Sri Indu
College of Engineering & Technology
UGC Autonomous Institution
Recognized under 2(f) & 12(B) of UGC Act 1956,
NAAC, Approved by AICTE &
Permanently Affiliated to JNTUH
Estd.2001

NAAC
NATIONAL ASSESSMENT AND ACCREDITATION COUNCIL

DATABASE MANAGEMENT SYSTEMS LAB
(R22CSE2227)

LAB MANUAL

II Year II Semester

DEPARTMENT OF INFORMATION TECHNOLOGY

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY
B. TECH –INFORMATION TECHNOLOGY

INSTITUTION VISION

To be a premier Institution in Engineering & Technology and Management with competency, valuesand social consciousness.

INSTITUTION MISSION

IM1 Provide high quality academic programs, training activities and research facilities.

IM2 Promote Continuous Industry-Institute Interaction for Employability, Entrepreneurship, Leadership and Research aptitude among stakeholders.

IM3 Contribute to the Economical and technological development of the region, state and nation.

DEPARTMENT VISION

To be a recognized knowledge center in the field of Information Technology with self - motivated, employable engineers to society.

DEPARTMENT MISSION

The Department has following Missions:

DM1 To offer high quality student centric education in Information Technology.

DM2 To provide a conducive environment towards innovation and skills.

DM3 To involve in activities that provide social and professional solutions.

DM4 To impart training on emerging technologies namely cloud computing and IOT with involvement of stake holders.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO1: **Higher Studies:** Graduates with an ability to apply knowledge of Basic sciences and programming skills in their career and higher education.

PEO2: **Lifelong Learning:** Graduates with an ability to adopt new technologies for ever changing IT industry needs through Self-Study, Critical thinking and Problem solving skills.

PEO3: **Professional skills:** Graduates will be ready to work in projects related to complex problems involving multi-disciplinary projects with effective analytical skills.

PEO4: **Engineering Citizenship:** Graduates with an ability to communicate well and exhibitsocial, technical and ethical responsibility in process or product.

PROGRAM OUTCOMES (POs) & PROGRAM SPECIFIC OUTCOMES (PSOs)

PO	Description
PO 1	**Engineering Knowledge:** Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to develop to the solution of complex engineering problems.
PO 2	**Problem Analysis:** Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development. (WK1 to WK4)
PO 3	**Design/Development of Solutions:** Design creative solutions for complex engineering problems and design/develop systems/components/processes to meet identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society and environment as required. (WK5)
PO 4	**Conduct Investigations of Complex Problems:** Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modelling, analysis & interpretation of data to provide valid conclusions. (WK8).
PO 5	**Engineering Tool Usage:** Create, select and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modelling recognizing their limitations to solve complex engineering problems. (WK2 and WK6)
PO 6	**The Engineer and The World:** Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability with reference to economy, health, safety, legal framework, culture and environment. (WK1, WK5, and WK7).
PO 7	**Ethics:** Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws. (WK9)
PO 8	**Individual and Collaborative Team work:** Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams.
PO 10	**Project Management and Finance:** Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multidisciplinary environments.
PO 11	**Life-Long Learning:** Recognize the need for, and have the preparation and ability for i) independent and life-long learning ii) adaptability to new and emerging technologies and iii) critical thinking in the broadest context of technological change. (WK8)
Program Specific Outcomes	
PSO 1	**Software Development:** To apply the knowledge of Software Engineering, Data Communication, Web Technology and Operating Systems for building IOT and Cloud Computing applications.
PSO 2	**Industrial Skills Ability:** Design, develop and test software systems for world-wide network of computers toprovide solutions to real world problems.
PSO 3	**Project implementation:** Analyze and recommend the appropriate IT Infrastructure required for the implementationof a project.

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE OUTCOMES (CO'S)

COURSE NAME: Database Management System

Course Name	Course outcomes
C22L2.1	Design database schema for a given application and apply normalization.
C22L2.2	Acquires skills in using SQL commands for data definition and data manipulation.
C22L2.3	Develop solutions for database applications using procedures, cursors and triggers.

COURSE ARTICULATION MATRIX

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C22L2.1	3	3	3	2	-	2	-	-	2	-	-	2	2	3	-
C22L2..2	3	2	2	-	-	-	-	-	-	-	-	2	2	2	-
C22L2.3	3	3	2	2	-	-	-	-	-	-	-	2	2	2	1
C22L2	**3**	**2.6**	**2.3**	**2**	**-**	0.6	-	-	0.6	-	-	2	**2**	**2.3**	**0.3**

Database Management Systems

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY
(An Autonomous Institution under UGC, New Delhi)

B.Tech. - II Year – II Semester

L	T	P	C
0	0	2	1

(R22CSE2227) DATABASE MANAGEMENT SYSTEMS LAB

Course Objectives:

- Introduce ER data model, database design and normalization.
- Learn SQL basics for data definition and data manipulation.

Course Outcomes:

- Design database schema for a given application and apply normalization.
- Acquire skills in using SQL commands for data definition and data manipulation.
- Develop solutions for database applications using procedures, cursors and triggers.

List of Experiments:

1. Concept design with E-R Model
2. Relational Model
3. Normalization
4. Practicing DDL commands
5. Practicing DML commands
6. A. Querying (using ANY, ALL, UNION, INTERSECT, JOIN, Constraints etc.)
   B. Nested, Correlated subqueries
7. Queries using Aggregate functions, GROUP BY, HAVING and Creation and dropping of Views.
8. Triggers (Creation of insert trigger, delete trigger, update trigger)
9. Procedures
10. Usage of Cursors

TEXTB O O K S :

1. Database Management Systems, Raghurama Krishnan, Johannes Gehrke, Tata Mc Graw Hill,3rd Edition
2. Database System Concepts, Silberschatz, Korth, McGraw Hill, V edition.

REFERENCE BOOKS:

1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7thEdition.
2. Fundamentals of Database Systems, Elmasri Navrate, Pearson Education
3. Introduction to Database Systems, C.J. Date, Pearson Education
4. Oracle for Professionals, The X Team, S. Shah and V. Shah, SPD.
5. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL, Shah, PHI.
6. Fundamentals of Database Management Systems, M. L. Gillenson, Wiley Student Edition.

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EXPERIMENT- 1

CONCEPT DESIGN WITH E-R MODEL

AIM: To Relate the entities appropriately. Apply cardinalities for each relationship. Identify strong and weak entities. Indicate the type of relationships (total/partial). Incorporate generalization, aggregation and specialization etc wherever required.

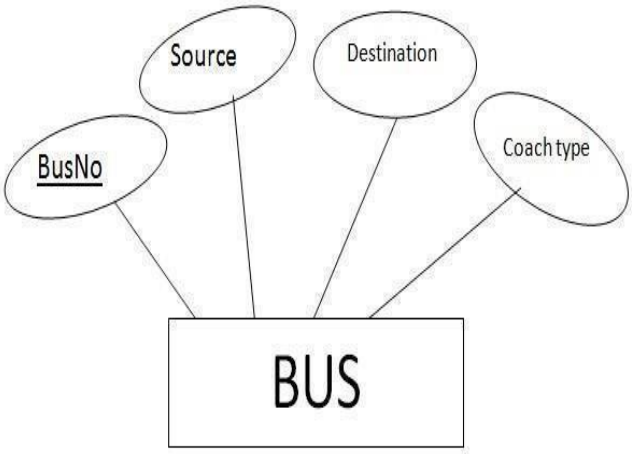
E-R Model

Bus

- BusNo
- Source
- Destination
- CoachType

SCHEMA

Bus: Bus(BusNo :String ,Source : String, Destination: String, Coach Type: String)



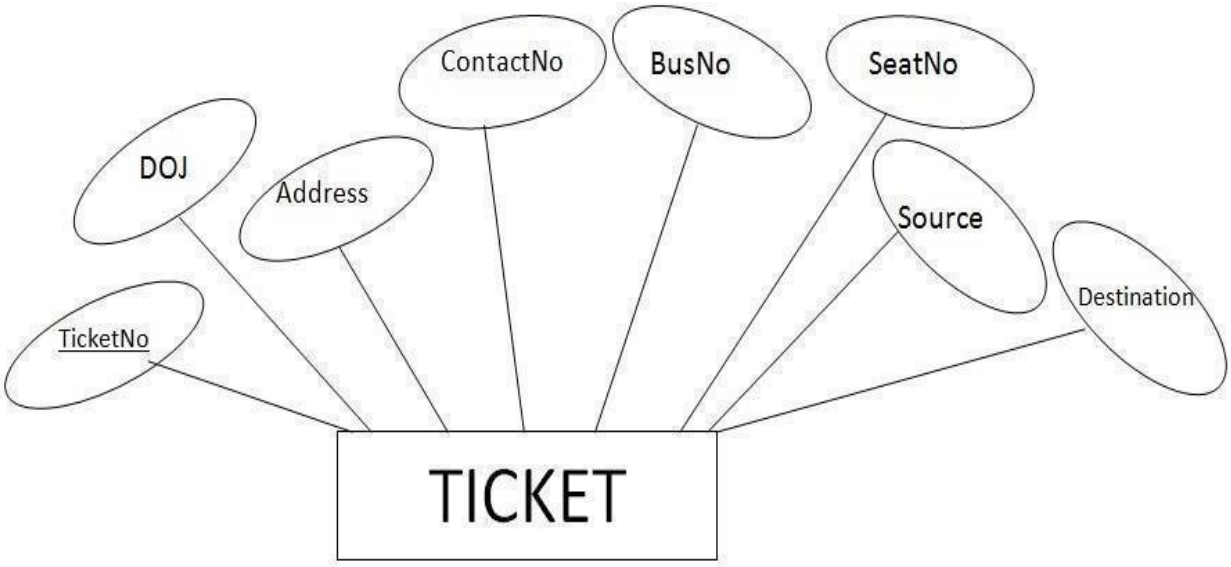
Ticket

- TicketNo
- DOJ
- Address
- ContactNo
- BusNo

- SeatNo
- Source
- Destination

SCHEMA

Ticket (TicketNo: string, DOJ: date, Address: string, ContactNo : string, BusNo:String SeatNo : Integer, Source: String, Destination: String)

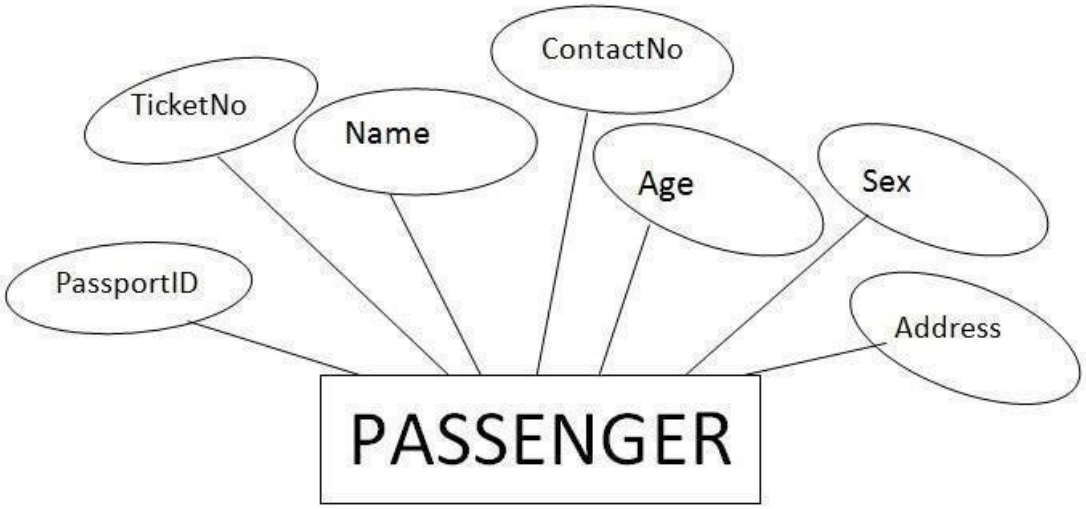


Passenger

- PassportID
- TicketNo
- Name
- ContactNo
- Age
- Sex
- Address

SCHEMA

Passenger (PassportID: String, TicketNo :string, Name: String, ContactNo: string, Age: integer, Sex: character, Address: String)



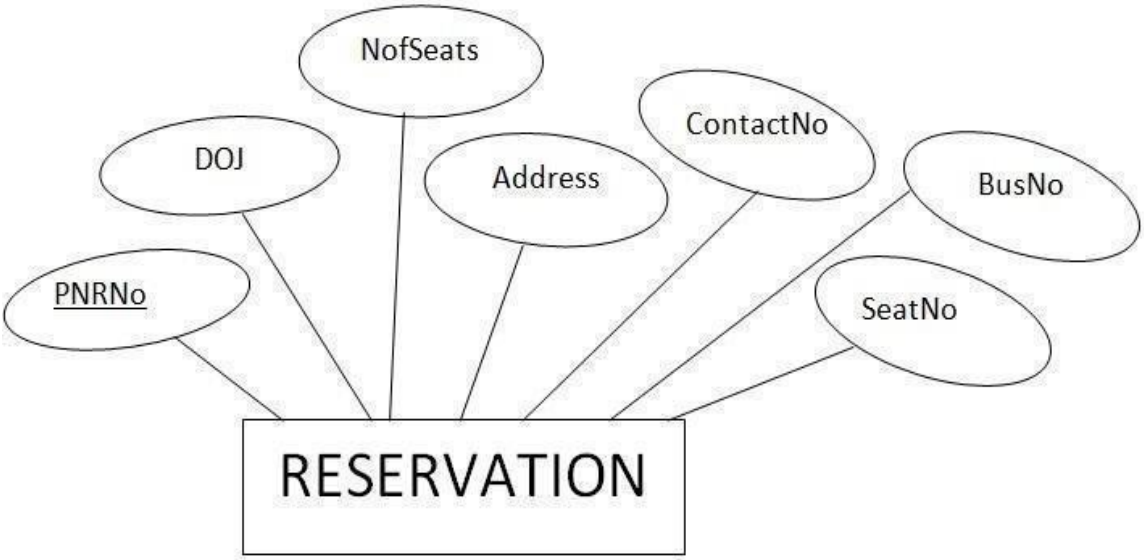
Reservation

- PNRNo
- DOJ
- No_of_seats
- Address
- ContactNo
- BusNo
- SeatNo

SCHEMA

Reservation(PNRNo: String, DOJ: Date, NoofSeats: integer , Address: String ,ContactNo: String, ,

