DATABASE MANAGEMENT SYSTEM LAB MANUAL

Year & Semester: II&II REGULATION- R18

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CS407PC: DATABASE MANAGEMENT SYSTEMS LAB

B.TECH II Year II Sem.	**L T P C**
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Co-requisites:

- Co-requisite of course “Database Management Systems”

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

TEXT BOOKS:

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

REFERENCES BOOKS:

1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
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.*

List of Experiments

1. E-R Model.
2. Concept Design With E-R Model.
3. Relation Model.
4. Normalization.
5. Installation of MYSql and Participating DDL Commands.
6. participating DML commands.
7. Querying.(Practise Quaries using ANY, ALL,IN,EXISTS,UNION,INTER)
8. Querying(Practise Quaries using Aggrigate functions,Group By,Having and creation and dropping of views.
9. Practise Quaries using Aggrigate functions,Group By,Having Clause and Order Clause
10. Triggers.
11. Procedures.
12. Cursors.

Indroduction

Database management system:

Database is collection of data which is related by some aspect. Data is collection of facts and figures which can be processed to produce information. Name of a student, age, class and her subjects can be counted as data for recording purposes. Mostly data represents recordable facts. Data aids in producing information which is based on facts. For example, if we have data about marks obtained by all students, we can then conclude about toppers and average marks etc. A database management system stores data, in such a way which is easier to retrieve, manipulate and helps to produce information.

DDL Introduction

DDL:

DDL statements or commands are used to define and modify the database structure of your tables or schema. When you execute a DDL statement, it takes effect immediately.

Some commands of DDL are:

- CREATE – to create table (objects) in the database
- ALTER – alters the structure of the database
- DROP – delete table from the database
- TRUNCATE – remove all records from a table, including all spaces allocated for the records are removed
- COMMENT – add comments to the data dictionary
- RENAME – rename a table

CREATE :

The create table statement (query) to create a table is given below:

```
CREATE TABLE <table name> (

<attribute name 1> <data type 1>,

...

<attribute name n> <data type n>);
```

Example:

```
CREATE TABLE STUDENT ( StudID NUMBER, Name VARCHAR);
```

The data types that you will use most frequently are character strings, which might be called VARCHAR or CHAR for variable or fixed length strings; numeric types such as NUMBER or NTEGER, which will usually specify a precision; and DATE or related types. Data types are differ according to the databases software whatever you are using to your system.

ALTER :

The alter table statement to make modifications to the table structure such as Key constraints, Column size, etc.

```
ALTER TABLE <table name> ADD CONSTRAINT <constraint name> PRIMARY
KEY(<attribute list>);
```

Example:

```
ALTER TABLE STUDENT ADD CONSTRAINT NOT NULL PRIMARY KEY (StudID);
```

DROP :

The drop table statement (query) to delete a table is given below:

```
DROP TABLE <table name>;

Example: DROP TABLE STUDENT;
```

DML Introduction

DML:

DML- Data Manipulation Language (DML) statements are used for managing data within schema objects DML deals with data manipulation, and therefore includes most common SQL statements such SELECT, INSERT, etc. DML allows to add / modify / delete data itself.

DML is used to manipulate with the existing data in the database objects (insert, select, update, delete).

DML Commands:

1. **INSERT**: Insert command is used to insert data in table within the database.We can insert single or multiple records using a single query in mysql.

Syntax: **For single record:**

```
insert into table_name values(value1,value2.. value n);
```

Syntax: **For multiple records:**

```
insert into table_name(column1,column2,….column n)  values(value1,value2,.. value n);
```

2. **SELECT** : The select command is used to fetch data from the one or more tables in mysql. We can retrieve records of all fields or specified fields.

Syntax for all fields: Select * from table_name [where conditions];

Syntax for specified fields: select expressions from table_name [where conditions];

3.**UPDATE :** The update command is used to update data of the mysql table within the database.It is used when you need to modify the table.

Syntax: UPDATE table_name SET column_name1=new_value1, column_name2=new_value2 [WHERE clause];

4. **DELETE :** The delete command is used to delete data from the table.By using delete statement, we can delete records on the basis of conditions.

Syntax: DELETE FROM table_name WHERE condition;

Data Types

MySQL datatypes:

A database table contains multiple columns with specific data types such as numeric or string. MySQL provides more data types other than just numeric or string. Each data type in MySQL can be determined by the following characteristics:

- The kind of values it represents.
- The space that takes up and whether the values is a fixed-length or variable length.
- The values of the data type can be indexed or not.
- How MySQL compares the values of a specific data type.

Numeric Data Types

You can find all SQL standard numeric types in MySQL including exact number data type and approximate numeric data types including integer, fixed-point and floating point. In addition, MySQL also supports BIT data type for storing bit field values.
Numeric types can be signed or unsigned except the BIT type. The following table shows you the summary of numeric types in MySQL:

Numeric Types	**Description**
TINYINT	A very small integer
SMALLINT	A small integer
MEDIUMINT	A medium-sized integer
INT	A standard integer

Numeric Types	Description
BIGINT	A large integer
DECIMAL	A fixed-point number
FLOAT	A single-precision floating point number
DOUBLE	A double-precision floating point number
BIT	A bit field

String Data Types:

In My SQL, a string can hold anything from plain text to binary data such as images and files. The string can be compared and searched based on pattern matching by using the LIKE operator or regular expression. The following table shows you the string data types in MySQL:

String Types	Description
CHAR	A fixed-length non binary (character) string
VARCHAR	A variable-length non-binary string
BINARY	A fixed-length binary string

String Types	**Description**
VARBINARY	A variable-length binary string
TINYBLOB	A very small BLOB (binary large object)
BLOB	A small BLOB
MEDIUMBLOB	A medium-sized BLOB
LONGBLOB	A large BLOB
TINYTEXT	A very small non-binary string
TEXT	A small non-binary string
MEDIUMTEXT	A medium-sized non-binary string
LONGTEXT	A large non-binary string
ENUM	An enumeration; each column value may be assigned one enumeration member
SET	A set; each column value may be assigned zero or more set members

Date and Time Data Types:

MySQL provides types for date and time as well as a combination of date and time. In addition, MySQL supports timestamp data type for tracking the changes of a row in a table. If you just want to store the year without date and month, you can use YEAR data type. The following table illustrates the MySQL date and time data types:

Date and Time Types	Description
DATE	A date value in 'YYYY-MM-DD' format
TIME	A time value in 'hh:mm:ss' format
DATETIME	A date and time value in 'YYYY-MM-DD hh:mm:ss' format

Experiments

Exp No: 1

E-R Model:

