

# **Railway Management System**

## **Overview :**

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

The Railway Management system facilitates the passengers to enquire about the trains available on the basis of source and destination, booking and cancellation of tickets, enquire about the status of the booked ticket, etc.


## **Database Creation :**

### **List of Entities and Attributes :**

| Entities         | Attributes   |
|------------------|--|
| <b>User</b>      | user_id<br>first_name<br>last_name<br>gender<br>age<br>mobile_no |
| <b>Passenger</b> | passenger_id<br>name<br>pnr_no<br>age<br>gender<br>seat_number   |
| <b>Train</b>     | train_no   |




## Passenger -



```
1 create table PASSENGER(passenger_id int primary key,  
2                        name varchar(50),  
3                        pnr_no int,age int,  
4                        gender char,  
5                        seat_number varchar(5));
```

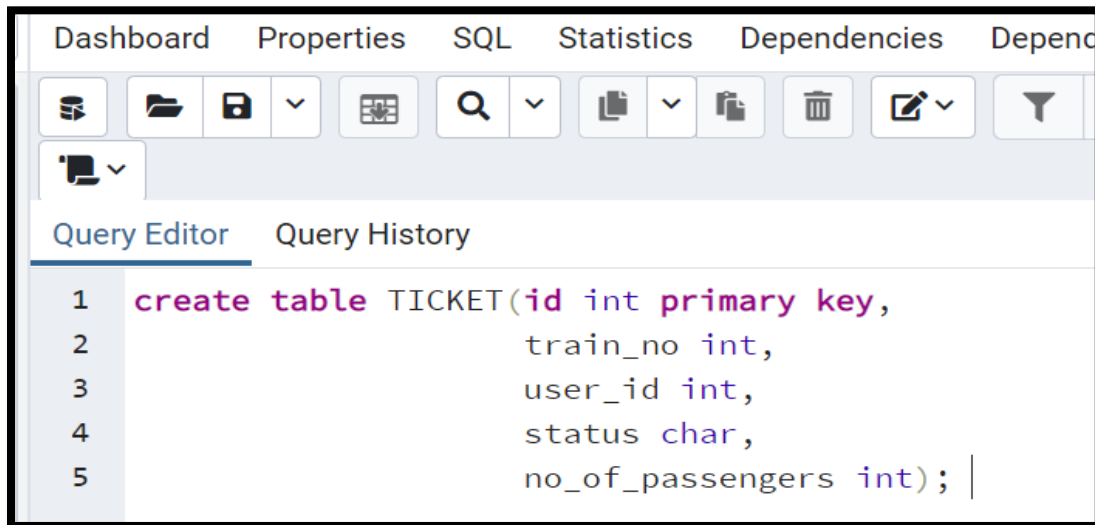
## Train -



```
1 create table TRAIN(train_no int primary key,  
2 train_name varchar(50),  
3 destination varchar(20),  
4 source_ varchar(20),  
5 arrival_time time,  
6 departure_time time,  
7 gen1 varchar(10),gen2 varchar(10),  
8 ac1 varchar(10),ac2 varchar(10));
```