BusNo: String,SeatNo:Integer)

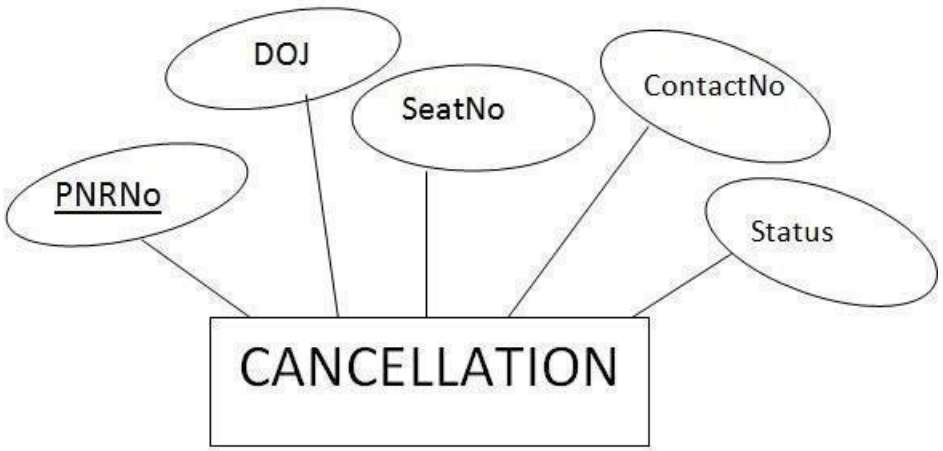


Cancellation

- PNRNo
- DOJ
- SeatNo
- ContactNo
- Status

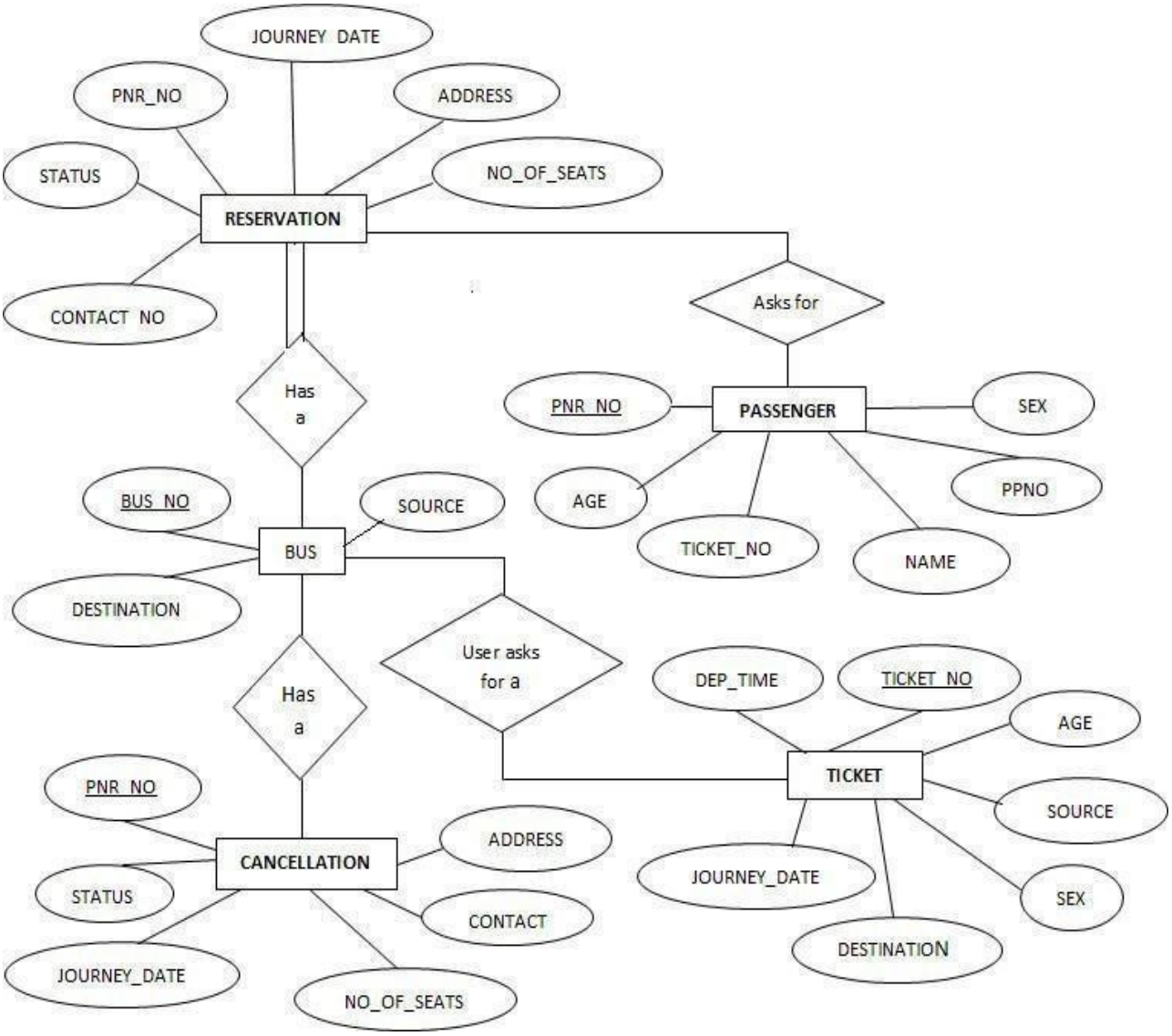
SCHEMA

Cancellation (PNRNo: String, DOJ: Date, SeatNo: integer, ContactNo: String, Status: String)



[4]

CONCEPT DESIGN WITH E-R MODEL



Viva Questions:

1. Define DBMS?
2. Define the terms i) Entity ii) Entity set iii) weak entity set iv) strong entity set?
3. What is ER-diagram?
4. What are the different types of entities?
5. List various types of attributes?

EXPERIMENT – 2
RELATIONAL MODEL

AIM: To Represent all the entities (Strong, Weak) in tabular fashion. Represent relationships in a tabular fashion.

1. **Bus:** Bus(BusNo: String, Source: String, Destination: String, CoachType: String)

ColumnName	Datatype	Constraints	Type of Attributes
BusNo	**Varchar(10)**	**Primary key**	**Single-value**
Source	**Varchar(20)**		**Single-value**
Destination	**Varchar(20)**		**Simple**
CoachType	**Varchar(10)**		**Simple**

Mysql>create table Bus(BusNo varchar(10),source varchar(20),Destination varchar(20),coachType varchar(10),primary key(BusNo));

Mysql>desc Bus;

```
mysql> use cse;
Database changed
mysql> create table Bus(BusNo varchar(10),source varchar(20),Destination varchar(20),coachType varchar(10),primary key(BusNo));
Query OK, 0 rows affected (0.06 sec)

mysql> desc Bus;
+-------------+-------------+------+-----+---------+-------+
| Field       | Type        | Null | Key | Default | Extra |
+-------------+-------------+------+-----+---------+-------+
| BusNo       | varchar(10) | NO   | PRI |         |       |
| source      | varchar(20) | YES  |     | NULL    |       |
| Destination | varchar(20) | YES  |     | NULL    |       |
| coachType   | varchar(10) | YES  |     | NULL    |       |
+-------------+-------------+------+-----+---------+-------+
4 rows in set (0.00 sec)

mysql>
```

Ticket:

Ticket(TicketNo: string, DOJ: date, Address:string,ContactNo: string, BusNo:String, SeatNo :Integer, Source: String, Destination: String)

ColumnName	Datatype	Constraints	Type of Attributes
TicketNo	Varchar(20)	Primary Key	Single-valued
DOJ	Date		Single-valued
Address	Varchar(20)		Composite
ContactNo	Integer		Multi-valued
BusNo	Varchar(10)	Foreign Key	Single-valued
SeatNo	Integer		Simple
Source	Varchar(10)		Simple
Destination	Varchar(10)		Simple

Mysql> create table ticket(ticketno varchar(20), doj date,address varchar(20),contactno int, busno varchar(20),seatno int,source varchar(10),destination varchar(10),primary key(ticketno,busno) foreign key(busno) references bus(busno);

Mysql>desc Ticket;

```
mysql> create table Ticket (TicketNo varchar(20),DOJ date,Address varchar(20),ContactNo varchar(15),BusNo varc
har(10),seatNo int,Source varchar(10),Destination varchar(10),primary key(TicketNo,BusNo),foreign key(BusNo)re
ferences Bus(BusNo));
Query OK, 0 rows affected (0.05 sec)

mysql> desc Ticket;
+-------------+------------+------+-----+---------+-------+
| Field       | Type       | Null | Key | Default | Extra |
+-------------+------------+------+-----+---------+-------+
| TicketNo    | varchar(20) | NO   | PRI |         |       |
| DOJ         | date       | YES  |     | NULL    |       |
| Address     | varchar(20) | YES  |     | NULL    |       |
| ContactNo   | varchar(15) | YES  |     | NULL    |       |
| BusNo       | varchar(10) | NO   | PRI |         |       |
| seatNo      | int(11)    | YES  |     | NULL    |       |
| Source      | varchar(10) | YES  |     | NULL    |       |
| Destination | varchar(10) | YES  |     | NULL    |       |
+-------------+------------+------+-----+---------+-------+
8 rows in set (0.00 sec)

mysql>
```

Passenger:

Passenger(PassportID: String, TicketNo:string,Name: String, ContactNo:string,Age: integer, Sex: character, Address: String);

ColumnName	Datatype	Constraints	Type of Attributes
PassportID	Varchar(15)	Primary Key	Single-valued
TicketNo	Varchar(20)	Foreign Key	Single-valued

Name	Varchar(20)		Composite
ContactNo	Varchar(20)		Multi-valued
Age	Integer		Single-valued
Sex	character		Simple
Address	Varchar(20)		Composite

Mysql> Create table passenger(passportID varchar(15) ,TicketNo varchar(15),Name varchar(15),ContactNo varchar(20),Age integer, sex char(2),address varchar(20), primary key(passportID,TicketNo),foreign key(TicketNo) references Ticket(TicketNo));

Mysql> desc passenger;

```
mysql> use cse;
Database changed
mysql> create table passenger(passportid varchar(10),ticketno varchar(15),name varchar(15),contactno varchar(1
5),age integer,sex char(2),address varchar(20),primary key(passportid,ticketno),foreign key(ticketno) referenc
es ticket(ticketno));
Query OK, 0 rows affected (0.08 sec)

mysql> desc passenger;
+------------+-------------+------+-----+---------+-------+
| Field      | Type        | Null | Key | Default | Extra |
+------------+-------------+------+-----+---------+-------+
| passportid | varchar(10) | NO   | PRI |         |       |
| ticketno   | varchar(15) | NO   | PRI |         |       |
| name       | varchar(15) | YES  |     | NULL    |       |
| contactno  | varchar(15) | YES  |     | NULL    |       |
| age        | int(11)     | YES  |     | NULL    |       |
| sex        | char(2)     | YES  |     | NULL    |       |
| address    | varchar(20) | YES  |     | NULL    |       |
+------------+-------------+------+-----+---------+-------+
7 rows in set (0.03 sec)
```

Reservation:

Reservation(PNRNo: String, DOJ: Date, NoofSeats: integer , Address: String ,ContactNo: String, , BusNo: String,SeatNo:Integer)

ColumnName	Datatype	Constraints	Type of Attributes
PNRNo	Varchar(20)	Primary Key	Single-valued
DOJ	date		Single-valued
No_of_Seats	Integer		Simple
Address	Varchar(20)		Composite
ContactNo	Varchar(10)		Multi-valued

BusNo	**Varchar(10)**	**Foreign Key**	**Single-valued**
SeatNo	**Integer**		**Simple**

Mysql> Create table Resevation(PNRNo varchar(20),DOJ date,NoofSeates integer,Address varchar(20),ContactNo varchar(20),BusNo varchar(20),SeatNo integer, primary key(PNRNo,BusNo),foreign key(BusNo) references Bus(BusNo));

Mysql> desc reservation;

```
mysql> create table reservation(PNRNo varchar(20),DOJ date,NofSeats integer,Address varchar(20),ContactNo varc
har(20),BusNo varchar(20),SeatNo integer,primary key(PNRNo,BusNo),foreign key(BusNo) references Bus(BusNo));
Query OK, 0 rows affected (0.05 sec)

mysql> desc Reservation;
+-----------+-------------+------+-----+---------+-------+
| Field     | Type        | Null | Key | Default | Extra |
+-----------+-------------+------+-----+---------+-------+
| PNRNo     | varchar(20) | NO   | PRI |         |       |
| DOJ       | date        | YES  |     | NULL    |       |
| NofSeats  | int(11)     | YES  |     | NULL    |       |
| Address   | varchar(20) | YES  |     | NULL    |       |
| ContactNo | varchar(20) | YES  |     | NULL    |       |
| BusNo     | varchar(20) | NO   | PRI |         |       |
| SeatNo    | int(11)     | YES  |     | NULL    |       |
+-----------+-------------+------+-----+---------+-------+
7 rows in set (0.01 sec)
```

Cancellation:

Cancellation (PNRNo: String,DOJ: Date, SeatNo: integer,ContactNo: String,Status: String)

ColumnName	Datatype	Constraints	Type of Attributes
PNRNo	**Varchar(10)**	**Primary Key**	**Single-valued**
DOJ	**date**		**Single-valued**
SeatNo	**Integer**		**Simple**
ContactNo	**Varchar(15)**		**Multi-valued**
Status	**Varchar(10)**		**Simple**

Mysql> create table cancellation(PNRNo varchar(10),DOJ date,SeatNo integer, ContactNo varchar(15),Status varchar(10), primary key(PNRNo), foreign key(PNRNo) references reservation(PNRNo));

Mysql> desc cancellation;

```
mysql> create table cancellation(PNRNo varchar(10),DOJ date,SeatNo integer,ContactNo varchar(15),Status varcha
r(10),primary key(PNRNo),foreign key(PNRNo) references Reservation(PNRNo));
Query OK, 0 rows affected (0.05 sec)

mysql> desc cancellation;
+-----------+-------------+------+-----+---------+-------+
| Field     | Type        | Null | Key | Default | Extra |
+-----------+-------------+------+-----+---------+-------+
| PNRNo     | varchar(10) | NO   | PRI |         |       |
| DOJ       | date        | YES  |     | NULL    |       |
| SeatNo    | int(11)     | YES  |     | NULL    |       |
| ContactNo | varchar(15) | YES  |     | NULL    |       |
| Status    | varchar(10) | YES  |     | NULL    |       |
+-----------+-------------+------+-----+---------+-------+
5 rows in set (0.00 sec)
```

Viva Questions:

1What is relation schema and a relation?