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

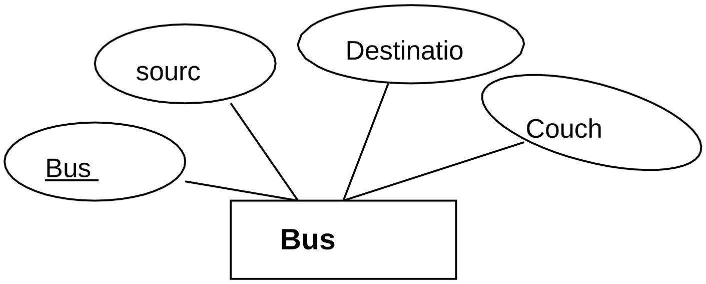
2. Reservation

3. Ticket

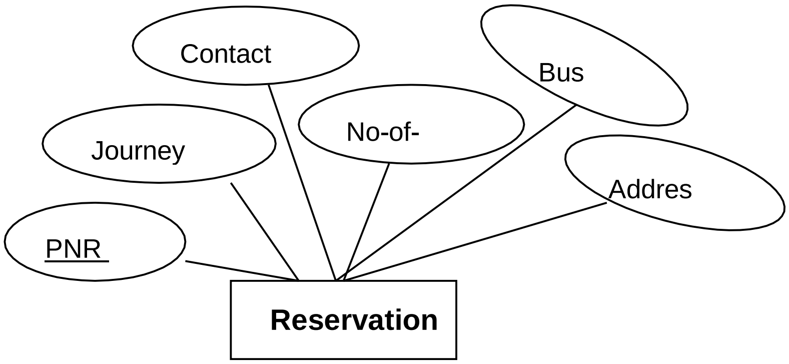
4. Passenger

5. Cancellation

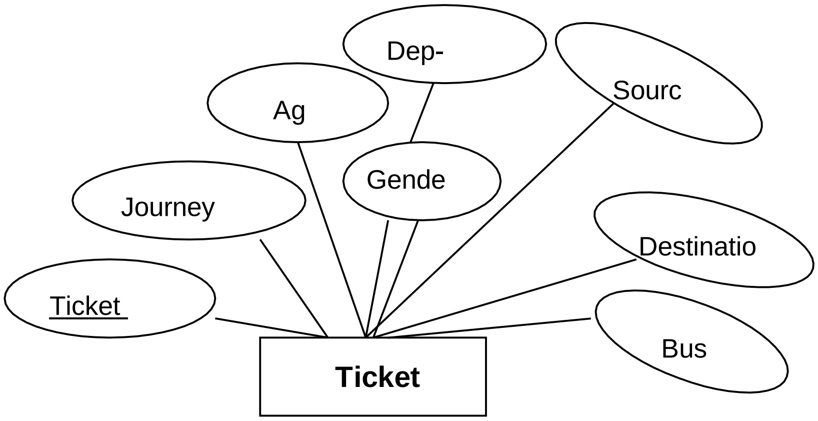
Bus:(Entity)

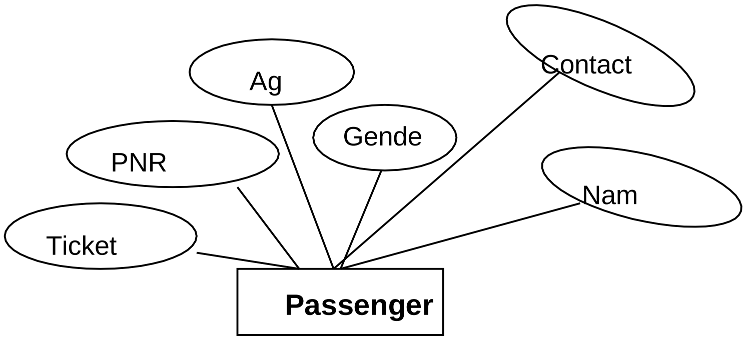


Reservation:(Entity)

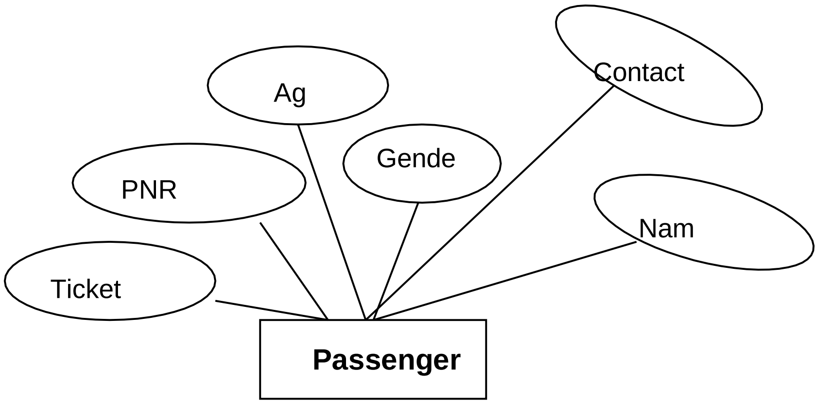


Ticket :(Entity)





Cancellation (Entity)

