Project on

RAILWAY MANAGEMENT SYSTEM

CSF 205

DATABASE MANAGEMENT SYSTEM

Submitted to -   **Submitted by –**

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                                            Section – A (P2)

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<u>ABSTRACT</u>

This project is about creating the database for Railway Management System.

The railway management system facilitates the passengers to enquire about the trains availability. Booking and cancellation of tickets. enquiring about the status of the booked ticket, etc.
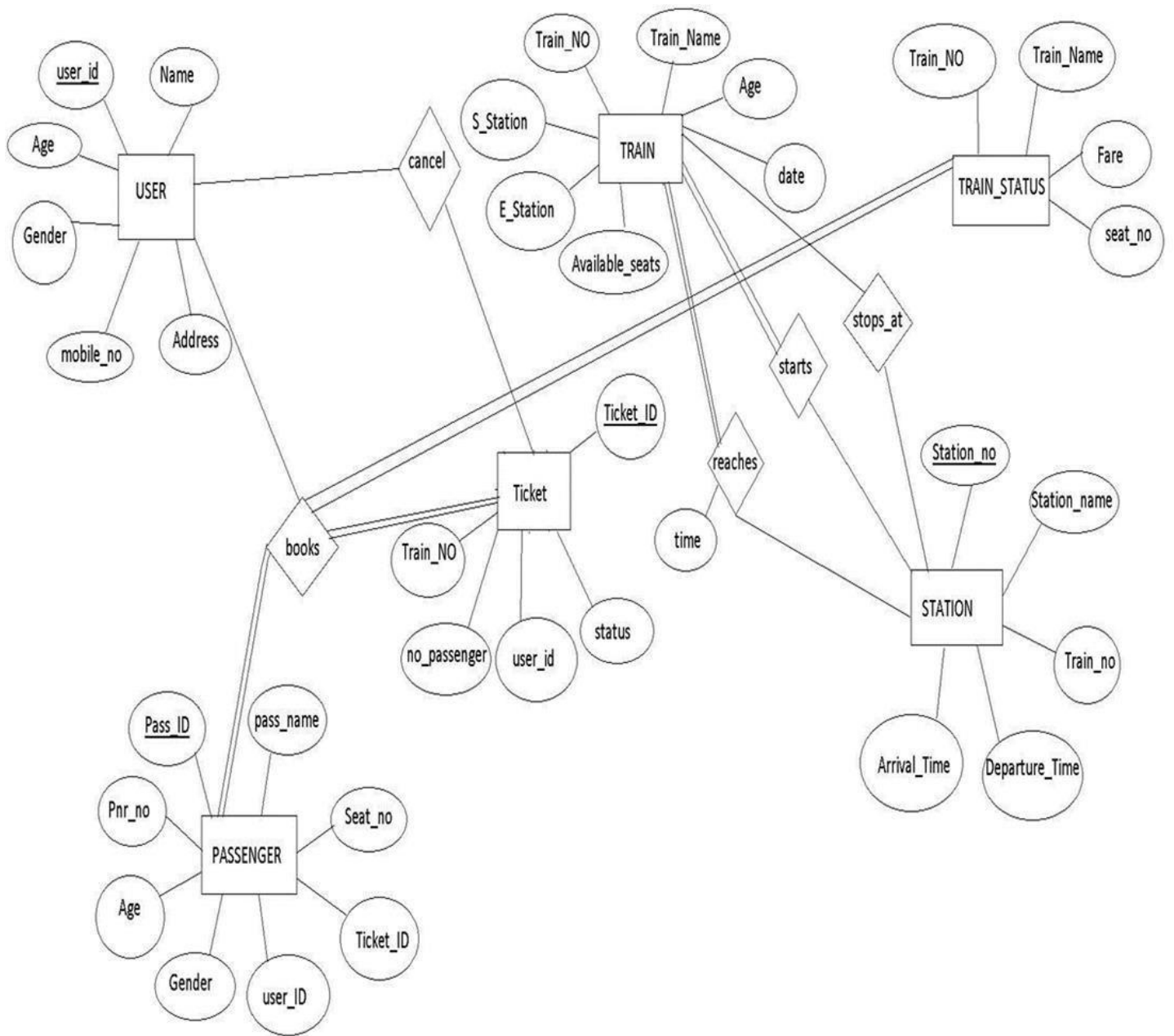
The database is designed to store and manage data related to train schedules, tickets, passenger information, and other essential aspects of railway management.