2. What is Relation and Relationship?

3. Define Instance and Schema?

4. What is the difference between ER and Relational Model?

5. What is the degree of relation?

EXPERIMENT – 3
NORMALIZATION

AIM: Apply the database Normalization techniques for designing relational database tables to minimize duplication of information like 1NF, 2NF, 3NF, BCNF.

Normalization is a process of converting a relation to be standard form by decomposition a larger relation into smaller efficient relation that depicts a good database design.

- 1NF: A Relation scheme is said to be in 1NF if the attribute values in the relation are atomic.i.e., Mutli –valued attributes are not permitted.

- 2NF: A Relation scheme is said to be in 2NF, iff and every Non-key attribute is fully functionally dependent on primary Key.

- 3NF: A Relation scheme is said to be in 3NF, iff and does not have transitivity dependencies. A Relation is said to be 3NF if every determinant is a key for each & every functional dependency.

- BCNF: A Relation scheme is said to be BCNF if the following statements are true for eacg FD P->Q in set F of FDs that holds for each FD. P->Q in set F of FD's that holds over R. Here P is the subset of attributes of R & Q is a single attribute of R.

The given FD is a trival

P is a super key.

Normalized tables are:-

Mysql> create table Bus2(BusNo varchar(20) primary key,Source varchar(20),Destination varchar(20));

Mysql>Create table passenger4(PPN varchar(15) Primary key,Name varchar(20),Age integer,Sex char,Address varchar(20));

Mysql> Create table PassengerTicket(PPN varchar(15) Primary key,TicketNo integer);

Mysql> Create table Reservation2(PNRNO integer Primary key, JourneyDate DateTime,NoofSeats int,Address varchar(20),ContactNo Integer);

Mysql> create table Cancellation2(PNRNO Integer primary key,JourneyDate DateTime,NoofSeats Integer,Address varchar(20),ContactNo Integer,foreignkey(PNRNO) references Reservation2(PNRNO));

Mysql> Create table Ticket2(TicketNo Integer Primary key,JourneyDate DateTime, Age Int(4),Sex char(2),Source varchar(20),Destination varchar(20),DeptTime varchar(2));

Viva Questions:

1. Define Redundancy?
2. What is decomposition?
3. What is Normalization?
4. What is fully functional dependency?
5. List the different types of Normal forms?

EXPERIMENT – 4
PRACTICING DDL COMMANDS

AIM : Creating Tables and altering the Tables

Mysql>Create table passenger2(passportId Integer Primary Key, Name varchar(10) NotNull, Age Integer Not Null, Sex char, Address varchar(20) Not Null);

Mysql> desc passenger2;

```
mysql> create table passenger3(passportId integer primary key,name varchar(10) not null,Age Integer not null,
Sex char,Address varchar(20) not null);
Query OK, 0 rows affected (0.03 sec)

mysql> desc passenger3;
+------------+-------------+------+-----+---------+-------+
| Field      | Type        | Null | Key | Default | Extra |
+------------+-------------+------+-----+---------+-------+
| passportId | int(11)     | NO   | PRI |         |       |
| name       | varchar(10) | NO   |     |         |       |
| Age        | int(11)     | NO   |     |         |       |
| Sex        | char(1)     | YES  |     | NULL    |       |
| Address    | varchar(20) | NO   |     |         |       |
+------------+-------------+------+-----+---------+-------+
5 rows in set (0.02 sec)
```

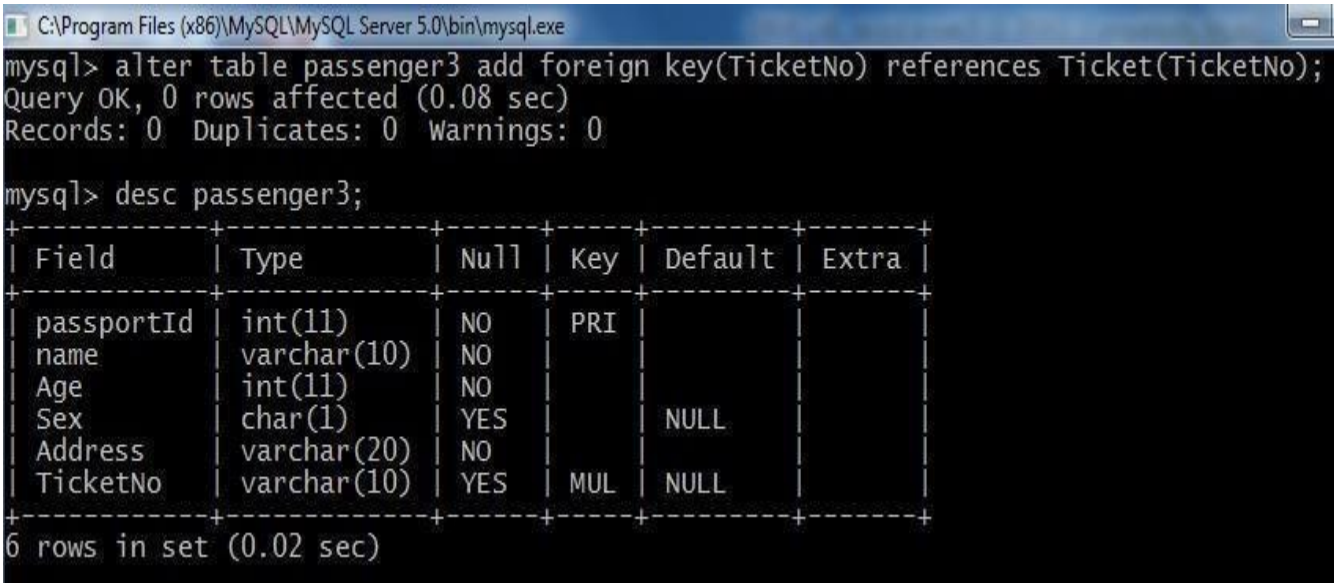
USING ALTER COMMAND

Adding Extra column to Existing Table

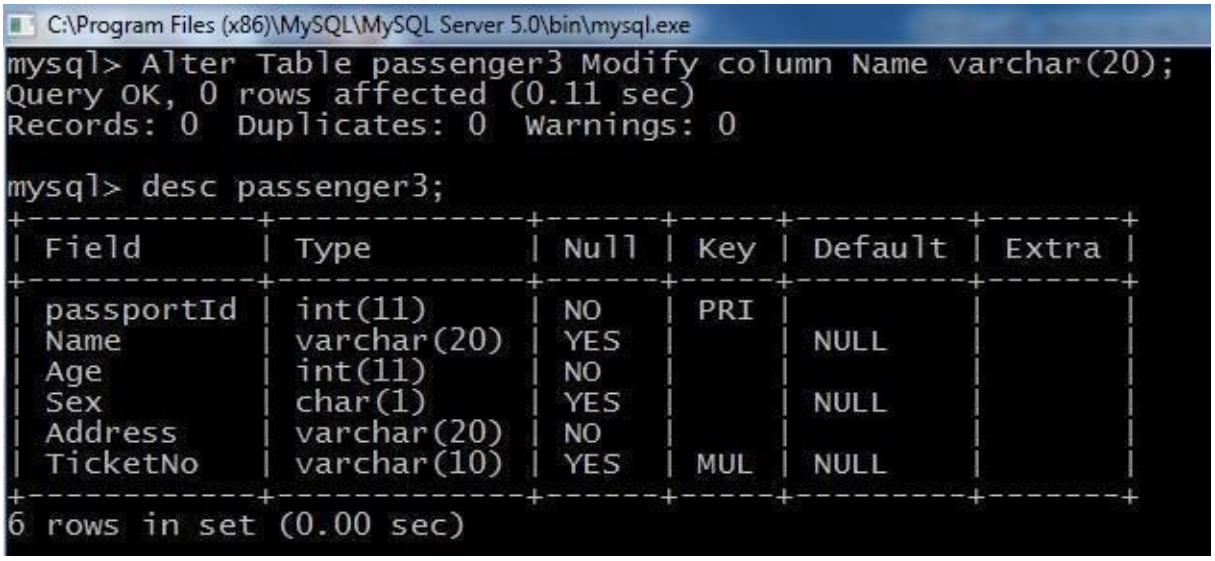
Mysql>Alter table passenger3 add column TicketNo varchar(10);

```
mysql> Alter table passenger3  add column TicketNo  varchar(10);
Query OK, 0 rows affected (0.14 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> desc passenger3;
+------------+-------------+------+-----+---------+-------+
| Field      | Type        | Null | Key | Default | Extra |
+------------+-------------+------+-----+---------+-------+
| passportId | int(11)     | NO   | PRI |         |       |
| name       | varchar(10) | NO   |     |         |       |
| Age        | int(11)     | NO   |     |         |       |
| Sex        | char(1)     | YES  |     | NULL    |       |
| Address    | varchar(20) | NO   |     |         |       |
| TicketNo   | varchar(10) | YES  |     | NULL    |       |
+------------+-------------+------+-----+---------+-------+
6 rows in set (0.00 sec)
```

Mysql>Alter Table passenger3 add Foreign key(TicketNo) references Ticket(TicketNo);



Mysql>Alter Table passenger3 Modify column Name varchar(20);



Mysql>Alter table passenger drop foreign key fk1;

```
mysql> Alter table passenger2  add column TicketNo  varchar(10);
Query OK, 0 rows affected (0.07 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> alter table passenger2 add constraint fk1 foreign key(TicketNo) reference
s Ticket(TicketNo);
Query OK, 0 rows affected (0.07 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> Alter table passenger2 drop foreign key fk1;
Query OK, 0 rows affected (0.09 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> desc passenger2;
+------------+-------------+------+-----+---------+-------+
| Field      | Type        | Null | Key | Default | Extra |
+------------+-------------+------+-----+---------+-------+
| passportId | int(11)     | NO   | PRI |         |       |
| name       | varchar(10) | NO   |     |         |       |
| Age        | int(11)     | NO   |     |         |       |
| Sex        | char(1)     | YES  |     | NULL    |       |
| Address    | varchar(20) | NO   |     |         |       |
| TicketNo   | varchar(10) | YES  | MUL | NULL    |       |
+------------+-------------+------+-----+---------+-------+
6 rows in set (0.00 sec)
```

Mysql> Alter table passenger2 Drop column TicketNo;

```
mysql> Alter table passenger2 drop column ticketNo;
Query OK, 0 rows affected (0.08 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> desc passenger2;
+------------+-------------+------+-----+---------+-------+
| Field      | Type        | Null | Key | Default | Extra |
+------------+-------------+------+-----+---------+-------+
| passportId | int(11)     | NO   | PRI |         |       |
| name       | varchar(10) | NO   |     |         |       |
| Age        | int(11)     | NO   |     |         |       |
| Sex        | char(1)     | YES  |     | NULL    |       |
| Address    | varchar(20) | NO   |     |         |       |
+------------+-------------+------+-----+---------+-------+
5 rows in set (0.01 sec)
```

Viva Questions:

1. What is DDL?
2. What are the different types of commands used in DDL language?
3. Difference between drop and truncate?
4. What is the use of DDL language in DBMS?
5. Define Database?

EXPERIMENT – 5
PRACTICING DML COMMANDS

AIM: Create a DML Commands are used to manage data within the scheme objects.

DML Commands:

INSERT COMMAND ON BUS2 & PASSENGER2 RELATIONS

mysql> select * from Bus2; Empty set (0.00 sec)

mysql> insert into Bus2 values(1234,'Hyderabad','Tirupathi');

Query OK, 1 row affected (0.03 sec)

mysql> insert into Bus2 values(2345,'Hyderabad','Banglore');

Query OK, 1 row affected (0.01 sec)

mysql> insert into Bus2 values(23,'Hyderabad','Kolkata');

Query OK, 1 row affected (0.03 sec)

mysql> insert into Bus2 values(45,'Tirupathi','Banglore');

Query OK, 1 row affected (0.03 sec)

mysql> insert into Bus2 values(34,'Hyderabad','Chennai');

Query OK, 1 row affected (0.03 sec)

mysql> select * from Bus2;

```
mysql> select * from Bus2;
Empty set (0.00 sec)

mysql> insert into Bus2 values(1234,'Hyderabad','Tirupathi');
Query OK, 1 row affected (0.03 sec)

mysql> insert into Bus2 values(2345,'Hyderabad','Banglore');
Query OK, 1 row affected (0.01 sec)

mysql> insert into Bus2 values(23,'Hyderabad','Kolkata');
Query OK, 1 row affected (0.03 sec)

mysql> insert into Bus2 values(45,'Tirupathi','Banglore');
Query OK, 1 row affected (0.03 sec)

mysql> insert into Bus2 values(34,'Hyderabad','Chennai');
Query OK, 1 row affected (0.03 sec)

mysql> select * from Bus2;
+-------+-----------+-------------+
| BusNo | Source    | Destination |
+-------+-----------+-------------+
| 1234  | Hyderabad | Tirupathi   |
| 23    | Hyderabad | Kolkata     |
| 2345  | Hyderabad | Banglore    |
| 34    | Hyderabad | Chennai     |
| 45    | Tirupathi | Banglore    |
+-------+-----------+-------------+
5 rows in set (0.01 sec)
```

mysql> select * from Passenger2;

Empty set (0.00 sec)

mysql> insert into Passenger2 values(145,'Ramesh',45,'M','abc123');

Query OK, 1 row affected (0.05 sec)

mysql> insert into Passenger2 values(278,'Geetha',36,'F','abc124');

Query OK, 1 row affected (0.02 sec)

mysql> insert into Passenger2 values(4590,'Ram',30,'M','abc12');

Query OK, 1 row affected (0.03 sec)

mysql> insert into Passenger2 values(6789,'Ravi',50,'M','abc14');

Query OK, 1 row affected (0.03 sec)

mysql> insert into Passenger2 values(5622,'Seetha',32,'F','abc55');