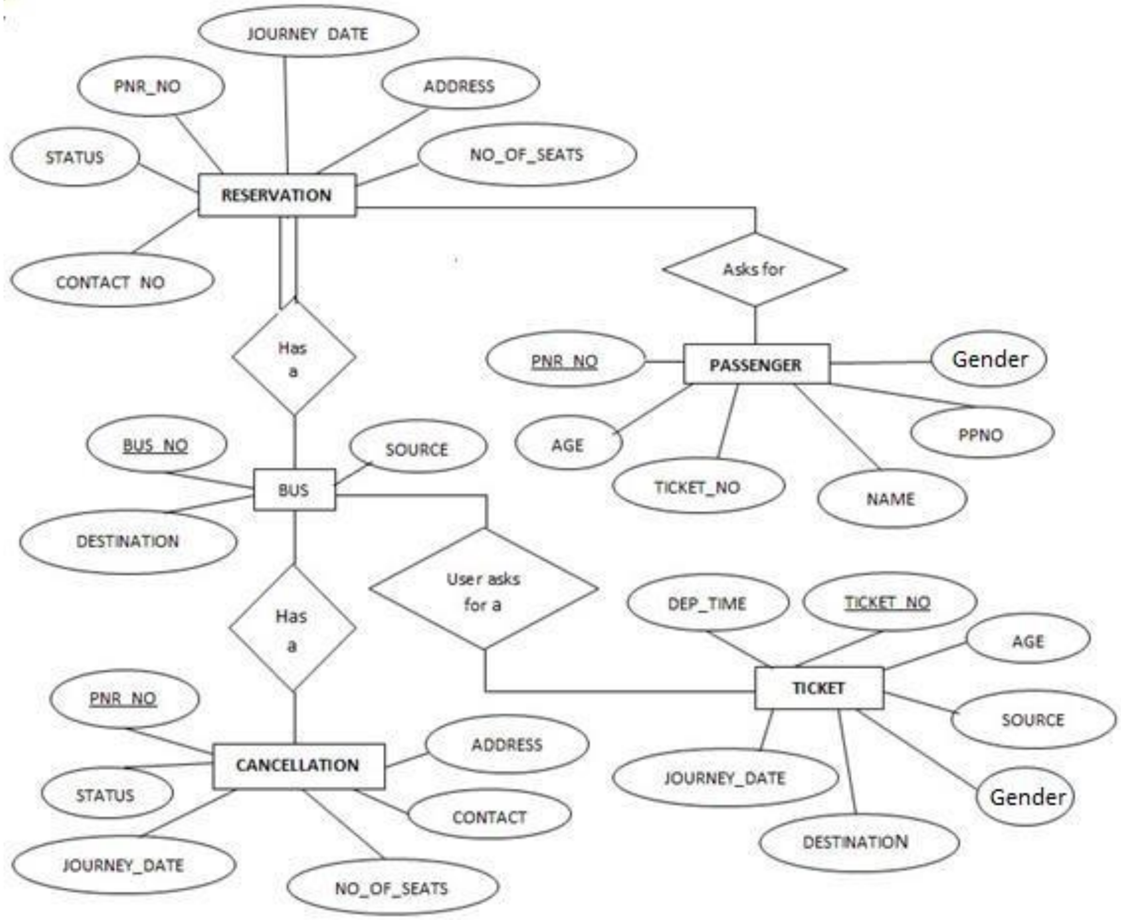


Exp No: 2

Concept Design With E-R Model:

AIM: Concept Design With E-R Model. Relate the entities appropriately. Apply Cardinality for each relationship. Identfiy strong Entities and Weak entities.

Indicate the type of relationship(total/ partial)



Exp No: 3 Relational Model:

AIM: Represent all entities in a tabular fashion. Represent all relationships ina tabular fashion.

BUS

COLOUMN NAME	**DATA TYPE**	**CONSTRAINT**
Bus_No	varchar(10)	**Primary Key**
Source	varchar(20)	
Destination	varchar(20)	
Couch _Type	varchar(20)	

Reservation

COLOUMN NAME	**DATA TYPE**	**CONSTRAINT**
PNR_No	number(9)	**Primary Key**
Journey_date	Date	
No_of_seats	integer(8)	
Address	varchar(50)	
Contact_No	Numeric(10)	
Bus_No	varchar(10)	**Foreign key**
Seat_no	Int(4)	

Ticket:

COLOUMN NAME	**DATA TYPE**	**CONSTRAINT**
Ticket_No	numeric(9)	**Primary Key**
Journey date	Date	
Age	int(4)	
Gender	Char(1)	
Source	varchar(20)	
Destination	varchar(20)	
Dep_time	varchar(10)	
Bus_No	varchar(10)	

Passenger:

COLOUMN NAME	**DATA TYPE**	**CONSTRAINT**
PNR_No	Numeric(9)	**Primary Key**
Ticket_No	Numeric(9)	Foreign key
Name	varchar(15)	
Age	integer(4)	
Gender	char(1)	(M/F)
Contact_no	Numeric(10)	Should be equal to 10 numbers and not allow other than numeric

Cancellation:

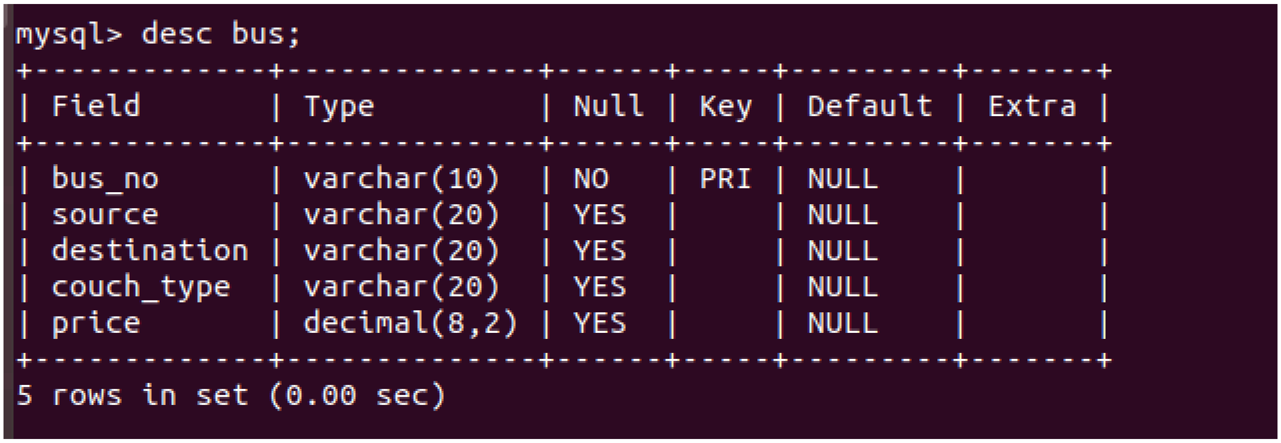
COLOUMN NAME	**DATA TYPE**	**CONSTRAINT**
PNR_No	Numeric(9)	PRIMARY KEY
Journey_date	Date	
Seat no	Integer(9)	
Contact_No	Numeric(10)	Should be equal to 10 numbers and not allow other than numeric

Exp No: 6

Practicing DDL Commands:

Q) Write a query to create bus table?