The record of train includes its number, name, whereas record of train status includes dates for which tickets are booked, total number of seats available. Passengers can book their tickets for the train in which seats are available. For this, passenger has to provide the desired train number.

Once the train number and booking date are validated, it is checked whether the seat is available. If yes, the ticket is booked with confirm status and corresponding ticket ID is generated which is stored along with other details of the passenger.

The ticket once booked can be cancelled at any time. For this, the passenger has to provide the ticket ID (the unique key). The ticket ID is searched, and the corresponding record is deleted. With this, the first ticket with waiting status also gets confirmed.

ER MODEL

LIST OF ENTITIES IN DATABASE

```
mysql> create database railway_management_system;
Query OK, 1 row affected (0.01 sec)

mysql> use railway_management_system;
Database changed
mysql> show tables;
+-------------------------------------+
| Tables_in_railway_management_system |
+-------------------------------------+
| books                               |
| cancel                              |
| passengers                          |
| reaches                             |
| starts                              |
| station                             |
| stops_at                            |
| ticket                              |
| train                               |
| train_status                        |
| user                                |
+-------------------------------------+
```

SQL TABLES

USER TABLE-

create table User (User_id int Primary Key, Name varchar (50), Gender varchar (20), Age int, Mobile_no varchar (10), Address varchar (50));

```
mysql> select*from User;
+---------+--------------+--------+------+------------+----------+
| User_id | Name         | Gender | Age  | Mobile_no  | Address  |
+---------+--------------+--------+------+------------+----------+
|       1 | Rakesh Singh | Male   |   25 | 7085953455 | Rudrapur |
|       2 | Mohit Arya   | Male   |   20 | 9876543210 | Dehradun |
|       3 | Ritika Yadav | Female |   19 | 7894561230 | Bilaspur |
|       4 | Pragati Malik| Female |   18 | 9784561230 | Rampur   |
|       5 | Ayush Tiwari | Male   |   22 | 8794561230 | Gonda    |
+---------+--------------+--------+------+------------+----------+
```

TRAIN TABLE-

create table Train (Train_no int Primary key, Train_name varchar (50), S_station varchar (20), E_station varchar (20), Available_seats int, Date date);

```
mysql> select*from Train;
+----------+-----------------------+----------+------------+-----------------+------------+
| Train_no | Train_name            | S_station | E_station | Available_seats | Date       |
+----------+-----------------------+----------+------------+-----------------+------------+
|      130 | Mumbai Express        | Mumbai   | Pune       |             211 | 2022-04-11 |
|      416 | Andhra Pradesh Express | New Delhi | Tamil Nadu |            561 | 2022-04-10 |
|      523 | Doon Express          | Dehradun | Kathgodam  |             212 | 2022-04-09 |
|      723 | Andhra Pradesh Express | Hydrabad | Delhi      |             528 | 2022-04-12 |
|      724 | Gonda express         | Gonda    | Dehradun   |             205 | 2022-04-16 |
+----------+-----------------------+----------+------------+-----------------+------------+
```

TRAIN STATUS TABLE-

create table Train_Status (Train_no int, Seat_no int, Fare float, Train_name varchar (50), Foreign key (Train_no) references Train (Train_no));

```
mysql> select*from Train_status;
+----------+---------+------+------------------------+
| Train_no | Seat_no | Fare | Train_name             |
+----------+---------+------+------------------------+
|      523 |      81 |  150 | Doon Express           |
|      523 |       4 |  150 | Doon Express           |
|      130 |      10 |   75 | Mumbai Express         |
|      130 |      67 |   75 | Mumbai Express         |
|      130 |      56 |   75 | Mumbai Express         |
|      130 |      70 |   75 | Mumbai Express         |
|      723 |      42 |  750 | Andhra Pradesh Express |
|      723 |      20 |  750 | Andhra Pradesh Express |
|      723 |      87 |  750 | Andhra Pradesh Express |
|      724 |      55 |  220 | Gonda Express          |
|      416 |      34 |  880 | Andhra Pradesh Express |
+----------+---------+------+------------------------+
```