Query OK, 1 row affected (0.03 sec)

mysql> select * from Passenger2;

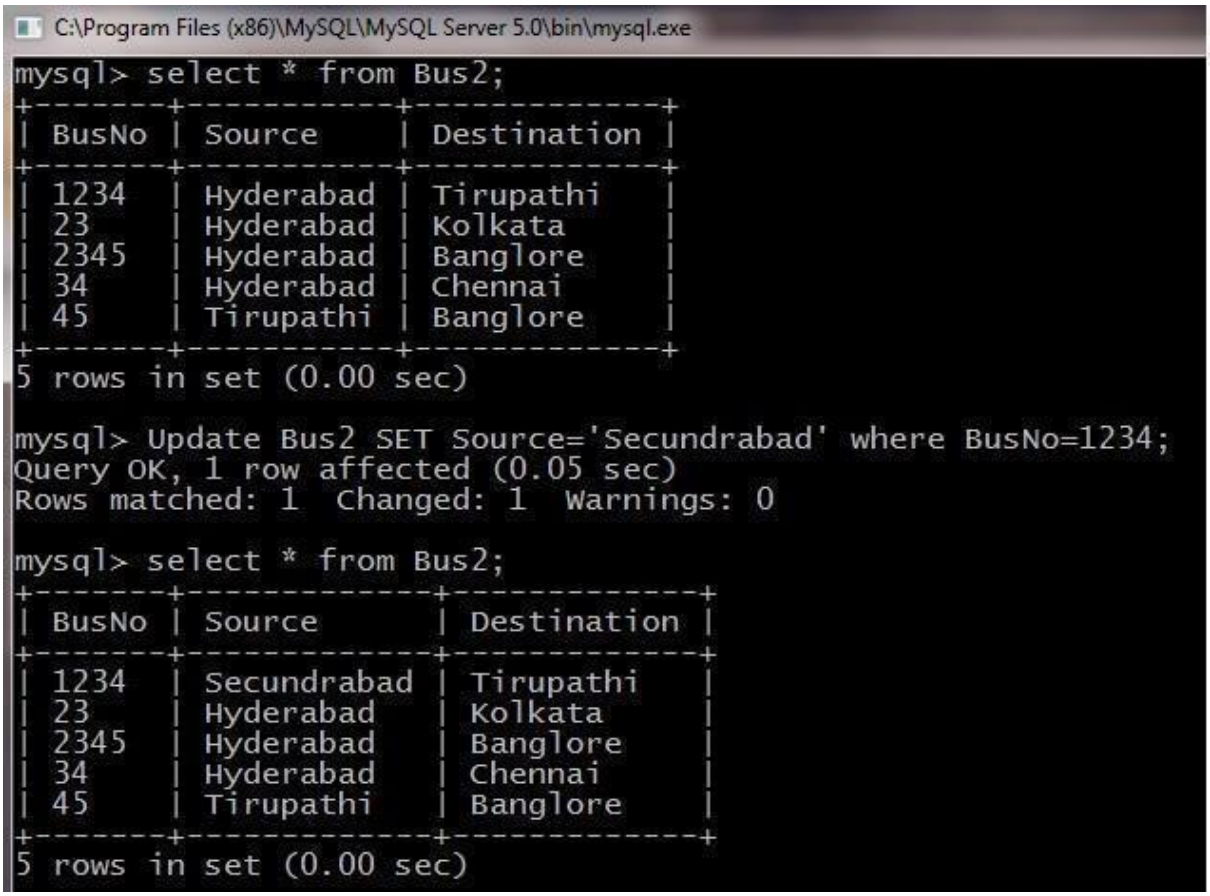
```
mysql> select * from Passenger2;
Empty set (0.00 sec)

mysql> insert into Passenger2 values(145,'Ramesh',45,'M','abc123');
Query OK, 1 row affected (0.05 sec)

mysql> insert into Passenger2 values(278,'Geetha',36,'F','abc124');
Query OK, 1 row affected (0.02 sec)

mysql> insert into Passenger2 values(4590,'Ram',30,'M','abc12');
Query OK, 1 row affected (0.03 sec)

mysql> insert into Passenger2 values(6789,'Ravi',50,'M','abc14');
Query OK, 1 row affected (0.03 sec)

mysql> insert into Passenger2 values(5622,'Seetha',32,'F','abc55');
Query OK, 1 row affected (0.03 sec)

mysql> select * from Passenger2;
+------------+--------+-----+------+---------+
| passportId | name   | Age | Sex  | Address |
+------------+--------+-----+------+---------+
|        145 | Ramesh |  45 | M    | abc123  |
|        278 | Geetha |  36 | F    | abc124  |
|       4590 | Ram    |  30 | M    | abc12   |
|       5622 | Seetha |  32 | F    | abc55   |
|       6789 | Ravi   |  50 | M    | abc14   |
+------------+--------+-----+------+---------+
5 rows in set (0.00 sec)
```

UPDATE COMMAND ON BUS2 RELATION

UPDATE Selected Rows & Multiple Rows

mysql> Update Bus2 SET Source='Secundrabad' where BusNo=1234; Query OK, 1 row affected (0.05 sec)

Rows matched: 1 Changed: 1 Warnings: 0



DELETE COMMAND ON BUS2 RELATION

DELETES Selected Rows and Multiple Rows

mysql> Delete from Bus2 where BusNo=1234; Query OK, 1 row affected (0.05 sec)

mysql> select * from Bus2;

```
mysql> select * from Bus2;
+-------+-------------+-------------+
| BusNo | Source      | Destination |
+-------+-------------+-------------+
| 1234  | Secundrabad | Tirupathi   |
| 23    | Secundrabad | Kolkata     |
| 2345  | Secundrabad | Banglore    |
| 34    | Secundrabad | Chennai     |
| 45    | Tirupathi   | Banglore    |
+-------+-------------+-------------+
5 rows in set (0.00 sec)

mysql> Delete from Bus2 where BusNo=1234;
Query OK, 1 row affected (0.05 sec)

mysql> select * from Bus2;
+-------+-------------+-------------+
| BusNo | Source      | Destination |
+-------+-------------+-------------+
| 23    | Secundrabad | Kolkata     |
| 2345  | Secundrabad | Banglore    |
| 34    | Secundrabad | Chennai     |
| 45    | Tirupathi   | Banglore    |
+-------+-------------+-------------+
4 rows in set (0.00 sec)
```

mysql> Delete from Bus2 where Source='Secundrabad'; Query OK, 1 row affected (0.05 sec)

mysql> select * from Bus2;

```
mysql> select * from Bus2;
+-------+-------------+-------------+
| BusNo | Source      | Destination |
+-------+-------------+-------------+
| 23    | Secundrabad | Kolkata     |
| 2345  | Secundrabad | Banglore    |
| 34    | Secundrabad | Chennai     |
| 45    | Tirupathi   | Banglore    |
+-------+-------------+-------------+
4 rows in set (0.00 sec)

mysql> Delete from Bus2 where Source='Secundrabad';
Query OK, 3 rows affected (0.03 sec)

mysql> select * from Bus2;
+-------+-----------+-------------+
| BusNo | Source    | Destination |
+-------+-----------+-------------+
| 45    | Tirupathi | Banglore    |
+-------+-----------+-------------+
1 row in set (0.00 sec)
```

Viva Questions:

1. What is DML?
2. What is the use of DML in DBMS?
3. What are the DML Commands?
4. What is the use of Alter command in DBMS?
5. Define view?

EXPERIMENT – 6

Querying (using ANY, ALL, IN, Exists, NOT EXISTS, UNION, INTERSECT, Constraints etc.)

Aim: Practice the following Queries:

1. Display unique PNR_NO of all passengers
2. Display all the names of male passengers.
3. Display the ticket numbers and names of all the passengers.
4. Find the ticket numbers of the passengers whose name start with 'r' and ends with 'h'.
5. Find the names of Passengers whose age is between 30 and 45.
6. Display all the passengers names beginning with 'A'.
7. Display the sorted list of Passengers names

```
mysql> DESC RESERVATION2;
+-------------+-------------+------+-----+---------+-------+
| Field       | Type        | Null | Key | Default | Extra |
+-------------+-------------+------+-----+---------+-------+
| PNRNO       | int(11)     | NO   | PRI |         |       |
| Journeydate | datetime    | YES  |     | NULL    |       |
| NoofSeats   | int(11)     | YES  |     | NULL    |       |
| Address     | varchar(20) | YES  |     | NULL    |       |
| CONTACTNO   | varchar(15) | YES  |     | NULL    |       |
+-------------+-------------+------+-----+---------+-------+
5 rows in set (0.00 sec)

mysql> insert into reservation2 values(10201,'2012-02-20 10:20:25',05,'HYD',9654
235242);
Query OK, 1 row affected (0.03 sec)

mysql> insert into reservation2 values(10202,'2012-02-22 10:22:25',05,'HYD',9654
232451);
Query OK, 1 row affected (0.02 sec)

mysql> insert into reservation2 values(10203,'2012-03-22 10:30:25',05,'DELHI',96
54587960);
Query OK, 1 row affected (0.01 sec)

mysql> insert into reservation2 values(10204,'2013-03-22 11:30:25',05,'CHENNAI',
9845761254);
Query OK, 1 row affected (0.02 sec)

mysql> SELECT * FROM RESERVATION2;
+-------+---------------------+-----------+---------+------------+
| PNRNO | Journeydate         | NoofSeats | Address | CONTACTNO  |
+-------+---------------------+-----------+---------+------------+
| 10201 | 2012-02-20 10:20:25 |         5 | HYD     | 9654235242 |
| 10202 | 2012-02-22 10:22:25 |         5 | HYD     | 9654232451 |
| 10203 | 2012-03-22 10:30:25 |         5 | DELHI   | 9654587960 |
| 10204 | 2013-03-22 11:30:25 |         5 | CHENNAI | 9845761254 |
+-------+---------------------+-----------+---------+------------+
4 rows in set (0.01 sec)
```

```
mysql> insert into passenger2 values(82302,'Smith',23,'M','Hyderabad');
Query OK, 1 row affected (0.02 sec)

mysql> insert into passenger2 values(82303,'Neha',23,'F','Hyderabad');
Query OK, 1 row affected (0.01 sec)

mysql> insert into passenger2 values(82304,'Neha',35,'F','Hyderabad');
Query OK, 1 row affected (0.03 sec)

mysql> insert into passenger2 values(82306,'Ramu',40,'M','Hyderabad');
Query OK, 1 row affected (0.02 sec)

mysql> insert into passenger2 values(82308,'Aakash',40,'M','Hyderabad');
Query OK, 1 row affected (0.02 sec)

mysql> insert into passenger2 values(82402,'Aravind',42,'M','Hyderabad');
Query OK, 1 row affected (0.02 sec)

mysql> insert into passenger2 values(82403,'Avinash',42,'M','Hyderabad');
Query OK, 1 row affected (0.02 sec)

mysql> insert into passenger2 values(82502,'Ramesh',23,'M','Hyderabad');
Query OK, 1 row affected (0.02 sec)

mysql> insert into passenger2 values(82602,'Rajesh',23,'M','Hyderabad');
 Query OK, 1 row affected (0.02 sec)
```

RESERVATION2

mysql> insert into reservation2 values(10201,'2012-02-20 10:20:25',05,'HYD',9654 235242);

Query OK, 1 row affected (0.03 sec)

mysql> insert into reservation2 values(10202,'2012-02-22 10:22:25',05,'HYD',9654 232451);

Query OK, 1 row affected (0.02 sec)

mysql> insert into reservation2 values(10203,'2012-03-22 10:30:25',05,'DELHI',96 54587960);

Query OK, 1 row affected (0.01 sec)

mysql> insert into reservation2 values(10204,'2013-03-22 11:30:25',05,'CHENNAI', 9845761254);

Query OK, 1 row affected (0.02 sec)

1. Display unique PNR_NO of all reservation Mysql>Select

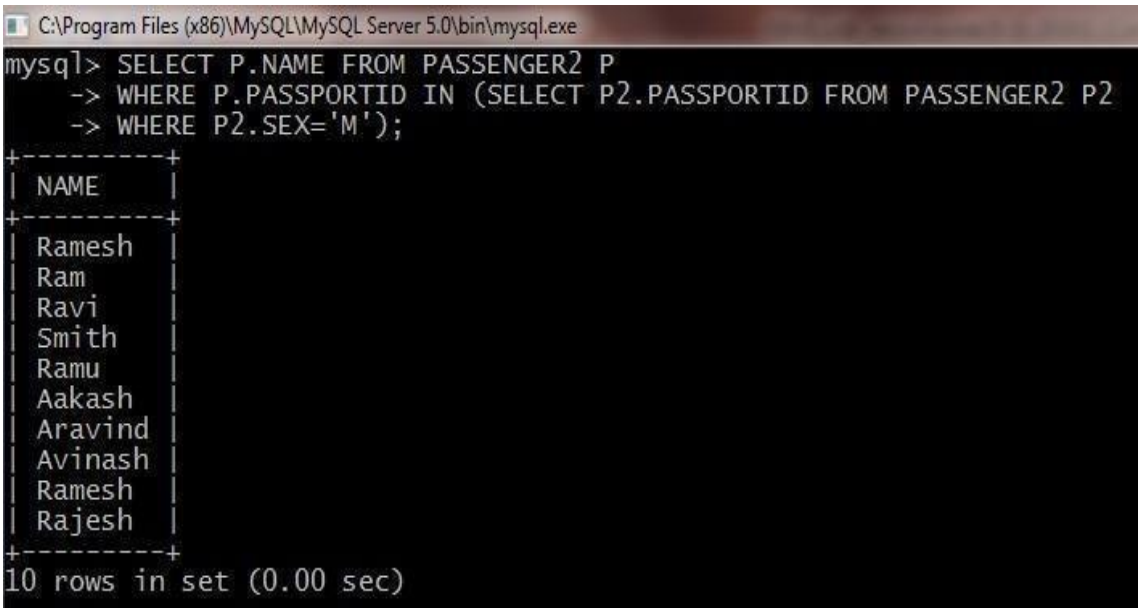
   DISTINCT PNR_NO from Reservation;

PNR_No
10201
10202
10203
10204

```
mysql> SELECT DISTINCT PNRNO FROM RESERVATION2;
+-------+
| PNRNO |
+-------+
| 10201 |
| 10202 |
| 10203 |
| 10204 |
+-------+
4 rows in set (0.02 sec)
```