**Station -**

## Ticket -

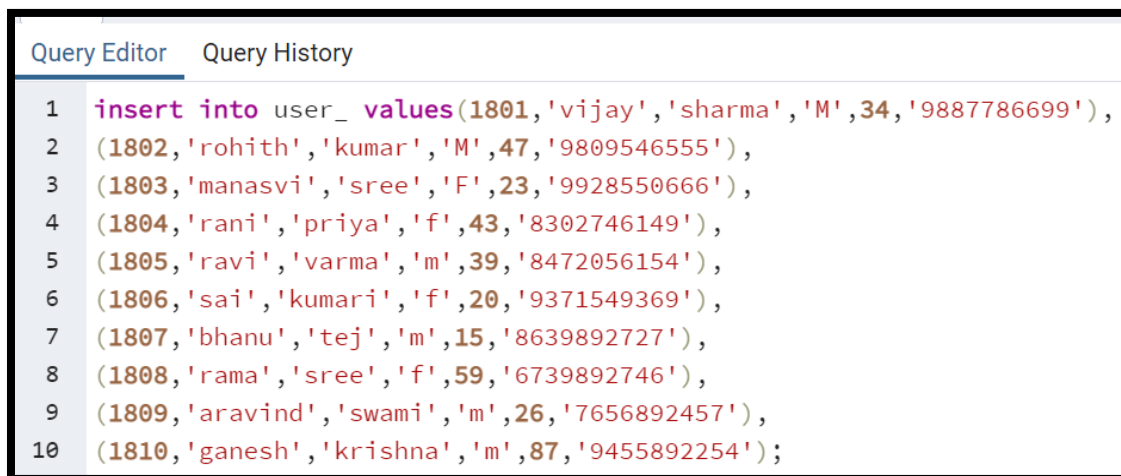


The screenshot shows a database management tool interface with tabs for Dashboard, Properties, SQL, Statistics, Dependencies, and Depend. Below the tabs is a toolbar with icons for file operations, search, and editing. The 'Query Editor' tab is active, displaying a SQL statement to create a table named TICKET.

```
1 create table TICKET(id int primary key,  
2 train_no int,  
3 user_id int,  
4 status char,  
5 no_of_passengers int); |
```

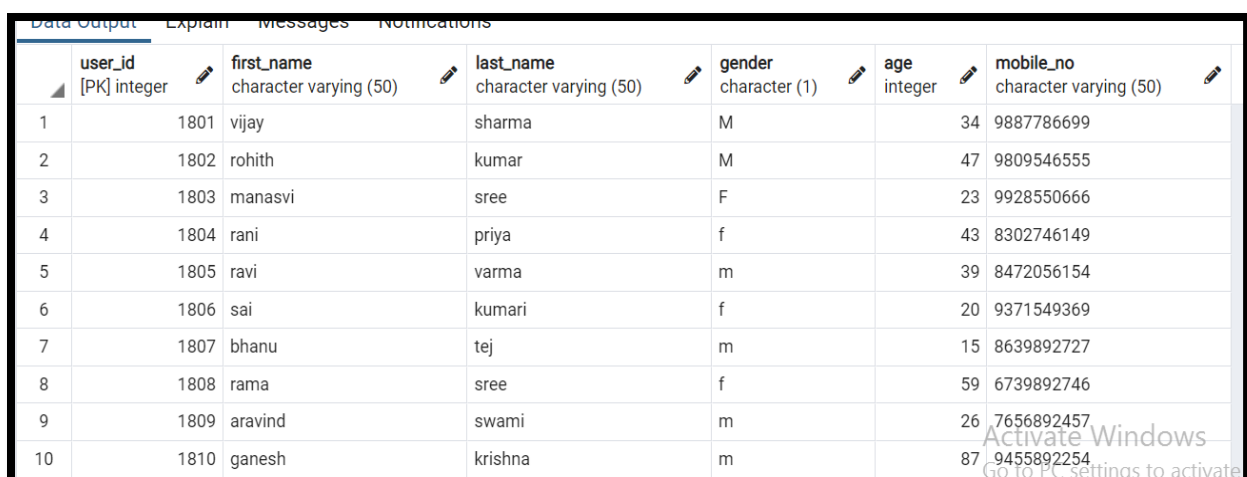
## Data Insertion :