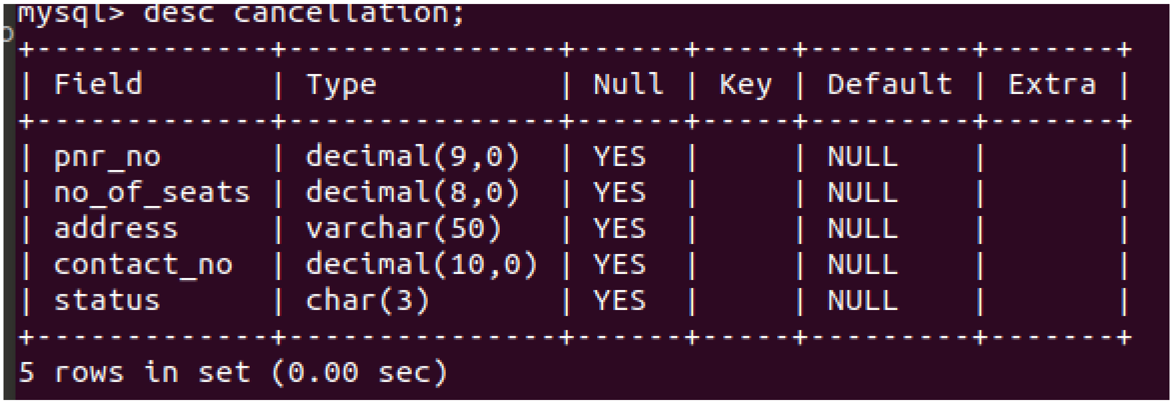
mysql > create table bus(bus_no varchar(10),source varchar(20),destination varchar(20),couch_type varchar(20),primary key(bus_no));



```
mysql> desc bus;
+-------------+--------------+------+-----+---------+-------+
| Field       | Type         | Null | Key | Default | Extra |
+-------------+--------------+------+-----+---------+-------+
| bus_no      | varchar(10)  | NO   | PRI | NULL    |       |
| source      | varchar(20)  | YES  |     | NULL    |       |
| destination | varchar(20)  | YES  |     | NULL    |       |
| couch_type  | varchar(20)  | YES  |     | NULL    |       |
| price       | decimal(8,2) | YES  |     | NULL    |       |
+-------------+--------------+------+-----+---------+-------+
5 rows in set (0.00 sec)
```

Reservation Table:

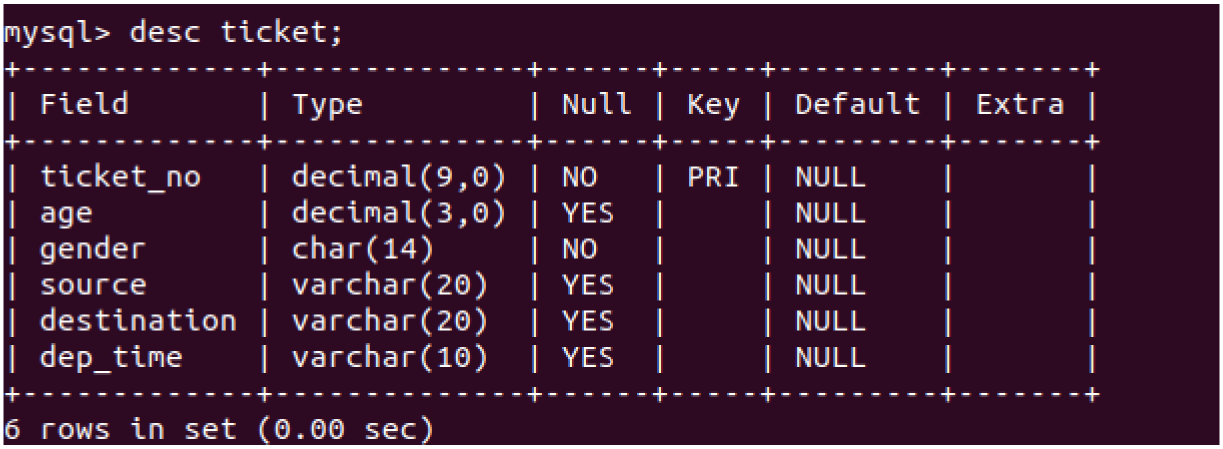
mysql> create table reservation(pnr_no numeric(9),no_of_seats numeric(8),address varchar(50),contact_no numeric(10),status char(3));



```
mysql> desc cancellation;
+-------------+---------------+------+-----+---------+-------+
| Field       | Type          | Null | Key | Default | Extra |
+-------------+---------------+------+-----+---------+-------+
| pnr_no      | decimal(9,0)  | YES  |     | NULL    |       |
| no_of_seats | decimal(8,0)  | YES  |     | NULL    |       |
| address     | varchar(50)   | YES  |     | NULL    |       |
| contact_no  | decimal(10,0) | YES  |     | NULL    |       |
| status      | char(3)       | YES  |     | NULL    |       |
+-------------+---------------+------+-----+---------+-------+
5 rows in set (0.00 sec)
```

Ticket Table:

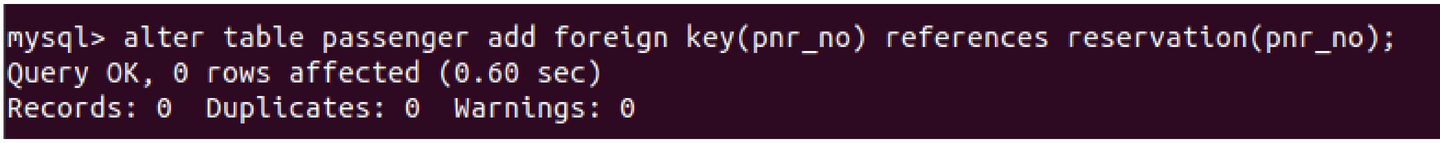
mysql> create table ticket(ticket_no numeric(9)primary key,age numeric(3),gender char(14) not null,source varchar(20),destination varchar(20),dep_time varchar(10),);



```
mysql> desc ticket;
+-------------+--------------+------+-----+---------+-------+
| Field       | Type         | Null | Key | Default | Extra |
+-------------+--------------+------+-----+---------+-------+
| ticket_no   | decimal(9,0) | NO   | PRI | NULL    |       |
| age         | decimal(3,0) | YES  |     | NULL    |       |
| gender      | char(14)     | NO   |     | NULL    |       |
| source      | varchar(20)  | YES  |     | NULL    |       |
| destination | varchar(20)  | YES  |     | NULL    |       |
| dep_time    | varchar(10)  | YES  |     | NULL    |       |
+-------------+--------------+------+-----+---------+-------+
6 rows in set (0.00 sec)
```

Q) Write a query to add a foreign key to passenger table?