2. Display all the names of male passengers.

```
mysql> Select p.name from passenger2 p
       where p.passportid IN (select p2.passportid from passenger2 p2
       where p2.sex='M');
```



```
mysql> SELECT * FROM PASSENGER2;
+------------+---------+-----+------+-----------+
| passportId | name    | Age | Sex  | Address   |
+------------+---------+-----+------+-----------+
|        145 | Ramesh  |  45 | M    | abc123    |
|        278 | Geetha  |  36 | F    | abc124    |
|       4590 | Ram     |  30 | M    | abc12     |
|       5622 | Seetha  |  32 | F    | abc55     |
|       6789 | Ravi    |  50 | M    | abc14     |
|      82302 | Smith   |  23 | M    | Hyderabad |
|      82303 | Neha    |  23 | F    | Hyderabad |
|      82304 | Neha    |  35 | F    | Hyderabad |
|      82306 | Ramu    |  40 | M    | Hyderabad |
|      82308 | Aakash  |  40 | M    | Hyderabad |
|      82402 | Aravind |  42 | M    | Hyderabad |
|      82403 | Avinash |  42 | M    | Hyderabad |
|      82502 | Ramesh  |  23 | M    | Hyderabad |
|      82602 | Rajesh  |  23 | M    | Hyderabad |
+------------+---------+-----+------+-----------+
14 rows in set (0.00 sec)

mysql> SELECT P.NAME FROM PASSENGER2 P
    -> WHERE P.PASSPORTID IN (SELECT P2.PASSPORTID
    -> FROM PASSENGER2 P2
    -> WHERE P2.SEX='M');
+---------+
| NAME    |
+---------+
| Ramesh  |
| Ram     |
| Ravi    |
| Smith   |
| Ramu    |
| Aakash  |
| Aravind |
| Avinash |
| Ramesh  |
| Rajesh  |
+---------+
10 rows in set (0.00 sec)
```

3. Display the ticket numbers and names of all the passengers.

```
mysql> desc passengerticket;
+------------+-------------+------+-----+---------+-------+
| Field      | Type        | Null | Key | Default | Extra |
+------------+-------------+------+-----+---------+-------+
| passportid | varchar(15) | NO   | PRI |         |       |
| TicketNo   | int(11)     | YES  |     | NULL    |       |
+------------+-------------+------+-----+---------+-------+
2 rows in set (0.00 sec)

mysql> insert into passengerticket values(145,100);
Query OK, 1 row affected (0.03 sec)

mysql> insert into passengerticket values(278,200);
Query OK, 1 row affected (0.03 sec)

mysql> insert into passengerticket values(6789,300);
Query OK, 1 row affected (0.03 sec)

mysql> insert into passengerticket values(82302,400);
Query OK, 1 row affected (0.03 sec)

mysql> insert into passengerticket values(82403,500);
Query OK, 1 row affected (0.03 sec)

mysql> insert into passengerticket values(82502,600);
Query OK, 1 row affected (0.02 sec)
```

mysql> select t.ticketno,p.name from passengerticket t,passenger2 p where t.passportid = p.passportid;

```
mysql> SELECT T.TICKETNO,P.NAME FROM PASSENGERTICKET T,PASSENGER2 P
    -> WHERE T.PASSPORTID=P.PASSPORTID;
+----------+---------+
| TICKETNO | NAME    |
+----------+---------+
|      100 | Ramesh  |
|      200 | Geetha  |
|      300 | Ravi    |
|      400 | Smith   |
|      500 | Avinash |
|      600 | Ramesh  |
+----------+---------+
6 rows in set (0.00 sec)
```

4. Find the ticket numbers of the passengers whose name start with ‘r’ and ends with ‘h’.

MySQL> SELECT Name FROM Passenger WHERE name LIKE ‘R%H’

Name
Rajesh
Ramesh
Ramesh

```
mysql> SELECT * FROM PASSENGER2;
+------------+---------+-----+------+-----------+
| passportId | name    | Age | Sex  | Address   |
+------------+---------+-----+------+-----------+
|        145 | Ramesh  |  45 | M    | abc123    |
|        278 | Geetha  |  36 | F    | abc124    |
|       4590 | Ram     |  30 | M    | abc12     |
|       5622 | Seetha  |  32 | F    | abc55     |
|       6789 | Ravi    |  50 | M    | abc14     |
|      82302 | Smith   |  23 | M    | Hyderabad |
|      82303 | Neha    |  23 | F    | Hyderabad |
|      82304 | Neha    |  35 | F    | Hyderabad |
|      82306 | Ramu    |  40 | M    | Hyderabad |
|      82308 | Aakash  |  40 | M    | Hyderabad |
|      82402 | Aravind |  42 | M    | Hyderabad |
|      82403 | Avinash |  42 | M    | Hyderabad |
|      82502 | Ramesh  |  23 | M    | Hyderabad |
|      82602 | Rajesh  |  23 | M    | Hyderabad |
+------------+---------+-----+------+-----------+
14 rows in set (0.00 sec)

mysql> SELECT NAME FROM PASSENGER2 WHERE NAME LIKE 'R%H';
+--------+
| NAME   |
+--------+
| Ramesh |
| Ramesh |
| Rajesh |
+--------+
3 rows in set (0.00 sec)
```

5. Find the names of Passengers whose age is between 30 and 45.

MySQL> SELECT Name FROM PASSENGER WHERE AGE BETWEEN 30 AND 45

```
mysql> SELECT * FROM PASSENGER2;
+------------+---------+-----+------+-----------+
| passportId | name    | Age | Sex  | Address   |
+------------+---------+-----+------+-----------+
|        145 | Ramesh  |  45 | M    | abc123    |
|        278 | Geetha  |  36 | F    | abc124    |
|       4590 | Ram     |  30 | M    | abc12     |
|       5622 | Seetha  |  32 | F    | abc55     |
|       6789 | Ravi    |  50 | M    | abc14     |
|      82302 | Smith   |  23 | M    | Hyderabad |
|      82303 | Neha    |  23 | F    | Hyderabad |
|      82304 | Neha    |  35 | F    | Hyderabad |
|      82306 | Ramu    |  40 | M    | Hyderabad |
|      82308 | Aakash  |  40 | M    | Hyderabad |
|      82402 | Aravind |  42 | M    | Hyderabad |
|      82403 | Avinash |  42 | M    | Hyderabad |
|      82502 | Ramesh  |  23 | M    | Hyderabad |
|      82602 | Rajesh  |  23 | M    | Hyderabad |
+------------+---------+-----+------+-----------+
14 rows in set (0.00 sec)

mysql> SELECT Name FROM PASSENGER2 WHERE AGE BETWEEN 30 AND 45;
+---------+
| Name    |
+---------+
| Ramesh  |
| Geetha  |
| Ram     |
| Seetha  |
| Neha    |
| Ramu    |
| Aakash  |
| Aravind |
| Avinash |
+---------+
9 rows in set (0.00 sec)
```

6. Display all the passengers names beginning with ‘A’.

MySQL> SELECT * FROM PASSENGER WHERE NAME LIKE ‘A%’;

Name
Akash
Arivind
Avinash

```
mysql> SELECT * FROM PASSENGER2;
+------------+---------+-----+------+-----------+
| passportId | name    | Age | Sex  | Address   |
+------------+---------+-----+------+-----------+
|        145 | Ramesh  |  45 | M    | abc123    |
|        278 | Geetha  |  36 | F    | abc124    |
|       4590 | Ram     |  30 | M    | abc12     |
|       5622 | Seetha  |  32 | F    | abc55     |
|       6789 | Ravi    |  50 | M    | abc14     |
|      82302 | Smith   |  23 | M    | Hyderabad |
|      82303 | Neha    |  23 | F    | Hyderabad |
|      82304 | Neha    |  35 | F    | Hyderabad |
|      82306 | Ramu    |  40 | M    | Hyderabad |
|      82308 | Aakash  |  40 | M    | Hyderabad |
|      82402 | Aravind |  42 | M    | Hyderabad |
|      82403 | Avinash |  42 | M    | Hyderabad |
|      82502 | Ramesh  |  23 | M    | Hyderabad |
|      82602 | Rajesh  |  23 | M    | Hyderabad |
+------------+---------+-----+------+-----------+
14 rows in set (0.00 sec)

mysql> SELECT NAME FROM PASSENGER2 WHERE NAME LIKE 'A%';
+---------+
| NAME    |
+---------+
| Aakash  |
| Aravind |
| Avinash |
+---------+
3 rows in set (0.00 sec)
```

7. Display the sorted list of Passengers names

MySQL> SELECT NAME FROM PASSENGER ORDER BY NAME;

```
mysql> SELECT * FROM PASSENGER2;
+------------+---------+-----+------+-----------+
| passportId | name    | Age | Sex  | Address   |
+------------+---------+-----+------+-----------+
|        145 | Ramesh  |  45 | M    | abc123    |
|        278 | Geetha  |  36 | F    | abc124    |
|       4590 | Ram     |  30 | M    | abc12     |
|       5622 | Seetha  |  32 | F    | abc55     |
|       6789 | Ravi    |  50 | M    | abc14     |
|      82302 | Smith   |  23 | M    | Hyderabad |
|      82303 | Neha    |  23 | F    | Hyderabad |
|      82304 | Neha    |  35 | F    | Hyderabad |
|      82306 | Ramu    |  40 | M    | Hyderabad |
|      82308 | Aakash  |  40 | M    | Hyderabad |
|      82402 | Aravind |  42 | M    | Hyderabad |
|      82403 | Avinash |  42 | M    | Hyderabad |
|      82502 | Ramesh  |  23 | M    | Hyderabad |
|      82602 | Rajesh  |  23 | M    | Hyderabad |
+------------+---------+-----+------+-----------+
14 rows in set (0.00 sec)

mysql> SELECT NAME FROM PASSENGER2 ORDER BY NAME;
+---------+
| NAME    |
+---------+
| Aakash  |
| Aravind |
| Avinash |
| Geetha  |
| Neha    |
| Neha    |
| Rajesh  |
| Ram     |
| Ramesh  |
| Ramesh  |
| Ramu    |
| Ravi    |
| Seetha  |
| Smith   |
+---------+
14 rows in set (0.02 sec)
```

Viva Questions:

1. What are the Different types of set operators?
2. What are the aggregate operators?
3. What is the difference between ANY and OR operators?
4. What is NULL Values?
5. What is the use of EXISTS operator?

EXPERIMENT – 7

Querying Aggregate Functions (GROUP BY, HAVING and Creation and Dropping of Views)

Aim: To Practice Queries using Aggregate functions for the following

1. Write a Query to display the information present in the passenger and cancellation tables
2. Display the number of days in a week on which the AP123 bus is available
3. Find number of tickets booked for each PNR_ No using GROUP BY CLAUSE
4. Find the distinct PNR Numbers that are present.

1. Write a Query to display the information present in the passenger and cancellation tables

MYSQL> CREATE TABLE CANCELLATION2(PNRNO INT PRIMARY KEY,JOURNEYDATE DATETIME, NOOFSEATS INT,ADDRESS VARCHAR(20),CONTACTNO INT,STATUS VARCHAR(10),FOREIGN KEY(PNRNO) REFERENCES RESERVATION2(PNRNO));

mysql> INSERT INTO CANCELLATION2 VALUES(10201,'2012-02-20 10:20:25',2,'HYD',9654235242,'CONFIRM');

mysql> INSERT INTO CANCELLATION2 VALUES(10202,'2012-02-22 10:22:25',2,'HYD',9654232451,'CONFIRM');

mysql> INSERT INTO CANCELLATION2 VALUES(10203,'2012-03-22 10:30:25',2,'DELHI',9654587960,'CONFIRM');

MySQL> SELECT * FROM RESERVATION UNION

SELECT * FROM CANCELLATION;

```
mysql> SELECT * FROM RESERVATION2
    -> UNION
    -> SELECT * FROM CANCELLATION2;
+-------+---------------------+-----------+---------+------------+---------+
| PNRNO | Journeydate         | NoofSeats | Address | CONTACTNO  | STATUS  |
+-------+---------------------+-----------+---------+------------+---------+
| 10201 | 2012-02-20 10:20:25 |         5 | HYD     | 9654235242 | NULL    |
| 10202 | 2012-02-22 10:22:25 |         5 | HYD     | 9654232451 | NULL    |
| 10203 | 2012-03-22 10:30:25 |         5 | DELHI   | 9654587960 | NULL    |
| 10204 | 2013-03-22 11:30:25 |         5 | CHENNAI | 9845761254 | NULL    |
| 10201 | 2012-02-20 10:20:25 |         2 | HYD     | 9654235242 | CONFIRM |
| 10202 | 2012-02-22 10:22:25 |         2 | HYD     | 9654232451 | CONFIRM |
| 10203 | 2012-03-22 10:30:25 |         2 | DELHI   | 9654587960 | CONFIRM |
+-------+---------------------+-----------+---------+------------+---------+
7 rows in set (0.01 sec)
```

2. Display the Minimum age of the Passenger

MySQL> SELECT MIN(AGE) as MINAGE FROM PASSENGER;

```
mysql> SELECT * FROM PASSENGER2;
+------------+---------+-----+------+-----------+
| passportId | name    | Age | Sex  | Address   |
+------------+---------+-----+------+-----------+
|        145 | Ramesh  |  45 | M    | abc123    |
|        278 | Geetha  |  36 | F    | abc124    |
|       4590 | Ram     |  30 | M    | abc12     |
|       5622 | Seetha  |  32 | F    | abc55     |
|       6789 | Ravi    |  50 | M    | abc14     |
|      82302 | Smith   |  23 | M    | Hyderabad |
|      82303 | Neha    |  23 | F    | Hyderabad |
|      82304 | Neha    |  35 | F    | Hyderabad |
|      82306 | Ramu    |  40 | M    | Hyderabad |
|      82308 | Aakash  |  40 | M    | Hyderabad |
|      82402 | Aravind |  42 | M    | Hyderabad |
|      82403 | Avinash |  42 | M    | Hyderabad |
|      82502 | Ramesh  |  23 | M    | Hyderabad |
|      82602 | Rajesh  |  23 | M    | Hyderabad |
+------------+---------+-----+------+-----------+
14 rows in set (0.00 sec)

mysql> SELECT MIN(AGE) as MINAGE FROM PASSENGER2;
+--------+
| MINAGE |
+--------+
|     23 |
+--------+
1 row in set (0.03 sec)
```