PASSENGERS TABLE-

create table Passengers (Pass_id int Primary key, Pass_name varchar (30), PNR_no int, Age int, Gender varchar (25), User_id int, Seat_no varchar (25), Ticket_id int, constraint foreign key (User_id) references User (User_id), constraint foreign key (Ticket_id) references Ticket (Ticket_id));

```
mysql> select*from Passengers;
+---------+------------------+--------+------+--------+---------+---------+-----------+
| Pass_id | Pass_name        | PNR_no | Age  | Gender | User_id | Seat_no | Ticket_id |
+---------+------------------+--------+------+--------+---------+---------+-----------+
|      66 | Rohan Mukharjee  | 663345 |   34 | Male   |       3 | 42      |       152 |
|      70 | Karan Pratap     | 111222 |   20 | Male   |       3 | 20      |       152 |
|      80 | Mohit Kumar      | 693693 |   25 | Male   |       5 | 55      |       252 |
|     100 | Roshni Gaba      |   7878 |   22 | Female |       2 | 10      |       143 |
|     111 | Sikha Pant       | 456789 |   32 | Female |       2 | 67      |       143 |
|     114 | Neha Singh       | 754484 |   25 | Female |       3 | 87      |       152 |
|     121 | Ramesh Singhal   | 987658 |   45 | Male   |       1 | 34      |       122 |
|     130 | Nitin Chaudhary  | 908754 |   30 | Male   |       4 | 81      |       101 |
|     165 | Rakesh Agarwal   | 567324 |   35 | Male   |       4 | 4       |       101 |
|     178 | Rohit Shukhla    | 670987 |   22 | Male   |       2 | 56      |       143 |
|     191 | Pragati Aggrawal | 342134 |   28 | Female |       2 | 70      |       143 |
+---------+------------------+--------+------+--------+---------+---------+-----------+
```

TICKET TABLE-

create table Ticket (Ticket_id int Primary key, User_id int, Status char (50), No_passenger int, Train_no int, constraint foreign key (user_id) references User (user_id), constraint foreign key (Train_no) references Train (Train_no));

```
mysql> select*from Ticket;
+-----------+---------+-----------+--------------+----------+
| Ticket_id | User_id | Status    | No_passenger | Train_no |
+-----------+---------+-----------+--------------+----------+
|       101 |       4 | Confirmed |            2 |      523 |
|       122 |       1 | Waiting   |            1 |      416 |
|       143 |       2 | Confirmed |            4 |      130 |
|       152 |       3 | Confirmed |            3 |      723 |
|       252 |       5 | Confirmed |            1 |      724 |
+-----------+---------+-----------+--------------+----------+
```

STATION TABLE-

create table Station (Station_no int Primary key, Station_name varchar (50), Train_no int, Arrival_time varchar (20), Departure_time varchar (10), foreign key (Train_no) references Train (Train_no));

```
mysql> select*from Station;
+------------+--------------+----------+--------------+----------------+
| Station_no | Station_name | Train_no | Arrival_time | Departure_time |
+------------+--------------+----------+--------------+----------------+
|       3001 | Hyderabad    |      723 | 8:00 PM      | 8:10 PM        |
|       6001 | New Delhi    |      130 | 3:00 PM      | 3:15 PM        |
|       7001 | Dehradun     |      523 | 5:00 PM      | 5:15 PM        |
|       8001 | Gonda        |      724 | 6:00 PM      | 6:05 PM        |
|       9001 | Mumbai       |      130 | 12:10 PM     | 12:15 PM       |
+------------+--------------+----------+--------------+----------------+
```

STARTS TABLE-

create table Starts (Train_no int Primary key, Station_no int, constraint foreign key (Station_no) references Station (Station_no));

```
mysql> select*from Starts;
+----------+------------+
| Train_no | Station_no |
+----------+------------+
|      723 |       3001 |
|      523 |       7001 |
|      724 |       8001 |
|      130 |       9001 |
+----------+------------+
```