### User -



The screenshot shows the 'Query Editor' tab of a database management tool. It contains a SQL statement to insert 10 rows of data into the 'user\_' table. The data includes user\_id, first\_name, last\_name, gender, age, and mobile\_no.

```
1 insert into user_ values(1801,'vijay','sharma','M',34,'9887786699'),  
2 (1802,'rohith','kumar','M',47,'9809546555'),  
3 (1803,'manasvi','sree','F',23,'9928550666'),  
4 (1804,'rani','priya','f',43,'8302746149'),  
5 (1805,'ravi','varma','m',39,'8472056154'),  
6 (1806,'sai','kumari','f',20,'9371549369'),  
7 (1807,'bhanu','tej','m',15,'8639892727'),  
8 (1808,'rama','sree','f',59,'6739892746'),  
9 (1809,'aravind','swami','m',26,'7656892457'),  
10 (1810,'ganesh','krishna','m',87,'9455892254');
```



The screenshot shows the 'Data Output' tab of a database management tool. It displays a table with 10 rows of user data. The columns are user\_id, first\_name, last\_name, gender, age, and mobile\_no. The data is as follows:

|    | user_id<br>[PK] integer | first_name<br>character varying (50) | last_name<br>character varying (50) | gender<br>character (1) | age<br>integer | mobile_no<br>character varying (50) |
|----|-------------------------|--------------------------------------|-------------------------------------|-------------------------|----------------|-------------------------------------|
| 1  | 1801                    | vijay                                | sharma                              | M                       | 34             | 9887786699                          |
| 2  | 1802                    | rohith                               | kumar                               | M                       | 47             | 9809546555                          |
| 3  | 1803                    | manasvi                              | sree                                | F                       | 23             | 9928550666                          |
| 4  | 1804                    | rani                                 | priya                               | f                       | 43             | 8302746149                          |
| 5  | 1805                    | ravi                                 | varma                               | m                       | 39             | 8472056154                          |
| 6  | 1806                    | sai                                  | kumari                              | f                       | 20             | 9371549369                          |
| 7  | 1807                    | bhanu                                | tej                                 | m                       | 15             | 8639892727                          |
| 8  | 1808                    | rama                                 | sree                                | f                       | 59             | 6739892746                          |
| 9  | 1809                    | aravind                              | swami                               | m                       | 26             | 7656892457                          |
| 10 | 1810                    | ganesh                               | krishna                             | m                       | 87             | 9455892254                          |

## Passenger -

| Query Editor | Query History  |
|--------------|--|
| 1            | <code>insert into passenger values(6001,'ramesh','8253651936',30,'m','gen1'),</code> |
| 2            | <code>(6002,'suresh','8789936389','40','m','gen2'),</code>                           |
| 3            | <code>(6003,'ram','8253651638',38,'m','ac2'),</code>                                 |
| 4            | <code>(6004,'naresh','8253621936',24,'m','ac1'),</code>                              |
| 5            | <code>(6005,'ram charan','9856651936',35,'m','gen2'),</code>                         |
| 6            | <code>(6006,'rathna kumari','6789363789','25','f','gen1'),</code>                    |
| 7            | <code>(6007,'likitha','8173651936',61,'f','gen3'),</code>                            |
| 8            | <code>(6008,'rathna kumari','6789363789','25','f','gen2'),</code>                    |
| 9            | <code>(6009,'Venkaih','9173651936',41,'m','ac3'),</code>                             |
| 10           | <code>(6010,'teja','6573651929',38,'f','ac3');</code>                                |

|    | passenger_id<br>[PK] integer | name<br>character varying (50) | pnr_no<br>character varying (20) | age<br>integer | gender<br>character (1) | seat_number<br>character varying (5) |
|----|------------------------------|--------------------------------|----------------------------------|----------------|-------------------------|--------------------------------------|
| 1  | 6001                         | ramesh                         | 8253651936                       | 30             | m                       | gen1                                 |
| 2  | 6002                         | suresh                         | 8789936389                       | 40             | m                       | gen2                                 |
| 3  | 6003                         | ram                            | 8253651638                       | 38             | m                       | ac2                                  |
| 4  | 6004                         | naresh                         | 8253621936                       | 24             | m                       | ac1                                  |
| 5  | 6005                         | ram charan                     | 9856651936                       | 35             | m                       | gen2                                 |
| 6  | 6006                         | rathna kumari                  | 6789363789                       | 25             | f                       | gen1                                 |
| 7  | 6007                         | likitha                        | 8173651936                       | 61             | f                       | gen3                                 |
| 8  | 6008                         | rathna kumari                  | 6789363789                       | 25             | f                       | gen2                                 |
| 9  | 6009                         | Venkaih                        | 9173651936                       | 41             | m                       | ac3                                  |
| 10 | 6010                         | teja                           | 6573651929                       | 38             | f                       | ac3                                  |