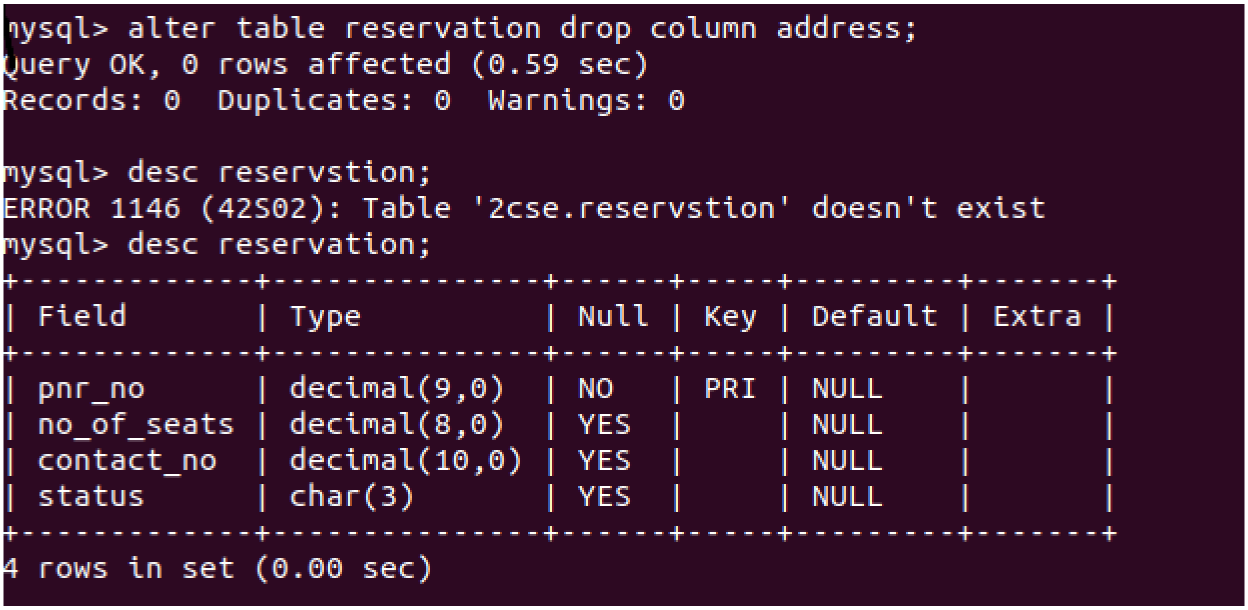
mysql>alter table passenger add foreign key(pnr_no) references reservation(pnr_no);
desc reservation;



```
mysql> alter table passenger add foreign key(pnr_no) references reservation(pnr_no);
Query OK, 0 rows affected (0.60 sec)
Records: 0  Duplicates: 0  Warnings: 0
```

Q) **Write query to drop address column from reservation table?**

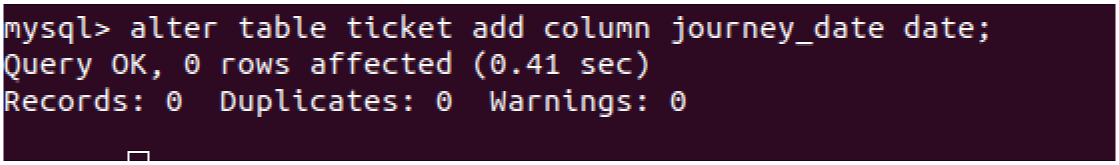
mysql>alter table reservation drop column address;



```
mysql> alter table reservation drop column address;
Query OK, 0 rows affected (0.59 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> desc reservstion;
ERROR 1146 (42S02): Table '2cse.reservstion' doesn't exist
mysql> desc reservation;
+-------------+---------------+------+-----+---------+-------+
| Field       | Type          | Null | Key | Default | Extra |
+-------------+---------------+------+-----+---------+-------+
| pnr_no      | decimal(9,0)  | NO   | PRI | NULL    |       |
| no_of_seats | decimal(8,0)  | YES  |     | NULL    |       |
| contact_no  | decimal(10,0) | YES  |     | NULL    |       |
| status      | char(3)       | YES  |     | NULL    |       |
+-------------+---------------+------+-----+---------+-------+
4 rows in set (0.00 sec)
```

Q) Write a query to add a column to the existing table?

alter table ticket add column journey_date date;



```
mysql> alter table ticket add column journey_date date;
Query OK, 0 rows affected (0.41 sec)
Records: 0  Duplicates: 0  Warnings: 0
```

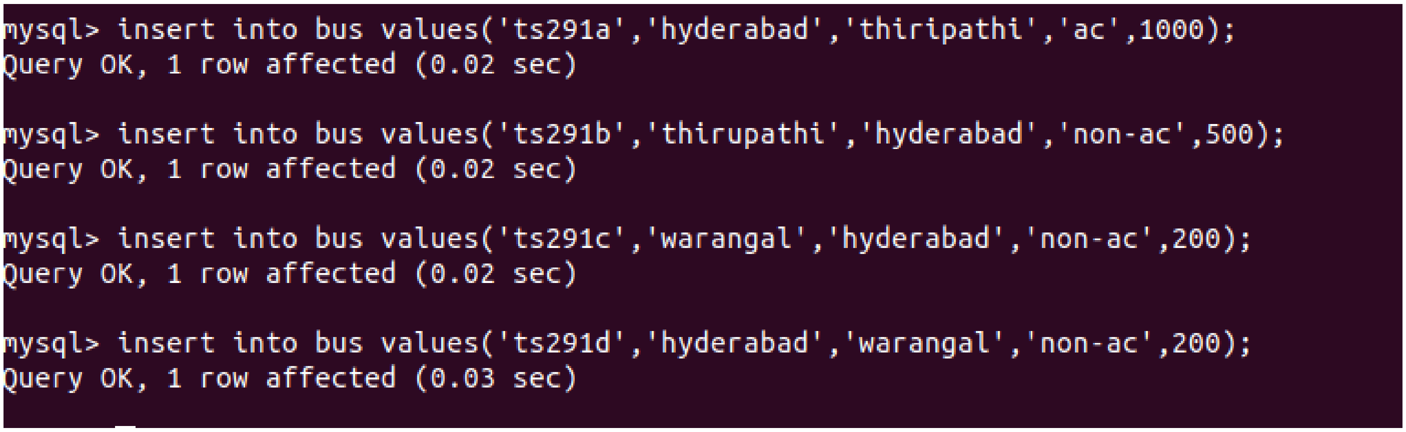
alter table cancellation add column journey_date date

Exp No: 7 Practicing DML commands:

Q) Write a query to insert the records in the bus table?

insert into bus values('ts291a','hyderabad','thiripathi','ac',1000);
insert into bus values('ts291b','thirupathi','hyderabad','non-ac',500);
insert into bus values('ts291c','warangal','hyderabad','non-ac',200);
insert into bus values('ts291d','hyderabad','warangal','non-ac',200);

