS

1. 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.

2. What is DBMS?
It is a collection of programs that enables user to create and maintain a database. In other words it is general-purpose software that provides the users with the processes of defining, constructing and manipulating the database for various applications.

3. What is a Database system?
The database and DBMS software together is called as Database system.

4. Advantages of DBMS?

- Redundancy is controlled.
- Unauthorized access is restricted.
- Providing multiple user interfaces.
- Enforcing integrity constraints.
- Providing backup and recovery.

5. Disadvantage in File Processing System?

- Data redundancy & inconsistency.
- Difficult in accessing data.
- Data isolation.
- Data integrity.
- Concurrent access is not possible.
- Security Problems.

6. Describe the three levels of data abstraction?
Three levels of abstraction:
Physical level: The lowest level of abstraction describes how data are stored.
Logical level: The next higher level of abstraction, describes what data are stored in database and what relationship among those data.
View level: The highest level of abstraction describes only part of entire database.

7. Define the "integrity rules"
There are two Integrity rules.
Entity Integrity: States that Primary key cannot have NULL value
Referential Integrity: States that Foreign Key can be either a NULL value or should be Primary Key value of other relation.

8. What is extension and intension?
Extension: It is the number of tuples present in a table at any instance. This is time dependent.
Intension: It is a constant value that gives the name, structure of table and the constraints laid on it.

9. 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:
Physical Data Independence: Modification in physical level should not affect the logical level.
Logical Data Independence: Modification in logical level should affect the view level.

10. 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.

11. What is Data Model?
A collection of conceptual tools for describing data, data relationships data semantics and constraints.

12. 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.

13. What is Object Oriented model?
This model is based on collection of objects. An object contains values stored in instance variables within the object. An object also contains bodies of code that operate on the object. These bodies of code are called methods. Objects that contain same types of values and the same methods are grouped together into classes.

14. What is an Entity?
It is a 'thing' in the real world with an independent existence.

15. What is an Entity type?
It is a collection (set) of entities that have same attributes.

16. What is an Entity set?
It is a collection of all entities of particular entity type in the database.

17. What is an Extension of entity type?
The collections of entities of a particular entity type are grouped together into an entity set.

18. 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.

19. What is an attribute?
It is a particular property, which describes the entity.

20. What is a Relation?
A relation is defined as a set of tuples.

21. What is degree of a Relation?
It is the number of attribute of its relation schema.

22. What is Relationship?
It is an association among two or more entities.

23. What is Relationship set?
The collection (or set) of similar relationships.

24. What is Relationship type?
Relationship type defines a set of associations or a relationship set among a given set of entity types.

25. What is degree of Relationship type?

It is number of entity type participating

1. What is DDL (Data Definition Language)?
A data base schema is specifies by a set of definitions expressed by a special language called DDL.

2. What is VDL (View Definition Language)?
It specifies user views and their mappings to the conceptual schema.

3. What is DML (Data Manipulation Language)?
This language that enable user to access or manipulate data as organized by appropriate data model.

4. What is DML Compiler?
It translates DML statements in a query language into low-level instruction that the query evaluation engine can understand.

5. What is Query evaluation engine?
It executes low-level instruction generated by compiler.

6. What is DDL Interpreter?
It interprets DDL statements and records them in tables containing metadata.

7. What is a query?
A query with respect to DBMS relates to user commands that are used to interact with a data base. The query language can be classified into data definition language and data manipulation language.

8. What do you mean by Correlated sub query?
A correlated sub query can be easily identified if it contains any references to the parent sub query columns in its WHERE clause. Columns from the sub query cannot be referenced anywhere else in the parent query.

9. Are the resulting relations of PRODUCT and JOIN operation the same?
No.
PRODUCT: Concatenation of every row in one relation with every row in another.
JOIN: Concatenation of rows from one relation and related rows from another.

10. What is database Trigger?
A database trigger is a PL/SQL block that can defined to automatically execute for insert, update, and delete statements against a table. The trigger can be defined to execute once for the entire statement or once for every row that is inserted, updated, or deleted. For any one table, there are twelve events for which you can define database triggers. A database trigger can call database procedures that are also written in PL/SQL.