STOPS AT TABLE-

create table Stops_at (Train_no int, Station_no int, constraint foreign key (train_no) references Train (Train_no), constraint Foreign key (Station_no) references Station (Station_no));

```
mysql> select*from Stops_at;
+----------+------------+
| Train_no | Station_no |
+----------+------------+
|      130 |       9001 |
|      724 |       8001 |
|      523 |       7001 |
|      723 |       3001 |
+----------+------------+
```

REACHES TABLE-

create table Reaches (Train_no int, Station_no int, Time time, constraint foreign key (Train_no) references Train (Train_no), constraint Foreign key (Station_no) references Station (Station_no));

```
mysql> select*from Reaches;
+----------+------------+----------+
| Train_no | Station_no | Time     |
+----------+------------+----------+
|      130 |       9001 | 12:10:00 |
|      523 |       7001 | 05:00:00 |
|      723 |       3001 | 08:00:00 |
|      724 |       8001 | 06:00:00 |
+----------+------------+----------+
```

BOOKS TABLE-

create table Books (User_id int, Ticket_id int, constraint foreign key (User_id) references User (User_id), constraint foreign key (Ticket_id) references Ticket (Ticket_id));

```
mysql> select*from Books;
+---------+-----------+
| User_id | Ticket_id |
+---------+-----------+
|       4 |       101 |
|       1 |       122 |
|       2 |       143 |
|       3 |       152 |
|       5 |       252 |
+---------+-----------+
```

CANCEL TABLE-

create table Cancel (User_id int, Ticket_id int, Pass_id int, constraint foreign key (Ticket_id) references Ticket (Ticket_id), constraint foreign key (Pass_id) references Passengers (Pass_id), constraint foreign key (User_id) references User (User_id));

```
mysql> select*from Cancel;
+---------+-----------+---------+
| User_id | Ticket_id | Pass_id |
+---------+-----------+---------+
|       3 |       152 |      66 |
|       1 |       122 |     121 |
|       2 |       143 |     191 |
+---------+-----------+---------+
```

SQL QUERIES

1. Display Name of all trains in the database.

```
mysql> select DISTINCT Train_name from Train;
+-----------------------+
| Train_name            |
+-----------------------+
| Mumbai Express        |
| Andhra Pradesh Express|
| Doon Express          |
| Gonda express         |
+-----------------------+
```

2. Display the total number of passengers in the database.

```
mysql> select count(pass_id) from passengers;
+----------------+
| count(pass_id) |
+----------------+
|             11 |
+----------------+
```

3. Display the total no of confirmed seats.

```
mysql> select sum(no_passenger) as 'Confirmed seats' from ticket where status='confirmed';
+-----------------+
| Confirmed seats |
+-----------------+
|              10 |
+-----------------+
```

4. Print details of passengers travelling under ticket number '143'.

```
mysql> select*from Passengers where Ticket_id = 143;
+---------+-----------------+--------+------+--------+---------+---------+-----------+
| Pass_id | Pass_name       | PNR_no | Age  | Gender | User_id | Seat_no | Ticket_id |
+---------+-----------------+--------+------+--------+---------+---------+-----------+
|     100 | Roshni Gaba     |   7878 |   22 | Female |       2 | 10      |       143 |
|     111 | Sikha Pant      | 456789 |   32 | Female |       2 | 67      |       143 |
|     178 | Rohit Shukhla   | 670987 |   22 | Male   |       2 | 56      |       143 |
|     191 | Pragati Aggrawal| 342134 |   28 | Female |       2 | 70      |       143 |
+---------+-----------------+--------+------+--------+---------+---------+-----------+
```

5. Display the Starting and Ending Station of 'Andhra Pradesh Express'.

```
mysql> select Train_no, S_station as 'Andhra Pradesh Express Starting Station', E_station as 'Andhra Pradesh
 Express Ending Stations' from Train where Train_name='Andhra Pradesh Express';
+----------+-----------------------------------------+--------------------------------------+
| Train_no | Andhra Pradesh Express Starting Station | Andhra Pradesh Express Ending Stations |
+----------+-----------------------------------------+--------------------------------------+
|      416 | New Delhi                               | Tamil Nadu                           |
|      723 | Hydrabad                                | Delhi                                |
+----------+-----------------------------------------+--------------------------------------+
```