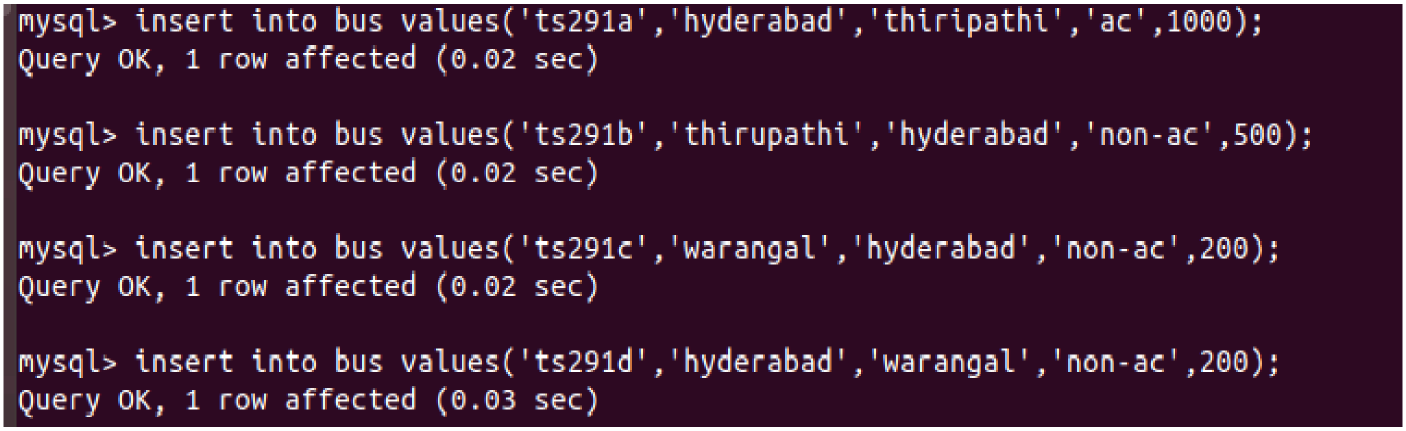
output:-



```
mysql> insert into bus values('ts291a','hyderabad','thiripathi','ac',1000);
Query OK, 1 row affected (0.02 sec)

mysql> insert into bus values('ts291b','thirupathi','hyderabad','non-ac',500);
Query OK, 1 row affected (0.02 sec)

mysql> insert into bus values('ts291c','warangal','hyderabad','non-ac',200);
Query OK, 1 row affected (0.02 sec)

mysql> insert into bus values('ts291d','hyderabad','warangal','non-ac',200);
Query OK, 1 row affected (0.03 sec)
```

Q) **Write a query to insert the records in passenger table?**

insert into passenger values(1,'akshay',23,'male',9858541245,102);
insert into passenger values(2,'akshay',23,'male',9858541245,102);
insert into passenger values(3,'akila',24,'female',9858541245,101);
insert into passenger values(4,'akil',25,'male',9858541245,101);



```
mysql> insert into bus values('ts291a','hyderabad','thiripathi','ac',1000);
Query OK, 1 row affected (0.02 sec)

mysql> insert into bus values('ts291b','thirupathi','hyderabad','non-ac',500);
Query OK, 1 row affected (0.02 sec)

mysql> insert into bus values('ts291c','warangal','hyderabad','non-ac',200);
Query OK, 1 row affected (0.02 sec)

mysql> insert into bus values('ts291d','hyderabad','warangal','non-ac',200);
Query OK, 1 row affected (0.03 sec)
```

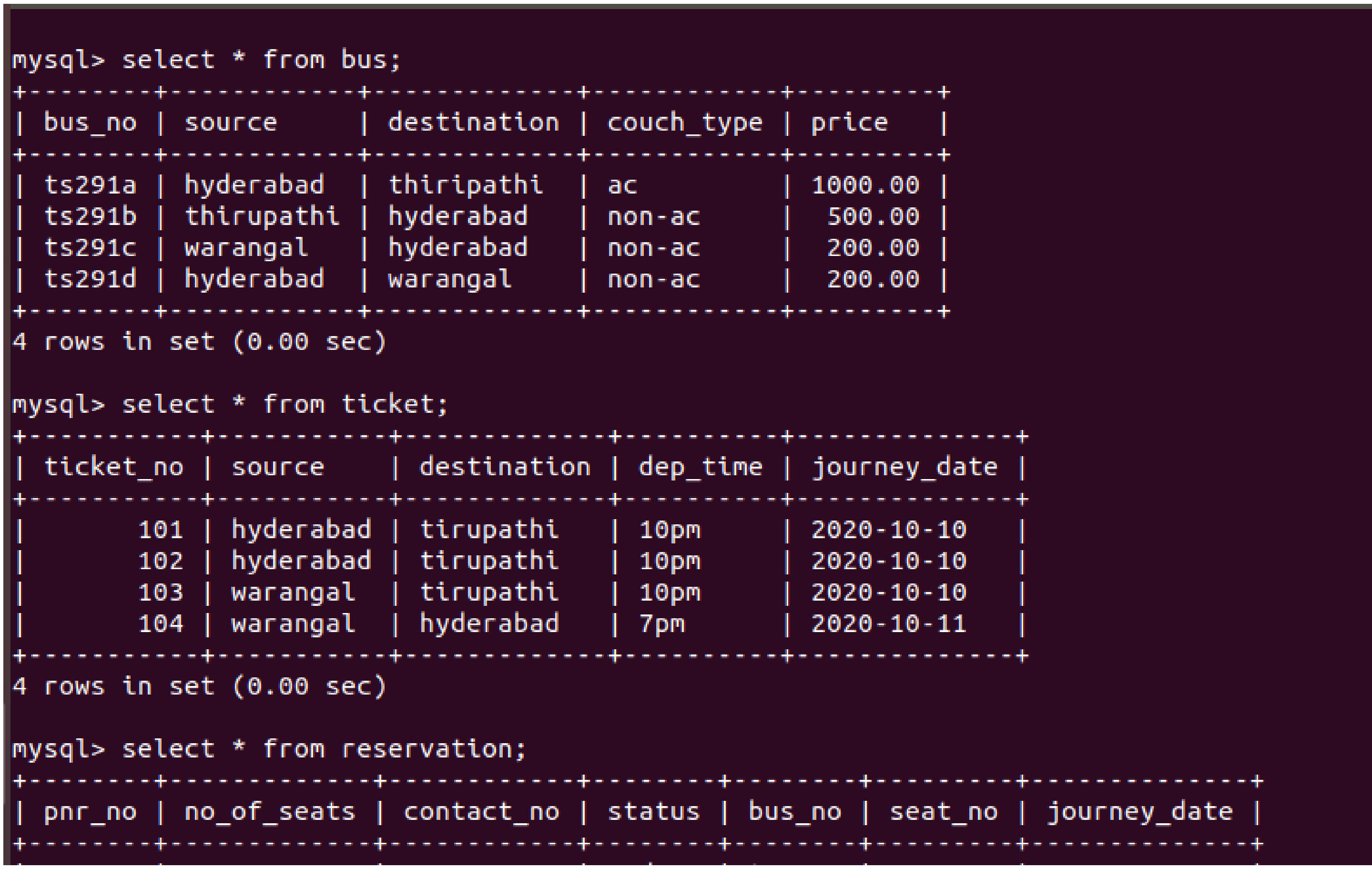
insert into ticket values(101,'hyderabad','tirupathi','10pm','2020-10-10');
insert into ticket values(102,'hyderabad','tirupathi','10pm','2020-10-10');
insert into ticket values(103,'warangal','tirupathi','10pm','2020-10-10');
insert into ticket values(104,'warangal','hyderabad','7pm','2020-10-11');
insert into ticket values(104,'warangal','hyderabad','7pm','2020-10-11');

Q) Write a query to insert records in reservation table?