3. Find number of tickets booked for each PNR_No using GROUP BY CLAUSE

MySQL> SELECT PNRNO,SUM(No_of_SEATS) AS SUM_OF_SEATS FROM RESERVATION2 GROUP BY PNRNO;

```
mysql> SELECT * FROM RESERVATION2;
+-------+---------------------+-----------+---------+------------+--------+
| PNRNO | Journeydate         | NoofSeats | Address | CONTACTNO  | STATUS |
+-------+---------------------+-----------+---------+------------+--------+
| 10201 | 2012-02-20 10:20:25 |         5 | HYD     | 9654235242 | NULL   |
| 10202 | 2012-02-22 10:22:25 |         5 | HYD     | 9654232451 | NULL   |
| 10203 | 2012-03-22 10:30:25 |         5 | DELHI   | 9654587960 | NULL   |
| 10204 | 2013-03-22 11:30:25 |         5 | CHENNAI | 9845761254 | NULL   |
+-------+---------------------+-----------+---------+------------+--------+
4 rows in set (0.00 sec)

mysql> SELECT PNRNO,SUM(NOOFSEATS) AS SUM_OF_SEATS FROM RESERVATION2   GROUP BY
PNRNO;
+-------+--------------+
| PNRNO | SUM_OF_SEATS |
+-------+--------------+
| 10201 |            5 |
| 10202 |            5 |
| 10203 |            5 |
| 10204 |            5 |
+-------+--------------+
4 rows in set (0.00 sec)
```

4 Find the distinct PNR Numbers that are present.

MySQL> SELECT DISTINCT PNR_NO FROM RESERVATION2;

```
mysql> SELECT * FROM RESERVATION2;
+-------+---------------------+-----------+---------+------------+--------+
| PNRNO | Journeydate         | NoofSeats | Address | CONTACTNO  | STATUS |
+-------+---------------------+-----------+---------+------------+--------+
| 10201 | 2012-02-20 10:20:25 |         5 | HYD     | 9654235242 | NULL   |
| 10202 | 2012-02-22 10:22:25 |         5 | HYD     | 9654232451 | NULL   |
| 10203 | 2012-03-22 10:30:25 |         5 | DELHI   | 9654587960 | NULL   |
| 10204 | 2013-03-22 11:30:25 |         5 | CHENNAI | 9845761254 | NULL   |
+-------+---------------------+-----------+---------+------------+--------+
4 rows in set (0.00 sec)

mysql> SELECT DISTINCT PNRNO FROM RESERVATION2;
+-------+
| PNRNO |
+-------+
| 10201 |
| 10202 |
| 10203 |
| 10204 |
+-------+
4 rows in set (0.00 sec)
```

5 Mysql> select sum(Noofseats) from Cancellation2;

```
mysql> SELECT * FROM CANCELLATION2;
+-------+---------------------+-----------+---------+------------+---------+
| PNRNO | JOURNEYDATE         | NOOFSEATS | ADDRESS | CONTACTNO  | STATUS  |
+-------+---------------------+-----------+---------+------------+---------+
| 10201 | 2012-02-20 10:20:25 |         2 | HYD     | 9654235242 | CONFIRM |
| 10202 | 2012-02-22 10:22:25 |         2 | HYD     | 9654232451 | CONFIRM |
| 10203 | 2012-03-22 10:30:25 |         2 | DELHI   | 9654587960 | CONFIRM |
+-------+---------------------+-----------+---------+------------+---------+
3 rows in set (0.00 sec)

mysql> SELECT SUM(NOOFSEATS) FROM CANCELLATION2;
+----------------+
| SUM(NOOFSEATS) |
+----------------+
|              6 |
+----------------+
1 row in set (0.00 sec)
```

6 Find the total number of cancelled seats.

MySQL> select sum(noofseats) as canceled_seats from cancellation2;

```
mysql> SELECT * FROM CANCELLATION2;
+-------+---------------------+-----------+---------+------------+---------+
| PNRNO | JOURNEYDATE         | NOOFSEATS | ADDRESS | CONTACTNO  | STATUS  |
+-------+---------------------+-----------+---------+------------+---------+
| 10201 | 2012-02-20 10:20:25 |         2 | HYD     | 9654235242 | CONFIRM |
| 10202 | 2012-02-22 10:22:25 |         2 | HYD     | 9654232451 | CONFIRM |
| 10203 | 2012-03-22 10:30:25 |         2 | DELHI   | 9654587960 | CONFIRM |
+-------+---------------------+-----------+---------+------------+---------+
3 rows in set (0.00 sec)

mysql> select sum(noofseats) as canceled_seats from  cancellation2;
+----------------+
| canceled_seats |
+----------------+
|              6 |
+----------------+
1 row in set (0.00 sec)
```

Creation and Droping of Views

mysql> create table students(sid int primary key,name varchar(15),login varchar(15), age int,gpa real); mysql> create table Enrolled(sid int,cid int,grade varchar(5),primary key(sid,cid), foreign key(sid) references students(sid));

mysql>create view BStudents(name,sid,course) AS SELECT

s.name,s.sid,E.cid from students s,enrolled E where s.sid=e.sid AND

E.grade='B';

```
mysql> create view BStudents(name,sid,course) AS SELECT s.name,s.sid,E.cid from
students s,enrolled E where s.sid=e.sid AND E.grade='B';
Query OK, 0 rows affected (0.00 sec)

mysql> select * from Bstudents;
+-------+-------+--------+
| name  | sid   | course |
+-------+-------+--------+
| jones | 53666 |      3 |
| Guldu | 53832 |      2 |
+-------+-------+--------+
2 rows in set (0.03 sec)
```

Syntax: Drop view view name;

Mysql> Drop view Bstudents; Mysql> Drop view Goodstudents;

```
mysql> Drop view Bstudents;
Query OK, 0 rows affected (0.00 sec)

mysql> Drop view Goodstudents;
Query OK, 0 rows affected (0.00 sec)
```

Viva Questions:

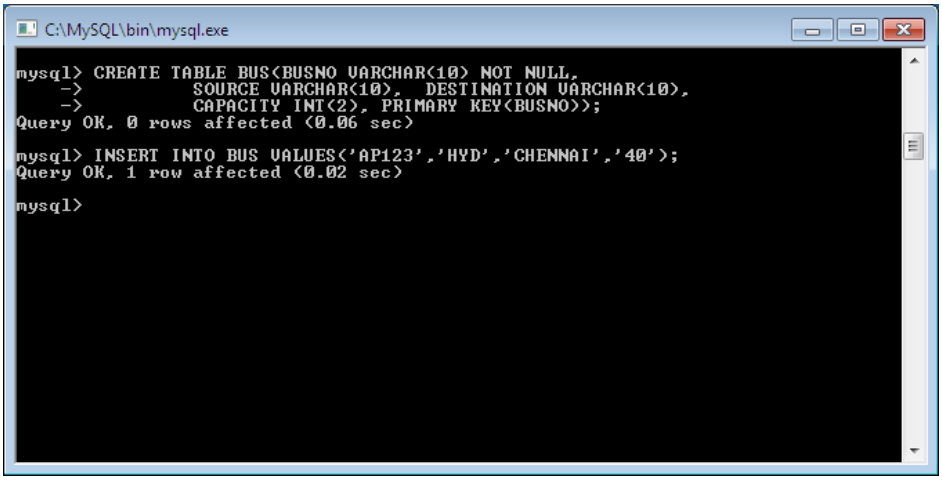
1. What is Nested query?
2. What is the use of Group By Clause?
3. Define Join?List different types of joins?
4. What is difference between left outer join and right outer join?
5. What is Co-related nested query?

EXPERIMENT-8
Triggers

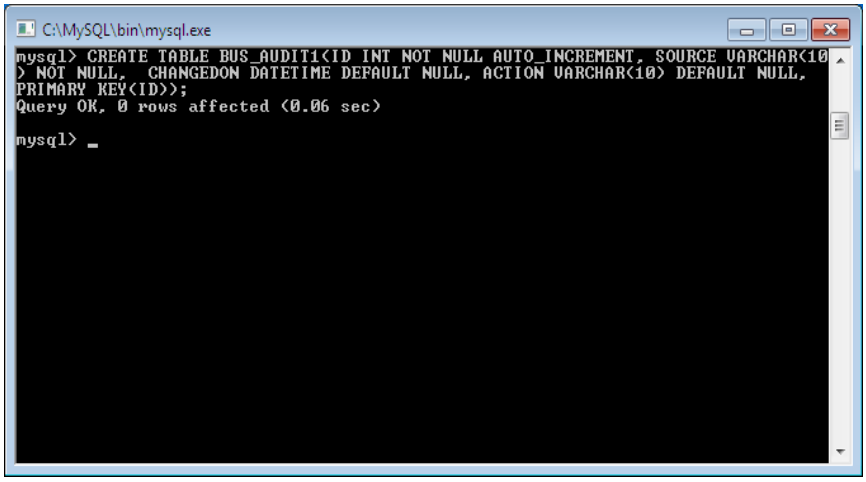
Aim: Creation of insert trigger, delete trigger and update trigger.

MySQL>CREATE TABLE BUS(BUSNO VARCHAR(10) NOT NULL, SOURCE VARCHAR(10), DESTINATION VARCHAR(10), CAPACITY INT(2), PRIMARY KEY(BUSNO));

MySQL>INSERT INTO BUS VALUES('AP123','HYD','CHENNAI','40');



CREATE TABLE BUS_AUDIT1(ID INT NOT NULL AUTO_INCREMENT, SOURCE VARCHAR(10) NOT NULL, CHANGEDON DATETIME DEFAULT NULL, ACTION VARCHAR(10) DEFAULT NULL, PRIMARY KEY(ID));

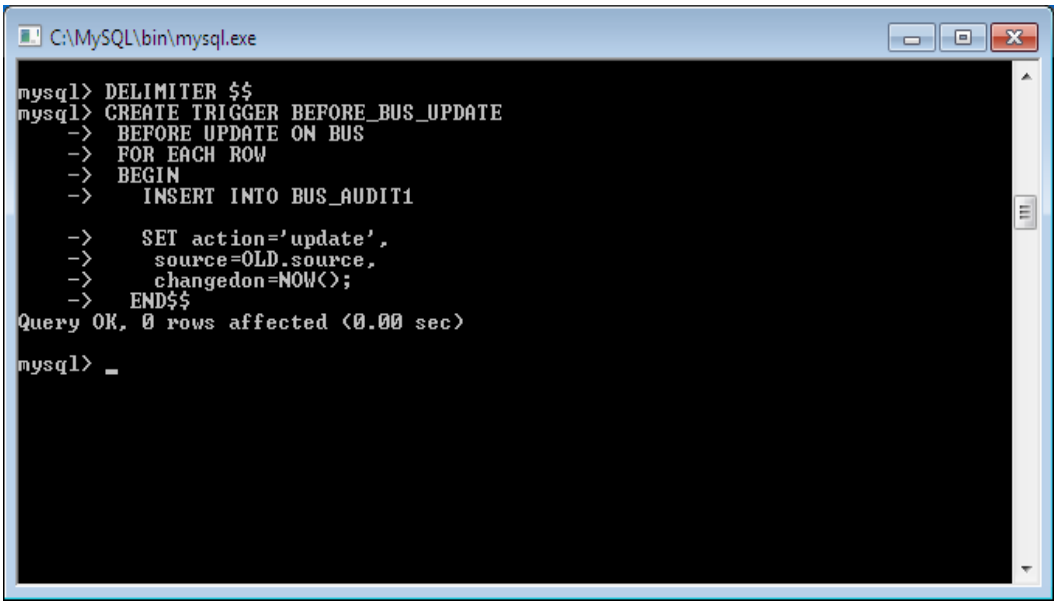


CREATE TRIGGER BEFORE_BUS_UPDATE BEFORE UPDATE ON BUS

FOR EACH ROW BEGIN

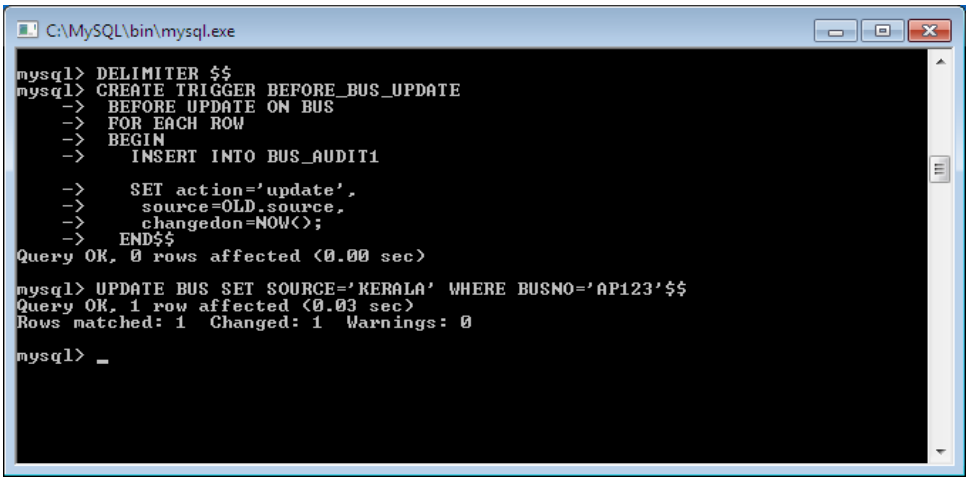
INSERT INTO BUS_AUDIT1

SET action='update', source=OLD.source, changedon=NOW(); END$$



UPDATE :

MySQL>UPDATE BUS SET SOURCE='KERALA' WHERE BUSNO='AP123'$$



SNo	Source	Changedon	Action
1	Banglore	2014:03:23 12:51:00	Insert
2	Kerela	2014:03:25:12:56:00	Update
3	Mumbai	2014:04:26:12:59:02	Delete

INSERT:

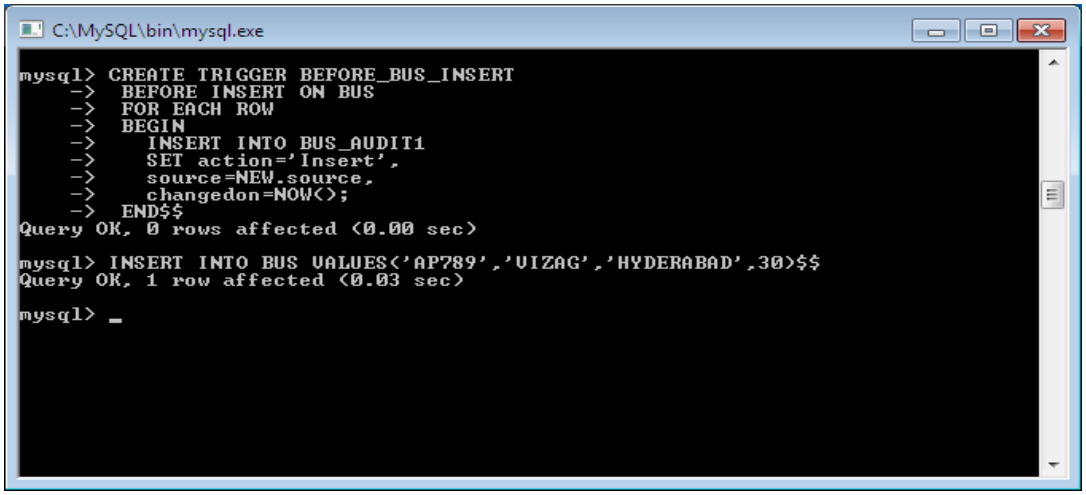
CREATE TRIGGER BEFORE_BUS_INSERT BEFORE INSERT ON BUS

FOR EACH ROW BEGIN

INSERT INTO BUS_AUDIT1

SET action='Insert', source=NEW.source, changedon=NOW(); END$$

MYSQL>INSERT INTO BUS VALUES('AP789','VIZAG','HYDERABAD',30)$$



SNo	Source	Changedon	Action
1	Banglore	2014:03:23 12:51:00	Insert
2	Kerela	2014:03:25:12:56:00	Update
3	Mumbai	2014:04:26:12:59:02	Delete

CREATE TRIGGER BEFORE_BUS_DELETE BEFORE DELETE ON BUS

FOR EACH ROW BEGIN

DELETE FROM BUS_AUDIT1

SET action='Insert', source=NEW.source, changedon=NOW(); END$$

DELETE FROM BUS WHERE SOURCE=’HYDERABAD’$$

SNo	Source	Changedon	Action
1	Banglore	2014:03:23 12:51:00	Insert
2	Kerela	2014:03:25:12:56:00	Update
3	Mumbai	2014:04:26:12:59:02	Delete

Examples

CREATE TRIGGER updcheck1 BEFORE UPDATE ON passengerticket FOR EACH ROW

BEGIN

IF NEW.TicketNO > 60 THEN

SET New.TicketNo = New.TicketNo; ELSE

SET New.TicketNo = 0; END IF;

END;

```
mysql> select * from passengerticket;$$
+------------+----------+
| passportid | TicketNo |
+------------+----------+
| 145        |      100 |
| 278        |      200 |
| 6789       |      300 |
| 82302      |      400 |
| 82403      |      500 |
| 82502      |      600 |
+------------+----------+
6 rows in set (0.00 sec)

mysql> desc passengerticket;$$
+------------+-------------+------+-----+---------+-------+
| Field      | Type        | Null | Key | Default | Extra |
+------------+-------------+------+-----+---------+-------+
| passportid | varchar(15) | NO   | PRI |         |       |
| TicketNo   | int(11)     | YES  |     | NULL    |       |
+------------+-------------+------+-----+---------+-------+
2 rows in set (0.00 sec)
```

```
mysql> CREATE TRIGGER updcheck BEFORE UPDATE ON passengerticket
    -> FOR EACH ROW
    -> BEGIN
    -> IF NEW.TicketNO > 60 THEN
    -> SET New.TicketNo = TicketNo;
    -> ELSE
    -> SET New.TicketNo = 0;
    -> END IF;
    -> END;
    -> $$
Query OK, 0 rows affected (0.00 sec)

mysql> update passengerticket set TicketNo=TicketNo-50 where passportid=145;$$
Query OK, 1 row affected (0.03 sec)
Rows matched: 1  Changed: 1  Warnings: 0

mysql> select * from passengerticket;$$
+------------+----------+
| passportid | TicketNo |
+------------+----------+
| 145        |        0 |
| 278        |      200 |
| 6789       |      300 |
| 82302      |      400 |
| 82403      |      500 |
| 82502      |      600 |
+------------+----------+
6 rows in set (0.00 sec)
```

```
mysql> select * from passengerticket;$$
+------------+----------+
| passportid | TicketNo |
+------------+----------+
| 145        |        0 |
| 278        |      200 |
| 6789       |      300 |
| 82302      |      400 |
| 82403      |      500 |
| 82502      |      600 |
+------------+----------+
6 rows in set (0.00 sec)

mysql> CREATE TRIGGER updcheck BEFORE UPDATE ON passengerticket
    -> FOR EACH ROW
    -> BEGIN
    -> IF NEW.TicketNO>60 THEN
    -> SET New.TicketNo=New.TicketNo;
    -> ELSE
    -> SET New.TicketNo=0;
    -> END IF;
    -> END;
    -> $$
Query OK, 0 rows affected (0.00 sec)

mysql> update passengerticket set TicketNo=TicketNo+80 where passportid=145;$$
Query OK, 1 row affected (0.03 sec)
Rows matched: 1  Changed: 1  Warnings: 0

mysql> select * from passengerticket;$$
+------------+----------+
| passportid | TicketNo |
+------------+----------+
| 145        |       80 |
| 278        |      200 |
| 6789       |      300 |
| 82302      |      400 |
| 82403      |      500 |
| 82502      |      600 |
+------------+----------+
6 rows in set (0.00 sec)
```

Viva Questions:

1. Define Trigger?
2. What are the types of triggers?
3. What is the advantage of trigger in database
4. Define Active data bases?
5. When we apply trigger?

Experiment-9
Procedures

Aim: Creation of stored Procedures and Execution of Procedures and Modification of Procedures.

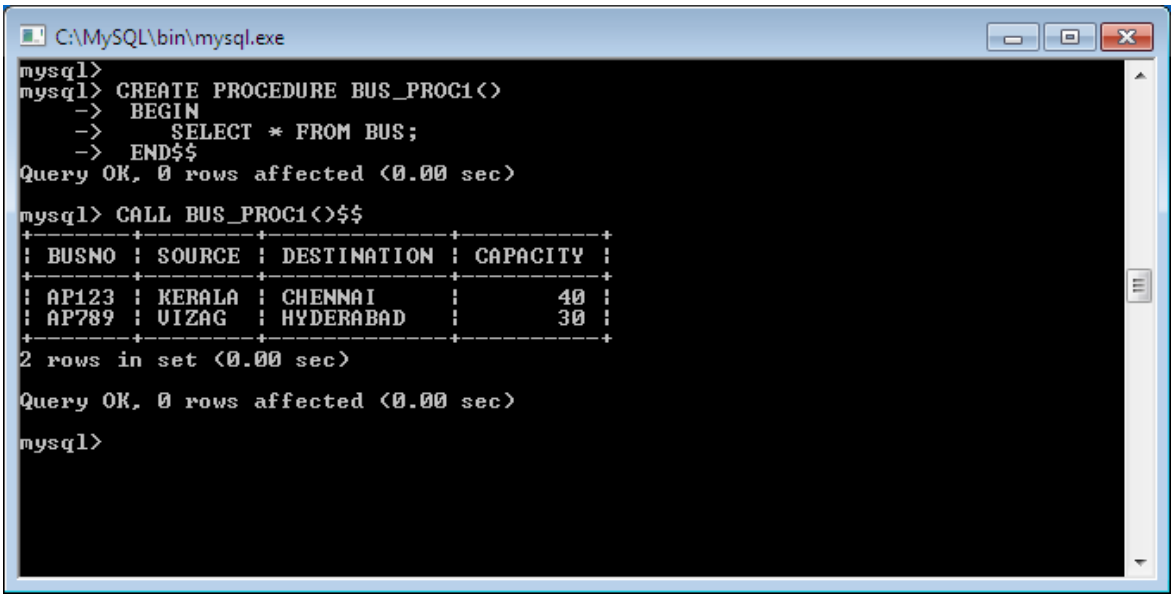
Ex1:

CREATE PROCEDURE BUS_PROC1() BEGIN

SELECT * FROM BUS;

END$$

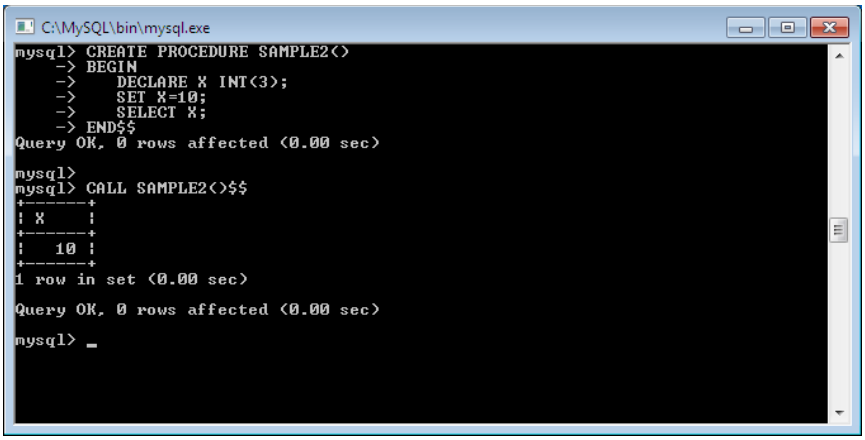
CALL BUS_PROC1()$$



Ex2:

CREATE PROCEDURE SAMPLE2() BEGIN
DECLARE X INT(3); SET X=10;
SELECT X;

END$$
Mysql> CALL SAMPLE2()$$



Ex3: CREATE PROCEDURE SIMPLE_PROC(OUT PARAM1 INT) BEGIN

SELECT COUNT(*) INTO PARAM1 FROM BUS;

END$$

Mysql> CALL SIMPLE_PROC(@a)$$ Mysql> select @a;

```
mysql> SELECT * FROM BUS2;
+-------+-----------+-------------+
| BusNo | Source    | Destination |
+-------+-----------+-------------+
| 35    | HYD       | CHENNAI     |
| 45    | Tirupathi | Banglore    |
| 55    | HYD       | MUMBAI      |
| 65    | DELHI     | KOLKATHA    |
+-------+-----------+-------------+
4 rows in set (0.00 sec)

mysql> DELIMITER $$
mysql> CREATE PROCEDURE SIMPLE_PROC(OUT PARAM1 INT)
    -> BEGIN
    -> SELECT COUNT(*) INTO PARAM1 FROM BUS2;
    -> END $$
Query OK, 0 rows affected (0.00 sec)

mysql> CALL SIMPLE_PROC(@a)$$
Query OK, 0 rows affected (0.03 sec)

mysql> SELECT @a$$
+------+
| @a   |
+------+
| 4    |
+------+
1 row in set (0.00 sec)
```

Viva Questions:

1. What do you mean by Procedure?
2. What is stored procedures used in databases?
3. What is stored procedure?
4. What are the advantage of using stored procedure?
5. List different types of keys in dbms?

EXPERIMENT-10
USAGE CURSORS

Aim: Declare a cursor that defines a result set. Open the cursor to establish the result set. Fetch the data into local variables as needed from the cursor, one row at a time. Close the cursor when done.

Cursors

In MySQL, a cursor allows row-by-row processing of the result sets. A cursor is used for the result set and returned from a query. By using a cursor, you can iterate, or by step through the results of a query and perform certain operations on each row. The cursor allows you to iterate through the result set and then perform the additional processing only on the rows that require it.

In a cursor contains the data in a loop. Cursors may be different from SQL commands that operate on all the rows in the returned by a query at one time.

There are some steps we have to follow, given below :

- □ Declare a cursor
- □ Open a cursor statement
- □ Fetch the cursor
- □ Close the cursor

1 . Declaration of Cursor : To declare a cursor you must use the DECLARE statement. With the help of the variables, conditions and handlers we need to declare a cursor before we can use it. first of all we will give the cursor a name, this is how we will refer to it later in the procedure. We can have more than one cursor in a single procedure so its necessary to give it a name that will in some way tell us what its doing. We then need to specify the select statement we want to associate with the cursor. The SQL statement can be any valid SQL statement and it is possible to use a dynamic where clause using variable or parameters as we have seen previously.

Syntax : DECLARE *cursor_name* CURSOR FOR *select_statement;*

2 . Open a cursor statement : For open a cursor we must use the open statement.If we want to fetch rows from it you must open thecursor.

Syntax : OPEN cursor_name;

3 . Cursor fetch statement : When we have to retrieve the next row from the cursor and move the cursor to next row then you need to fetch the cursor.

Synatx : FETCH cursor_name INTO var_name;

If any row exists, then the above statement fetches the next row and cursor pointer moves ahead to the next row.

4 . Cursor close statement : By this statement closed the open cursor.

Syntax: CLOSE_name;

By this statement we can close the previously opened cursor. If it is not closed explicitly then a cursor is closed at the end of compound statement in which that was declared.

Delimiter $$

```
Create procedure p1(in_customer_id int) begin
declare v_id int;
declare v_name varchar(20); declare v_finished integer default 0;
declare c1 cursor for select sid,sname from students where sid=in_customer_id; declare
continue handler for NOT FOUND set v_finished=1;
open c1; std:LOOP
fetch c1 into v_id,v_name; if v_finished=1 then
leave std; end if;
select concat(v_id,v_name); end LOOP std;
close c1; end;
```

```
mysql> select * from students;
+------+---------+------+--------+
| sid  | sname   | age  | marks  |
+------+---------+------+--------+
| 1    | ravi    |   15 |     25 |
| 2    | ramu    |   20 |     30 |
| 2    | rahul   |   18 |     26 |
| 5    | kiran   |   19 |     28 |
| 6    | varun   |   21 |     32 |
| 8    | ramesh  |   22 |     33 |
| 8    | xyz     |   10 |     20 |
+------+---------+------+--------+
7 rows in set (0.00 sec)
```

```
mysql> delimiter $$
mysql> Create procedure p1(in_customer_id int)
    -> begin
    -> declare v_id int;
    -> declare v_name varchar(20);
    -> declare v_finished integer  default 0;
    -> declare c1 cursor for select sid,sname from students where sid=in_custome
r_id;
    -> declare continue handler for NOT FOUND set v_finished=1;
    -> open c1;
    -> std:LOOP
    -> fetch c1 into v_id,v_name;
    -> if v_finished=1 then
    -> leave std;
    -> end if;
    -> select concat(v_id,v_name);
    -> end LOOP std;
    -> close c1;
    -> end;$$
Query OK, 0 rows affected (0.01 sec)
```

Viva Questions:

1. How Cursor used in Database?

2. How many types of Cursors in My Sql?
3. How to open and close the Cursor?
4. Differentiate Procedure and Cursor?
5. Can you pass a parameter to a Cursor?