6. Display train number and station name where arrival time is '8:00 PM'.

```
mysql> select Train_no, Station_name from Station where Arrival_time = '8:00 PM';
+----------+--------------+
| Train_no | Station_name |
+----------+--------------+
|      723 | Hyderabad    |
+----------+--------------+
```

7. Display the Maximum, Minimum and Average fare of trains.

```
mysql> select MAX(Fare) as 'Maximum Fare', MIN(Fare) as 'Minimum Fare', AVG(Fare) as 'Average Fare' from
Train_status;
+--------------+--------------+--------------------+
| Maximum Fare | Minimum Fare | Average Fare       |
+--------------+--------------+--------------------+
|          880 |           75 | 359.09090909090907 |
+--------------+--------------+--------------------+
```

8. Display the user id and ticket id of all those users whose status is confirmed.

```
mysql> select*from ticket where status='confirmed' order by user_id asc;
+-----------+---------+-----------+--------------+----------+
| Ticket_id | User_id | Status    | No_passenger | Train_no |
+-----------+---------+-----------+--------------+----------+
|       143 |       2 | Confirmed |            4 |      130 |
|       152 |       3 | Confirmed |            3 |      723 |
|       101 |       4 | Confirmed |            2 |      523 |
|       252 |       5 | Confirmed |            1 |      724 |
+-----------+---------+-----------+--------------+----------+
```

9. Display the details of all male passengers.

```
mysql> select User_id, Pass_name as 'Passenger Name', PNR_no, Age, Seat_no from passengers where
Gender='Male' order by user_id asc;
+---------+-----------------+--------+------+---------+
| User_id | Passenger Name  | PNR_no | Age  | Seat_no |
+---------+-----------------+--------+------+---------+
|       1 | Ramesh Singhal  | 987658 |   45 | 34      |
|       2 | Rohit Shukhla   | 670987 |   22 | 56      |
|       3 | Rohan Mukharjee | 663345 |   34 | 42      |
|       3 | Karan Pratap    | 111222 |   20 | 20      |
|       4 | Nitin Chaudhary | 908754 |   30 | 81      |
|       4 | Rakesh Agarwal  | 567324 |   35 | 4       |
|       5 | Mohit Kumar     | 693693 |   25 | 55      |
+---------+-----------------+--------+------+---------+
```

10. Display time at which a particular train reaches a particular station number.

```
mysql> select r.*,s.station_name from reaches r, station s where r.station_no=s.station_no;
+----------+------------+----------+--------------+
| Train_no | Station_no | Time     | station_name |
+----------+------------+----------+--------------+
|      130 |       9001 | 12:10:00 | Mumbai       |
|      523 |       7001 | 05:00:00 | Dehradun     |
|      723 |       3001 | 08:00:00 | Hyderabad    |
|      724 |       8001 | 06:00:00 | Gonda        |
+----------+------------+----------+--------------+
```

11. Display the user id and Name of all those users who booked tickets for 'Andhra Pradesh Express'.

```
mysql> select u.User_id, u.Name from User u, Train t, Ticket tc where u.User_id=tc.User_id and
t.Train_no=tc.Train_no and t.Train_name like 'Andhra Pradesh Express';
+---------+---------------+
| User_id | Name          |
+---------+---------------+
|       1 | Rakesh Singh  |
|       3 | Ritika Yadav  |
+---------+---------------+
```

12. Display passenger details for train "Doon Express".

```
mysql> select p.*from Passengers p, Train t, Ticket tc where tc.Train_no=t.Train_no and tc.Ticket_id=p.Ticket_id
and t.Train_name like 'Doon Express';
+---------+-----------------+--------+------+--------+---------+---------+-----------+
| Pass_id | Pass_name       | PNR_no | Age  | Gender | User_id | Seat_no | Ticket_id |
+---------+-----------------+--------+------+--------+---------+---------+-----------+
|     130 | Nitin Chaudhary | 908754 |   30 | Male   |       4 | 81      |       101 |
|     165 | Rakesh Agarwal  | 567324 |   35 | Male   |       4 | 4       |       101 |
+---------+-----------------+--------+------+--------+---------+---------+-----------+
```