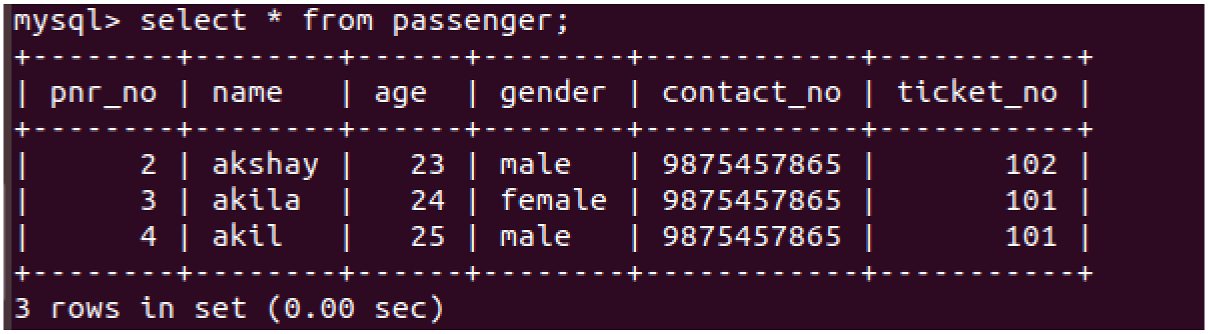
insert into reservation values(1,56,9874563214,'pnd','ts291a',1,'2021-10-10');
insert into reservation values(2,58,9875641232,'apd','ts291a',1,'2021-10-10');
insert into reservation values(3,54,7896542314,'apd','ts291b',5,'2021-10-10');
insert into reservation values(4,54,7896542314,'apd','ts291c',5,'2021-10-10');

Q) Write a query to retrieve all the records from bus table?

select * from bus;
select * from reservation;
selcect * from passenger;
select* from ticket;

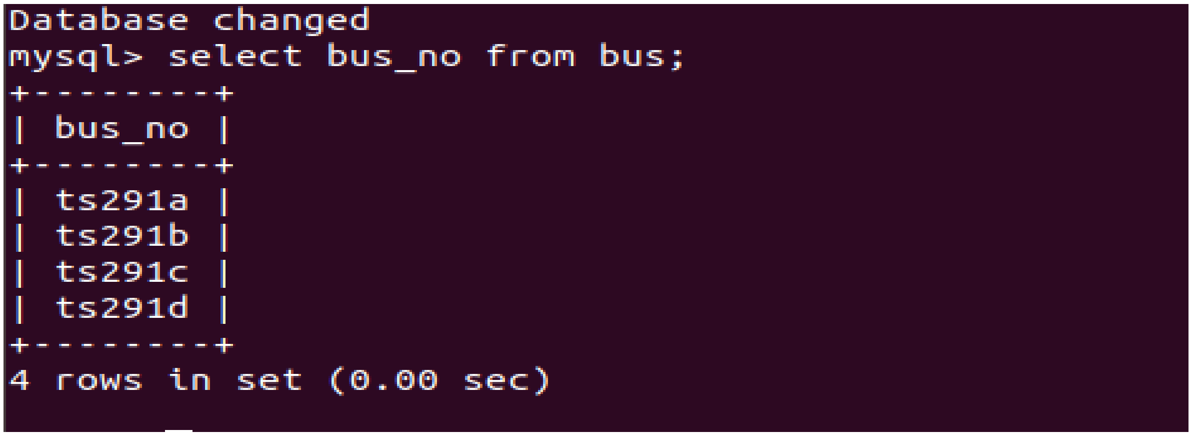


```
mysql> select * from bus;
+--------+------------+-------------+------------+---------+
| bus_no | source     | destination | couch_type | price   |
+--------+------------+-------------+------------+---------+
| ts291a | hyderabad  | thiripathi  | ac         | 1000.00 |
| ts291b | thirupathi | hyderabad   | non-ac     |  500.00 |
| ts291c | warangal   | hyderabad   | non-ac     |  200.00 |
| ts291d | hyderabad  | warangal    | non-ac     |  200.00 |
+--------+------------+-------------+------------+---------+
4 rows in set (0.00 sec)

mysql> select * from ticket;
+-----------+-----------+-------------+----------+--------------+
| ticket_no | source    | destination | dep_time | journey_date |
+-----------+-----------+-------------+----------+--------------+
|       101 | hyderabad | tirupathi   | 10pm     | 2020-10-10   |
|       102 | hyderabad | tirupathi   | 10pm     | 2020-10-10   |
|       103 | warangal  | tirupathi   | 10pm     | 2020-10-10   |
|       104 | warangal  | hyderabad   | 7pm      | 2020-10-11   |
+-----------+-----------+-------------+----------+--------------+
4 rows in set (0.00 sec)

mysql> select * from reservation;
+--------+-------------+------------+--------+--------+---------+--------------+
| pnr_no | no_of_seats | contact_no | status | bus_no | seat_no | journey_date |
+--------+-------------+------------+--------+--------+---------+--------------+
```



```
mysql> select * from passenger;
+--------+--------+------+--------+------------+-----------+
| pnr_no | name   | age  | gender | contact_no | ticket_no |
+--------+--------+------+--------+------------+-----------+
|      2 | akshay |   23 | male   | 9875457865 |       102 |
|      3 | akila  |   24 | female | 9875457865 |       101 |
|      4 | akil   |   25 | male   | 9875457865 |       101 |
+--------+--------+------+--------+------------+-----------+
3 rows in set (0.00 sec)
```

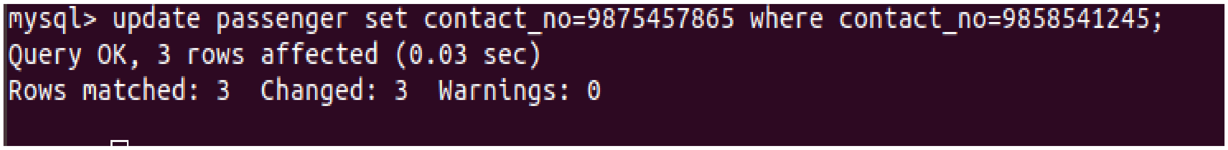
Q) **Write a query to retrieve bus numbers from bus table?**
select bus _no from bus;



```
Database changed
mysql> select bus_no from bus;
+--------+
| bus_no |
+--------+
| ts291a |
| ts291b |
| ts291c |
| ts291d |
+--------+
4 rows in set (0.00 sec)
```

Q) Write a query to modify the contact number in passenger table?