ADDITIONAL PROGRAMMS

EMPLOYEES TABLE

mysql> create table Employees(ssn varchar(15),name varchar(20),lot int,PRIMARY KEY(ssn)); mysql> insert into Employees values('123-22-3666','Attishoo',48);

mysql> insert into Employees values('321-31-5368','Smiley',22); mysql> insert into Employees values('131-24-3650','Smethurst',35);

```
mysql> desc Employees;
+-------+-------------+------+-----+---------+-------+
| Field | Type        | Null | Key | Default | Extra |
+-------+-------------+------+-----+---------+-------+
| ssn   | varchar(15) | NO   | PRI |         |       |
| name  | varchar(20) | YES  |     | NULL    |       |
| lot   | int(11)     | YES  |     | NULL    |       |
+-------+-------------+------+-----+---------+-------+
3 rows in set (0.00 sec)

mysql> select * from Employees;
+-------------+-----------+------+
| ssn         | name      | lot  |
+-------------+-----------+------+
| 123-22-3666 | Attishoo  |   48 |
| 131-24-3650 | Smethurst |   35 |
| 321-31-5368 | Smiley    |   22 |
+-------------+-----------+------+
3 rows in set (0.02 sec)
```

DEPARTMENT TABLE

mysql> create table Departments(did int,dname varchar(10),budget real, PRIMARY KEY(did));

mysql> insert into Departments values(05,'CSE',500000);

mysql> insert into Departments values(04,'ECE',400000);

mysql> insert into Departments values(03,'ME',300000);

mysql> insert into Departments values(01,'CE',100000);

```
mysql> desc Departments;
+--------+-------------+------+-----+---------+-------+
| Field  | Type        | Null | Key | Default | Extra |
+--------+-------------+------+-----+---------+-------+
| did    | int(11)     | NO   | PRI | 0       |       |
| dname  | varchar(10) | YES  |     | NULL    |       |
| budget | double      | YES  |     | NULL    |       |
+--------+-------------+------+-----+---------+-------+
3 rows in set (0.00 sec)

mysql> select * from Departments;
+-----+-------+--------+
| did | dname | budget |
+-----+-------+--------+
|   1 | CE    | 100000 |
|   3 | ME    | 300000 |
|   4 | ECE   | 400000 |
|   5 | CSE   | 500000 |
+-----+-------+--------+
4 rows in set (0.00 sec)
```

Sailors , Reserves , Boats Tables

Mysql> Create table Sailors(Sid integer PRIMARY KEY,sname varchar(15), rating int,age real); Mysql>Create table Reserves(Sid int,Bid int,Day Date);

Mysql>Create table Boats(Bid int,Bname varchar(15),Color varchar(15);

```
mysql> select * from sailors;
+-----+---------+--------+------+
| sid | sname   | rating | age  |
+-----+---------+--------+------+
|  22 | Dustin  |      7 |   45 |
|  29 | Brutus  |      1 |   33 |
|  31 | Lubber  |      8 | 55.5 |
|  32 | Andy    |      8 | 25.5 |
|  58 | Rusty   |     10 |   35 |
|  64 | Horatio |      7 |   35 |
|  71 | Zorba   |     10 |   16 |
|  74 | Horatio |      9 |   35 |
|  85 | Art     |      3 | 25.5 |
|  95 | Bob     |      3 | 63.5 |
+-----+---------+--------+------+
10 rows in set (0.00 sec)

mysql> select * from reserves;
+------+------+------------+
| sid  | bid  | day        |
+------+------+------------+
|   22 |  101 | 1998-10-10 |
|   22 |  102 | 1998-10-10 |
|   22 |  103 | 1998-08-10 |
|   22 |  104 | 1998-07-10 |
|   31 |  102 | 1998-10-11 |
|   31 |  103 | 1998-06-11 |
|   31 |  104 | 1998-12-11 |
|   64 |  101 | 1998-05-09 |
|   64 |  102 | 1998-08-09 |
|   44 |  103 | 1998-08-09 |
+------+------+------------+
10 rows in set (0.00 sec)

mysql> select * from boats;
+------+-----------+-------+
| bid  | bname     | color |
+------+-----------+-------+
|  101 | Interlake | blue  |
|  102 | Interlake | red   |
|  103 | Clipper   | green |
|  103 | Marine    | red   |
+------+-----------+-------+
```

mysql> select S.sname from sailors S, reserves R where S.sid=R.sid AND R.bid=103;

```
mysql> select S.sname from sailors S, reserves R where S.sid=R.sid AND R.bid=103
;
+--------+
| sname  |
+--------+
| Dustin |
| Lubber |
+--------+
2 rows in set (0.00 sec)
```

mysql> select sname from sailors s,Reserves R where S.sid=R.sid AND bid=103; mysql> select R.sid from Boats B,Reserves R where B.bid=R.bid AND B.color='red';

```
mysql> select sname from sailors s,Reserves R where S.sid=R.sid AND bid=103;
+--------+
| sname  |
+--------+
| Dustin |
| Lubber |
+--------+
2 rows in set (0.00 sec)

mysql> select R.sid from Boats B,Reserves R where B.bid=R.bid AND B.color='red';

+------+
| sid  |
+------+
|   22 |
|   22 |
|   31 |
|   31 |
|   64 |
|   44 |
+------+
6 rows in set (0.00 sec)
```

mysql> select S.sname from sailors S,reserves R,Boats B where S.sid=R.sid AND R.bid=B.bid AND B.color='red';

mysql> select B.color from Sailors S,Reserves R,Boats B where S.sid=R.sid AND R.bid=B.bid AND S.sname='Lubber';

```
mysql> select S.sname from sailors S,reserves R,Boats B where S.sid=R.sid AND
R.bid=B.bid AND B.color='red';
+---------+
| sname   |
+---------+
| Dustin  |
| Dustin  |
| Lubber  |
| Lubber  |
| Horatio |
+---------+
5 rows in set (0.00 sec)


mysql> select B.color from Sailors S,Reserves R,Boats B where S.sid=R.sid AND
R.bid=B.bid AND S.sname='Lubber';
+-------+
| color |
+-------+
| red   |
| green |
| red   |
+-------+
3 rows in set (0.00 sec)
```

mysql> select S.sname,S.rating+1 AS rating from Sailors S,Reserves R1,Reserves R2 where S.sid=R1.sid AND S.sid=R2.sid AND R1.day=R2.day AND R1.bid<>R2.bid;

mysql> select S1.sname AS name1,S2.sname AS name2 from sailors S1,sailors S2 where 2*S1.rating=S2.rating-1;

```
mysql> select S.sname,S.rating+1 AS rating from Sailors S,Reserves R1,Reserves
R2 where S.sid=R1.sid AND S.sid=R2.sid AND R1.day=R2.day AND R1.bid<>R2.bid;
+--------+--------+
| sname  | rating |
+--------+--------+
| Dustin |      8 |
| Dustin |      8 |
+--------+--------+
2 rows in set (0.00 sec)

mysql> select S1.sname AS name1,S2.sname AS name2 from sailors S1,sailors S2
 where 2*S1.rating=S2.rating-1;
+--------+---------+
| name1  | name2   |
+--------+---------+
| Art    | Dustin  |
| Bob    | Dustin  |
| Art    | Horatio |
| Bob    | Horatio |
| Brutus | Art     |
| Brutus | Bob     |
+--------+---------+
6 rows in set (0.02 sec)
```

```
mysql> select S.age from sailors S where S.sname LIKE 'B_%B';
+------+
| age  |
+------+
| 63.5 |
+------+
1 row in set (0.00 sec)


mysql> select S.sname from sailors S where S.sname LIKE 'B_%B';
+-------+
| sname |
+-------+
| Bob   |
+-------+
1 row in set (0.00 sec)
```

N , INTERSECT , AND EXCEPT

1).Find the names of sailors who have reserved a red or a green boat.

```
mysql> SELECT S.SNAME FROM SAILORS S,RESERVES R,BOATS B
    -> WHERE S.SID=R.SID AND R.BID=B.BID
    -> AND(B.COLOR='red' OR B.COLOR='green');
+---------+
| SNAME   |
+---------+
| Dustin  |
| Dustin  |
| Dustin  |
| Lubber  |
| Lubber  |
| Lubber  |
| Horatio |
+---------+
7 rows in set (0.01 sec)
```

OR

```
mysql> SELECT S.SNAME
    -> FROM SAILORS S,RESERVES R,BOATS B
    -> WHERE S.SID=R.SID AND R.BID=B.BID AND B.COLOR='red'
    -> UNION
    -> SELECT S2.SNAME
    -> FROM SAILORS S2,BOATS B2,RESERVES R2
    -> WHERE S2.SID=R2.SID AND R2.BID=B2.BID AND B2.COLOR='green';
+---------+
| SNAME   |
+---------+
| Dustin  |
| Lubber  |
| Horatio |
+---------+
3 rows in set (0.02 sec)
```

2). Find the names of sailors who have reserved both a red and a green boat.

```
SELECT S.SNAME
FROM SAILORS S,RESERVES R,BOATS B
WHERE S.SID=R.SID AND R.BID=B.BID AND B.COLOR='red' INTERSECT
SELECT S2.SNAME
FROM SAILORS S2,RESERVES R2,BOATS B2
WHERE S2.SID=R2.SID AND R2.BID=B2.BID AND B2.COLOR='green';
```

NESTED QUERIES

1) Find the Names of sailors who have reserved boat 103

```
mysql> SELECT S.SNAME FROM SAILORS S
    -> WHERE S.SID IN (SELECT R.SID FROM RESERVES R
    -> WHERE R.BID=103)
    -> ;
+--------+
| SNAME  |
+--------+
| Dustin |
| Lubber |
+--------+
2 rows in set (0.00 sec)
```

2) Find the names of Sailors who have reserved a red Boat

```
mysql> SELECT S.SNAME FROM SAILORS S
    -> WHERE S.SID IN (SELECT R.SID FROM RESERVES R
    -> WHERE R.BID IN (SELECT B.BID FROM BOATS B
    -> WHERE B.COLOR='RED'));
+---------+
| SNAME   |
+---------+
| Dustin  |
| Lubber  |
| Horatio |
+---------+
3 rows in set (0.00 sec)
```

3) Find the names of Sailors who have NOT reserved a red Boat

```
mysql> select s.sname from sailors s
    -> where s.sid NOT IN (select r.sid from reserves r
    -> where r.bid IN (select b.bid from boats b
    -> where b.color='red'));
+---------+
| sname   |
+---------+
| Brutus  |
| Andy    |
| Rusty   |
| Zorba   |
| Horatio |
| Art     |
| Bob     |
+---------+
7 rows in set (0.00 sec)
```

Correlated Nested Queries:

1) Find the names of Sailors who have reserved a red Boat

```
mysql> select s.sname from sailors s
    -> where EXISTS ( select * from reserves r
    -> where r.bid=103 AND r.sid=s.sid);
+--------+
| sname  |
+--------+
| Dustin |
| Lubber |
+--------+
2 rows in set (0.00 sec)
```

Set Comparison Operators:

1) Find sailors whose rating is better than some sailor called Horatio

```
mysql> select s.sid from sailors s
    -> where s.rating > ANY ( select s2.rating from sailors s2
    -> where s2.sname='Horatio');
+-----+
| sid |
+-----+
|  31 |
|  32 |
|  58 |
|  71 |
|  74 |
+-----+
5 rows in set (0.00 sec)
```

2) Find the sailors with the highest rating.

mysql> SELECT S.sid FORM Sailors WHERE S.rating>=ALL(SELECT S2.rating FROM Sailors S2);

The GROUP BY and HAVING Clauses:

1) Find the age of the youngest sailor for each rating level.

```
mysql> SELECT S.rating , MIN(S.age)
    -> FROM Sailors S
    -> GROUP BY S.rating;
+--------+------------+
| rating | MIN(S.age) |
+--------+------------+
|      1 |         33 |
|      3 |       25.5 |
|      7 |         35 |
|      8 |       25.5 |
|      9 |         35 |
|     10 |         16 |
+--------+------------+
6 rows in set (0.01 sec)
```

2) Find the age of the youngest sailor who is eligible to vote for each rating level with at least two such sailors

```
mysql> SELECT S.rating , MIN(S.age) AS minage
    -> FROM  Sailors S
    -> WHERE S.age>=18
    -> GROUP BY S.rating
    -> HAVING COUNT(*)>1;
+--------+--------+
| rating | minage |
+--------+--------+
|      3 |   25.5 |
|      7 |     35 |
|      8 |   25.5 |
+--------+--------+
3 rows in set (0.00 sec)
```

3) For each red boat , find the number of reservations for this boat

```
mysql> SELECT B.BID,COUNT(*) AS SAILORCOUNT
    -> FROM BOATS B,RESERVES R
    -> WHERE R.BID=B.BID AND B.COLOR='RED'
    -> GROUP BY B.BID;
+------+-------------+
| BID  | SAILORCOUNT |
+------+-------------+
|  102 |           3 |
|  103 |           3 |
+------+-------------+
2 rows in set (0.00 sec)
```

4) Find the average age of sailors for each rating level that has at least two sailors

```
mysql> SELECT S.RATING, AVG(S.AGE) AS AVGAGE
    -> FROM SAILORS S
    -> GROUP BY S.RATING
    -> HAVING 1<(SELECT COUNT(*)
    -> FROM SAILORS S2
    -> WHERE S.RATING = S2.RATING);
+--------+--------+
| RATING | AVGAGE |
+--------+--------+
|      3 |   44.5 |
|      7 |     40 |
|      8 |   40.5 |
|     10 |   25.5 |
+--------+--------+
4 rows in set (0.01 sec)
```