## Train -

| Query Editor | Query History   |
|--------------|---|
| 1            | <code>insert into TRAIN values(12711,'pinakini exp','Chennai','Vijayawada','10:50:00','16:45:00','Bo</code> |
| 2            | <code>(37291,'charminar exp','Hyderabad','Chennai','21:00:00','05:11:00','','','Booked'),</code>            |
| 3            | <code>(38479,'padmavati exp','Tirupathi','Hyderabad','19:40:00','06:25:00','Booked','','Booked',''),</code> |
| 4            | <code>(83534,'Simhapuri exp','Hyderabad','Gudur','21:50:00','12:45:00','','Booked','',''),</code>           |
| 5            | <code>(56204,'Howrah exp','Chennai','Howrah','17:50:00','03:45:00','Booked','','','Booked'),</code>         |
| 6            | <code>(52711,'Gomti exp','Lucknow','Delhi','12:50:00','16:45:00','Booked','','','Booked'),</code>           |
| 7            | <code>(97291,'amaravati exp','Vijayawada','Hubli','18:00:00','05:11:00','','','','Booked'),</code>          |
| 8            | <code>(68479,'chamundi exp','Bangalore','Mysore','19:40:00','07:25:00','','','Booked',''),</code>           |
| 9            | <code>(13534,'cheran exp','Chennai','Coimbatore','20:50:00','14:45:00','','Booked','Booked',''),</code>     |
| 10           | <code>(06204,'deccan exp','Mumbai','Pune','16:50:00','08:45:00','','','','Booked');</code>                  |

|    | train_no<br>[PK] integer | train_name<br>character varying (50) | destination<br>character varying (20) | source_<br>character varying (20) | arrival_time<br>time without time zone | departure_time<br>time without time zone |
|----|--------------------------|--------------------------------------|---------------------------------------|-----------------------------------|--|--|
| 1  | 12711                    | pinakini exp                         | Chennai                               | Vijayawada                        | 10:50:00                               | 16:45:00                                 |
| 2  | 37291                    | charminar exp                        | Hyderabad                             | Chennai                           | 21:00:00                               | 05:11:00                                 |
| 3  | 38479                    | padmavati exp                        | Tirupathi                             | Hyderabad                         | 19:40:00                               | 06:25:00                                 |
| 4  | 83534                    | Simhapuri exp                        | Hyderabad                             | Gudur                             | 21:50:00                               | 12:45:00                                 |
| 5  | 56204                    | Howrah exp                           | Chennai                               | Howrah                            | 17:50:00                               | 03:45:00                                 |
| 6  | 52711                    | Gomti exp                            | Lucknow                               | Delhi                             | 12:50:00                               | 16:45:00                                 |
| 7  | 97291                    | amaravati exp                        | Vijayawada                            | Hubli                             | 18:00:00                               | 05:11:00                                 |
| 8  | 68479                    | chamundi exp                         | Bangalore                             | Mysore                            | 19:40:00                               | 07:25:00                                 |
| 9  | 13534                    | cheran exp                           | Chennai                               | Coimbatore                        | 20:50:00                               | 14:45:00                                 |
| 10 | 6204                     | deccan exp                           | Mumbai                                | Pune                              | 16:50:00                               | 08:45:00                                 |