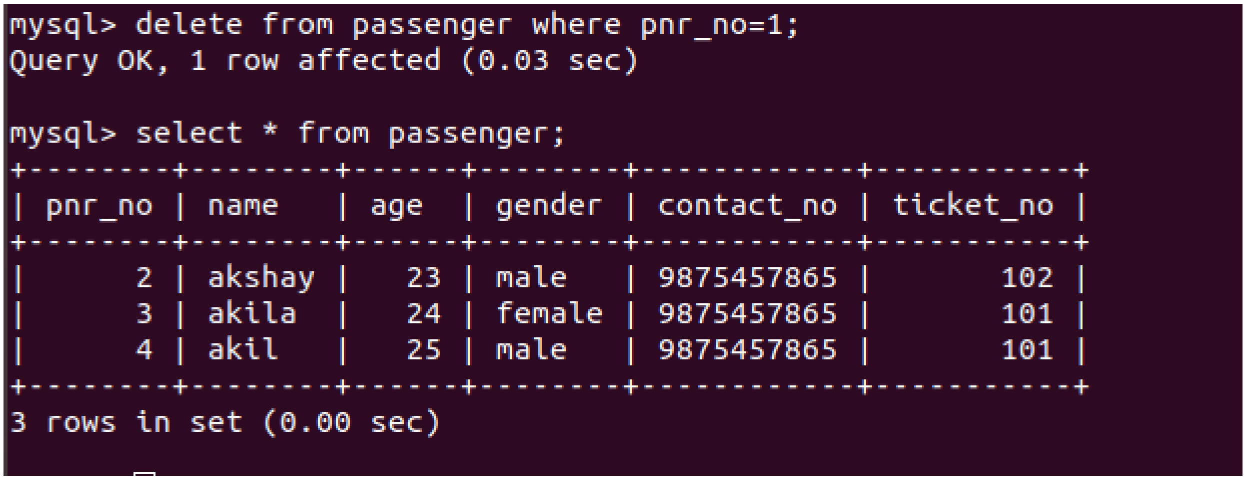
update passenger set contact_no=9875457865 where contact_no=9858541245;



```
mysql> update passenger set contact_no=9875457865 where contact_no=9858541245;
Query OK, 3 rows affected (0.03 sec)
Rows matched: 3  Changed: 3  Warnings: 0
```

Q) Write a query to delete the record from passenger table whose pnr_no is 1?

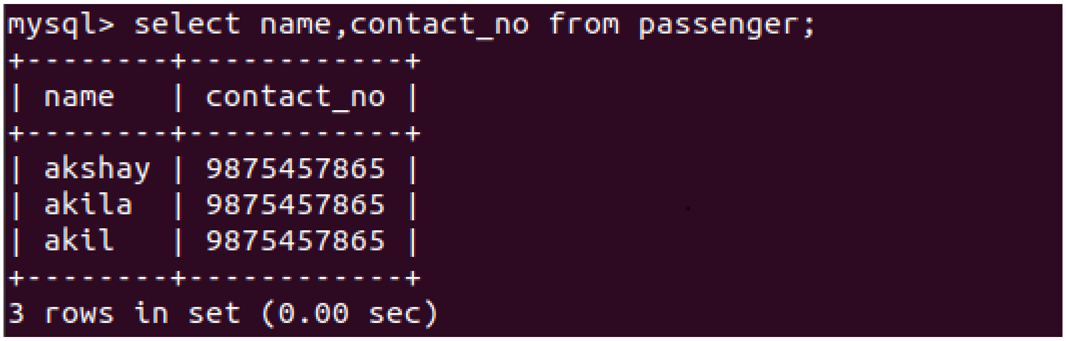
delete from passenger where pnr_no=1;



```
mysql> delete from passenger where pnr_no=1;
Query OK, 1 row affected (0.03 sec)

mysql> select * from passenger;
+--------+--------+------+--------+------------+-----------+
| pnr_no | name   | age  | gender | contact_no | ticket_no |
+--------+--------+------+--------+------------+-----------+
|      2 | akshay |   23 | male   | 9875457865 |       102 |
|      3 | akila  |   24 | female | 9875457865 |       101 |
|      4 | akil   |   25 | male   | 9875457865 |       101 |
+--------+--------+------+--------+------------+-----------+
3 rows in set (0.00 sec)
```

Q) Write a query to fetch name and contact numbers from passenger table?

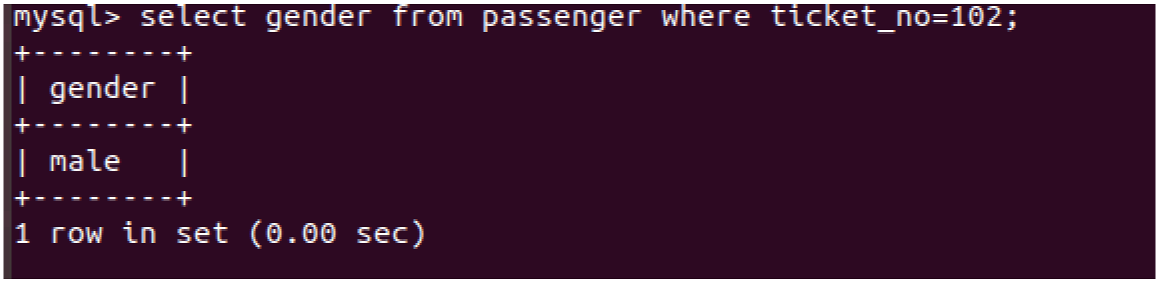
select name,contact_no from passenger;



```
mysql> select name,contact_no from passenger;
+--------+------------+
| name   | contact_no |
+--------+------------+
| akshay | 9875457865 |
| akila  | 9875457865 |
| akil   | 9875457865 |
+--------+------------+
3 rows in set (0.00 sec)
```

Q) Write a query to fetch gender from passenger whose ticket number is 102?

select gender from passenger where ticket_no=102;



```
mysql> select gender from passenger where ticket_no=102;
+--------+
| gender |
+--------+
| male   |
+--------+
1 row in set (0.00 sec)
```