13.Display the user id and train no of all those waiting passengers.

```
mysql> select user_id, ticket_id, status , train_no from ticket where status='waiting';
+---------+-----------+---------+----------+
| user_id | ticket_id | status  | train_no |
+---------+-----------+---------+----------+
|       1 |       122 | Waiting |      416 |
+---------+-----------+---------+----------+
```

14.Display details of train with passenger name and ticket id.

```
mysql> select t.*, p.pass_name, p.ticket_id from train_status t, passengers p where t.seat_no=p.seat_no
order by train_no asc;
+----------+---------+------+------------------------+-----------------+-----------+
| Train_no | Seat_no | Fare | Train_name             | pass_name       | ticket_id |
+----------+---------+------+------------------------+-----------------+-----------+
|      130 |      10 |   75 | Mumbai Express         | Roshni Gaba     |       143 |
|      130 |      67 |   75 | Mumbai Express         | Sikha Pant      |       143 |
|      130 |      56 |   75 | Mumbai Express         | Rohit Shukhla   |       143 |
|      130 |      70 |   75 | Mumbai Express         | Pragati Aggrawal|       143 |
|      416 |      34 |  880 | Andhra Pradesh Express | Ramesh Singhal  |       122 |
|      523 |      81 |  150 | Doon Express           | Nitin Chaudhary |       101 |
|      523 |       4 |  150 | Doon Express           | Rakesh Agarwal  |       101 |
|      723 |      42 |  750 | Andhra Pradesh Express | Rohan Mukharjee |       152 |
|      723 |      20 |  750 | Andhra Pradesh Express | Karan Pratap    |       152 |
|      723 |      87 |  750 | Andhra Pradesh Express | Neha Singh      |       152 |
|      724 |      55 |  220 | Gonda Express          | Mohit Kumar     |       252 |
+----------+---------+------+------------------------+-----------------+-----------+
```

15.Display the details of train where Starting Station is "Mumbai" and Ending Station is "Pune".

```
mysql> select Date, Train_no, Train_name, Available_seats from Train where S_station='Mumbai' and
E_station='Pune';
+------------+----------+----------------+-----------------+
| Date       | Train_no | Train_name     | Available_seats |
+------------+----------+----------------+-----------------+
| 2022-04-11 |      130 | Mumbai Express |             211 |
+------------+----------+----------------+-----------------+
```

16.Display details of train number with passenger name for fare less than 500.

```
mysql> select p.pass_name, t.* from passengers p, train_status t where t.seat_no=p.seat_no and
t.fare<500 order by fare asc;
+-------------------+----------+---------+------+----------------+
| pass_name         | Train_no | Seat_no | Fare | Train_name     |
+-------------------+----------+---------+------+----------------+
| Roshni Gaba       |      130 |      10 |   75 | Mumbai Express |
| Sikha Pant        |      130 |      67 |   75 | Mumbai Express |
| Rohit Shukhla     |      130 |      56 |   75 | Mumbai Express |
| Pragati Aggrawal  |      130 |      70 |   75 | Mumbai Express |
| Nitin Chaudhary   |      523 |      81 |  150 | Doon Express   |
| Rakesh Agarwal    |      523 |       4 |  150 | Doon Express   |
| Mohit Kumar       |      724 |      55 |  220 | Gonda Express  |
+-------------------+----------+---------+------+----------------+
```

17. Display the train name and number with decreasing order of the fare.

```
mysql> select Train_no, Train_name, Fare from Train_status order by Fare desc;
+----------+------------------------+------+
| Train_no | Train_name             | Fare |
+----------+------------------------+------+
|      416 | Andhra Pradesh Express |  880 |
|      723 | Andhra Pradesh Express |  750 |
|      723 | Andhra Pradesh Express |  750 |
|      723 | Andhra Pradesh Express |  750 |
|      724 | Gonda Express          |  220 |
|      523 | Doon Express           |  150 |
|      523 | Doon Express           |  150 |
|      130 | Mumbai Express         |   75 |
|      130 | Mumbai Express         |   75 |
|      130 | Mumbai Express         |   75 |
|      130 | Mumbai Express         |   75 |
+----------+------------------------+------+
```