## Station -

| Query Editor |   | Query History |
|--------------|---|---------------|
| 1            | <b>insert into</b> station <b>values</b> (111,'vijayawada',10,'11:05'), |               |
| 2            | (112,'guntur',11,'11:25'),  |               |
| 3            | (113,'visakhapatnam',49,'04:35'),                                       |               |
| 4            | (114,'vijayawada',27,'07:30'),  |               |
| 5            | (115,'kadapa',20,'01:17'),  |               |
| 6            | (116,'east godavari',38,'03:05'),                                       |               |
| 7            | (117,'west godavari',22,'09:19'),                                       |               |
| 8            | (118,'guntur',45,'03:35'),  |               |
| 9            | (119,'nellore',39,'12:40'),   |               |
| 10           | (120,'kadapa',12,'11:55');  |               |

|    | no<br>integer | name<br>character varying (50) | halt<br>integer | arrival_time<br>time without time zone |
|----|---------------|--------------------------------|-----------------|--|
| 1  | 111           | vijayawada                     | 10              | 11:05:00                               |
| 2  | 112           | guntur                         | 11              | 11:25:00                               |
| 3  | 113           | visakhapatnam                  | 49              | 04:35:00                               |
| 4  | 114           | vijayawada                     | 27              | 07:30:00                               |
| 5  | 115           | kadapa                         | 20              | 01:17:00                               |
| 6  | 116           | east godavari                  | 38              | 03:05:00                               |
| 7  | 117           | west godavari                  | 22              | 09:19:00                               |
| 8  | 118           | guntur                         | 45              | 03:35:00                               |
| 9  | 119           | nellore                        | 39              | 12:40:00                               |
| 10 | 120           | kadapa                         | 12              | 11:55:00                               |

## Ticket -

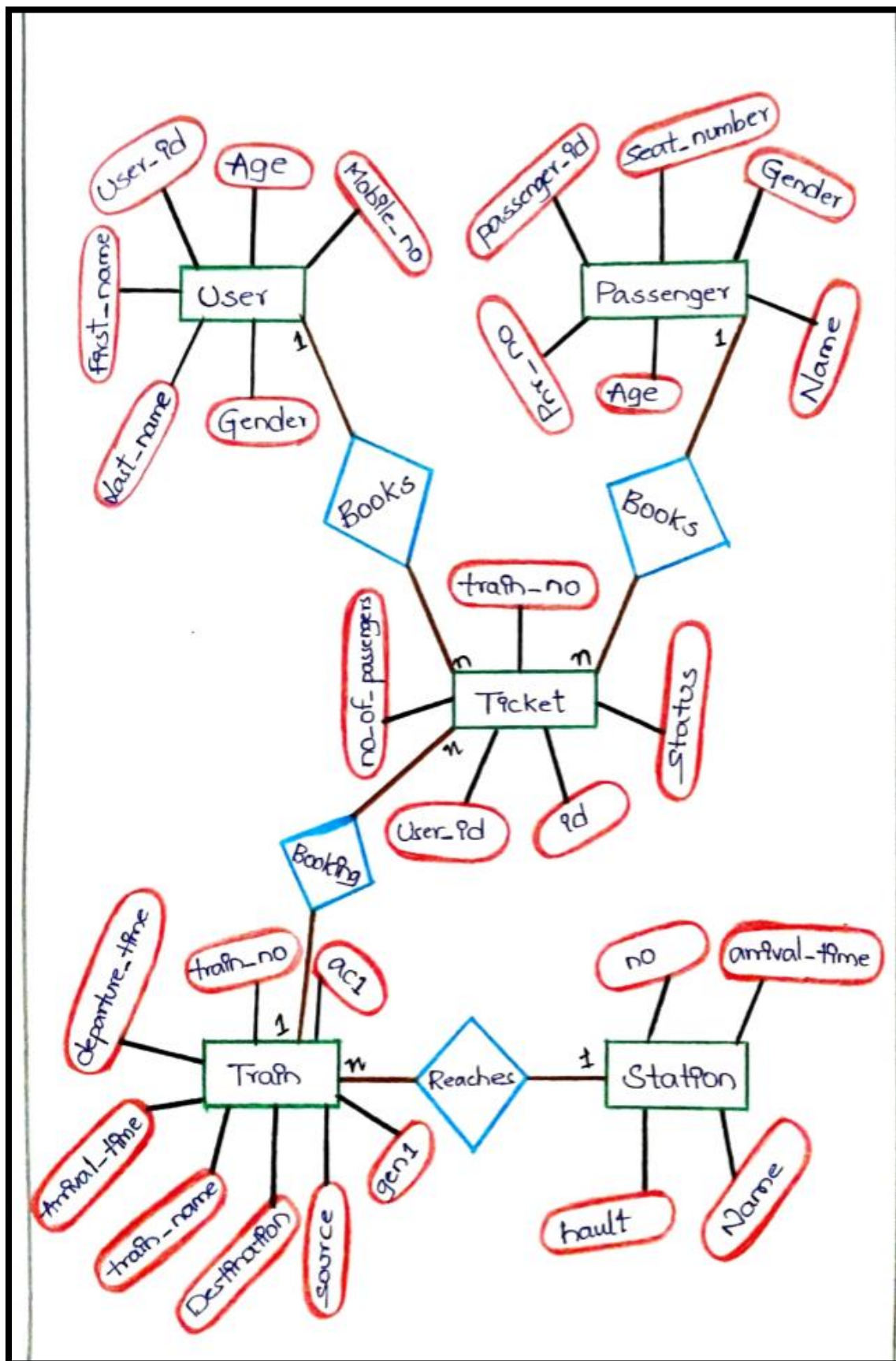
```
Query Editor  Query History

1  insert into ticket values(4001,58392,1901,'A',2),
2  (4002,73592,1902,'B',5),
3  (4003,78393,1903,'A',1),
4  (4004,58475,1904,'B',6),
5  (4005,60392,1905,'A',2),
6  (4006,53572,1906,'A',4),
7  (4007,12782,1907,'B',3),
8  (4008,94628,1908,'B',8),
9  (4009,04529,1909,'A',1),
10 (4010,75529,1910,'B',9);
```