11. What are stored-procedures? What are the advantages of using them?
Stored procedures are database objects that perform a user defined operation. A stored procedure can have a set of compound SQL statements. A stored procedure executes the SQL commands and returns the result tothe client. Stored procedures are used to reduce network traffic.

12. Define super key and give example to illustrate the super key?
Set of one or more attributes taken collectively, allowing to identify uniquely an entity in the entity set.Eg1. {SSN} and {SSN, Cust_name} of customer table are super keys.Eg2. {Branch name} and {Branch name, Branch city} of Branch table re super keys.

13. Define candidate key and give example to illustrate the candidate key?

Super keys with no proper subset are called the candidate keys. Otherwise it is called minimal super key. Candidate key is nothing but the primary key used in SQL. Eg1. {SSN} is the candidate keyfor the super keys {SSN} and {SSN, Cust_name} of customer table.Eg2. {Branch name} is the candidate key for the super keys {Branch name} and {Branch name, Branch city} of Branch table.

14. What is Primary key?

A key chosen to act as the means by which to identify tuples in a relation.

15. What is foreign key?

A foreign key of relation R is a set of its attributes intended to be used (by each tuple in R) for identifying/referring to a tuples in some relation S. (R is called the referencing relation and S the referenced relation.) For this to make sense, the set of attributes of R forming the foreign key should "correspond to" some superkey of S. Indeed, by definition we require this superkey to be the primary key of S.

14. What is a Cursor?

A cursor is a pointer to this context area. PL/SQL controls the context area through a cursor. A cursor holds the rows (one or more) returned by a SQL statement. The set of rows the cursor holds is referred to as the active set.

1. What is normalization?

It is a process of analyzing the given relation schemas based on their Functional Dependencies (FDs) and primary key to achieve the properties

- Minimizing redundancy
- Minimizing insertion, deletion and update anomalies.

2. What is Functional Dependency?

A Functional dependency is denoted by X-> Y between two sets of attributes X and Y that are subsets of R specifies a constraint on the possible tuples that can form a relation state r of R. The constraint is for any two tuples t1 and t2 in r if t1[X] = t2[X] then they have t1[Y] = t2[Y].

3. What is 1 NF (Normal Form)?

The domain of attribute must include only atomic (simple, indivisible) values.

4. What is Fully Functional dependency?

It is based on concept of full functional dependency. A functional dependency X-> Y is fully functional dependency if removal of any attribute A from X means that the dependency does not hold any more.

5. What is 2NF?

A relation schema R is in 2NF if it is in 1NF and every non-prime attribute A in R is fully functionally dependent on primary key.

6. What is 3NF?

A relation schema R is in 3NF if it is in 2NF and for every FD X A either of the following is true
X is a Super-key of R.
A is a prime attribute of R.
In other words, if every non prime attribute is non-transitively dependent on primary key.

7. What is BCNF (Boyce-Codd Normal Form)?

A relation schema R is in BCNF if it is in 3NF and satisfies an additional constraint that for every FD X A, X must be a candidate key.

8. What is 4NF?

A relation schema R is said to be in 4NF if for every multivalued dependency X Y that holds over R, one of following is true X is subset or equal to (or) XY = R. X is a super key.

9. What is 5NF?

A Relation schema R is said to be 5NF if for every join dependency {R1, R2... Rn} that holds R, one the following is true

i) Ri = R for some i.

ii) The join dependency is implied by the set of FD, over R in which the left side is key of R.

10.What is dependency preservation?

Dependency Preservation Property enables us to enforce a constraint on the original relation from corresponding instances in the smaller relations.

11. What is Lossless join property?

Lossless join property enables us to find any instance of the original relation from corresponding instances in the smaller relations

12. What are Multivalued dependencies?

A multivalued dependency (MVD) X ->->Y specified on R, where X, and Y are both subsets of R and Z = (R – (X Y)) specifies the following restrictions on r(R)

t3[X]=t4[X]=t1[X]=t2[X]
t3[Y] = t1[Y] and t4[Y] = t2[Y]
t3[Z] = t2[Z] and t4[Z] = t1 [Z]