18. Display the station no of all the stations from where train starts and stops.

```
mysql> select s.Train_no,s.station_no as 'Train Starts from Station no' ,st.station_no as
'Train Stops at Station no' from starts s, stops_at st where s.train_no=st.train_no;
+----------+------------------------------+---------------------------+
| Train_no | Train Starts from Station no | Train Stops at Station no |
+----------+------------------------------+---------------------------+
|      723 |                         3001 |                      3001 |
|      523 |                         7001 |                      7001 |
|      724 |                         8001 |                      8001 |
|      130 |                         9001 |                      9001 |
+----------+------------------------------+---------------------------+
```

19. Display the arrival station, arrival time and departure time of all the trains.

```
mysql> select Train_no, Station_name as 'Arrival Station', Arrival_time, Departure_time from Station;
+----------+-----------------+--------------+----------------+
| Train_no | Arrival Station | Arrival_time | Departure_time |
+----------+-----------------+--------------+----------------+
|      723 | Hyderabad       | 8:00 PM      | 8:10 PM        |
|      130 | New Delhi       | 3:00 PM      | 3:15 PM        |
|      523 | Dehradun        | 5:00 PM      | 5:15 PM        |
|      724 | Gonda           | 6:00 PM      | 6:05 PM        |
|      130 | Mumbai          | 12:10 PM     | 12:15 PM       |
+----------+-----------------+--------------+----------------+
```

20.Display the details of passengers having confirmed ticket.

```
mysql> select passengers.ticket_id as 'Confirmed Ticket',passengers.Pass_name, passengers.Age, passengers.Gender
,passengers.Seat_no from passengers INNER JOIN ticket on passengers.User_id=ticket.User_id where ticket.status='
confirmed' order by ticket.ticket_id asc;
+------------------+------------------+------+--------+---------+
| Confirmed Ticket | Pass_name        | Age  | Gender | Seat_no |
+------------------+------------------+------+--------+---------+
|              101 | Nitin Chaudhary  |   30 | Male   | 81      |
|              101 | Rakesh Agarwal   |   35 | Male   | 4       |
|              143 | Roshni Gaba      |   22 | Female | 10      |
|              143 | Sikha Pant       |   32 | Female | 67      |
|              143 | Rohit Shukhla    |   22 | Male   | 56      |
|              143 | Pragati Aggrawal |   28 | Female | 70      |
|              152 | Rohan Mukharjee  |   34 | Male   | 42      |
|              152 | Karan Pratap     |   20 | Male   | 20      |
|              152 | Neha Singh       |   25 | Female | 87      |
|              252 | Mohit Kumar      |   25 | Male   | 55      |
+------------------+------------------+------+--------+---------+
```

```
mysql> select passengers.ticket_id as 'Confirmed Ticket',passengers.Pass_name, passengers.Age, passengers.Gender
,passengers.Seat_no from passengers INNER JOIN ticket on passengers.User_id=ticket.User_id where ticket.status='
confirmed' order by ticket.ticket_id asc;
+------------------+------------------+------+--------+---------+
| Confirmed Ticket | Pass_name        | Age  | Gender | Seat_no |
+------------------+------------------+------+--------+---------+
|              101 | Nitin Chaudhary  |   30 | Male   | 81      |
```

<u>CONCLUSION</u>

In conclusion, the railway database management system project is an essential tool that simplifies the management of railway operations. The database offers a centralized platform for storing and managing various types of data related to railway services, such as passenger information, train schedules, ticket booking, and other necessary information. Through the implementation of this project, optimization of operations on railway data enhances the quality of their services and improves the overall customer experience. This project provides crucial insights that ensure smooth operations.

Furthermore, the railway database management system project is scalable, and its modular design makes it easy to customize and adapt to specific requirements.

Overall, the railway database management system project is a solution that can revolutionize the railway industry by providing an efficient, reliable, and user-friendly platform for managing railway operations.