|    | id<br>[PK] integer | train_no<br>integer | user_id<br>integer | status<br>character (1) | no_of_passengers<br>integer |
|----|--------------------|---------------------|--------------------|-------------------------|-----------------------------|
| 1  | 4001               | 58392               | 1901               | A                       | 2                           |
| 2  | 4002               | 73592               | 1902               | B                       | 5                           |
| 3  | 4003               | 78393               | 1903               | A                       | 1                           |
| 4  | 4004               | 58475               | 1904               | B                       | 6                           |
| 5  | 4005               | 60392               | 1905               | A                       | 2                           |
| 6  | 4006               | 53572               | 1906               | A                       | 4                           |
| 7  | 4007               | 12782               | 1907               | B                       | 3                           |
| 8  | 4008               | 94628               | 1908               | B                       | 8                           |
| 9  | 4009               | 4529                | 1909               | A                       | 1                           |
| 10 | 4010               | 75529               | 1910               | B                       |                             |

✓ Success

## ER Diagram :





**Primary Keys :**

1. user\_id
2. passenger\_id
3. train\_no
4. ticket\_id

**Foreign Keys :**

1. Pnr\_no
2. Source
3. Station\_no
4. Id
5. Arrival\_time

## **Normalization of Tables :**

**1. First Normal Form –** If a relation contain composite or multi-valued attribute, it violates first normal form or a relation is in first normal form if it does not contain any composite or multi-valued attribute. A relation is in first normal form if every attribute in that relation is singled valued attribute.

**User -**

| <b>user_id</b> | <b>first_name</b> | <b>last_name</b> | <b>gender</b> | <b>age</b> | <b>mobile_no</b> |
|----------------|-------------------|------------------|---------------|------------|------------------|
|----------------|-------------------|------------------|---------------|------------|------------------|

**Passenger -**

| <b>Passenger_id</b> | <b>name</b> | <b>pnr_no</b> | <b>age</b> | <b>gender</b> | <b>seat_number</b> |
|---------------------|-------------|---------------|------------|---------------|--------------------|
|---------------------|-------------|---------------|------------|---------------|--------------------|

**Train -**

| <b>Train_no</b>     | <b>Train_name</b> | <b>destination</b> | <b>source</b> | <b>Departure_time</b> |
|---------------------|-------------------|--------------------|---------------|-----------------------|
| <b>Arrival_time</b> | <b>Gen1</b>       | <b>Gen2</b>        | <b>Ac1</b>    | <b>Ac2</b>            |

**Station -**

| <b>no</b> | <b>name</b> | <b>hault</b> | <b>Arrival_time</b> |
|-----------|-------------|--------------|---------------------|
|-----------|-------------|--------------|---------------------|

**Ticket -**

| <b>id</b> | <b>Train_no</b> | <b>User_id</b> | <b>status</b> | <b>No_of_passengers</b> |
|-----------|-----------------|----------------|---------------|-------------------------|
|-----------|-----------------|----------------|---------------|-------------------------|

**2. Second Normal Form** – To be in second normal form, a relation must be in first normal form and relation must not contain any partial dependency. A relation is in 2NF if it has **No Partial Dependency**, i.e., no non-prime attribute (attributes which are not part of any candidate key) is dependent on any proper subset of any candidate key of the table.

**Partial Dependency** – If the proper subset of candidate key determines non-prime attribute, it is called partial dependency.

**3. Third Normal Form** – A relation is in third normal form, if there is **No Transitive Dependency** for non-prime attributes as well as it is in second normal form.

**User -**

| user_id | first_name | last_name | gender | age | mobile_no |
|---------|------------|-----------|--------|-----|-----------|
|---------|------------|-----------|--------|-----|-----------|

**Passenger -**

| Passenger_id | name | age | gender |
|--------------|------|-----|--------|
|--------------|------|-----|--------|

**Train -**

| Train_no | Train_name | destination | source | Departure_time | Arrival_time |
|----------|------------|-------------|--------|----------------|--------------|
|----------|------------|-------------|--------|----------------|--------------|

**Station -**

| no | name | halt | Arrival_time |
|----|------|------|--------------|
|----|------|------|--------------|

### **Ticket -**

| <b>id</b> | <b>Train_no</b> | <b>User_id</b> | <b>status</b> | <b>No_of_passengers</b> |
|-----------|-----------------|----------------|---------------|-------------------------|
|-----------|-----------------|----------------|---------------|-------------------------|

### **Travel -**

| <b>Train_no</b> | <b>Source</b> | <b>Destination</b> |
|-----------------|---------------|--------------------|
|-----------------|---------------|--------------------|

### **Train\_Status -**

| <b>Train_no</b> | <b>Gen1</b> | <b>Gen2</b> | <b>Ac1</b> | <b>Ac2</b> |
|-----------------|-------------|-------------|------------|------------|
|-----------------|-------------|-------------|------------|------------|

### **Booking -**

| <b>User_id</b> | <b>id</b> |
|----------------|-----------|
|----------------|-----------|

### **Cancelling -**

| <b>User_id</b> | <b>id</b> | <b>Passenger_id</b> |
|----------------|-----------|---------------------|
|----------------|-----------|---------------------|

### **Starts -**

| <b>Train_no</b> | <b>Station_no</b> |
|-----------------|-------------------|
|-----------------|-------------------|

### **Stops -**

| <b>Train_no</b> | <b>Station_no</b> |
|-----------------|-------------------|
|-----------------|-------------------|

### **Reaches -**

| <b>Train_no</b> | <b>Station_no</b> | <b>Arrival_time</b> |
|-----------------|-------------------|---------------------|
|-----------------|-------------------|---------------------|