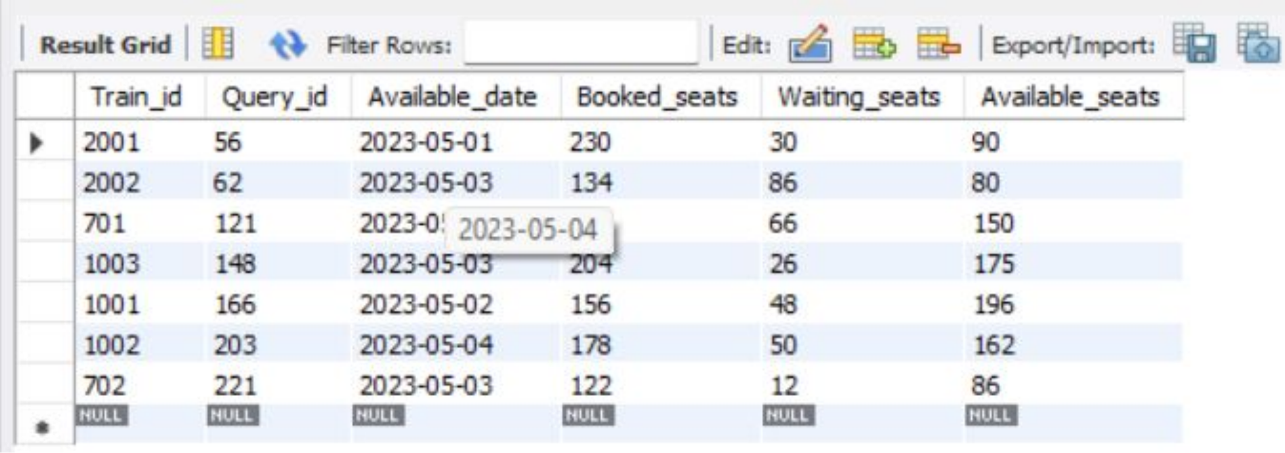
DBMS PROJECT
Railway Management System

Problem statement: The railway network of our country is one of the most complex public establishments. We can design a database solution for this network and make the management of the same more natural. Our system should have the following pieces of information:

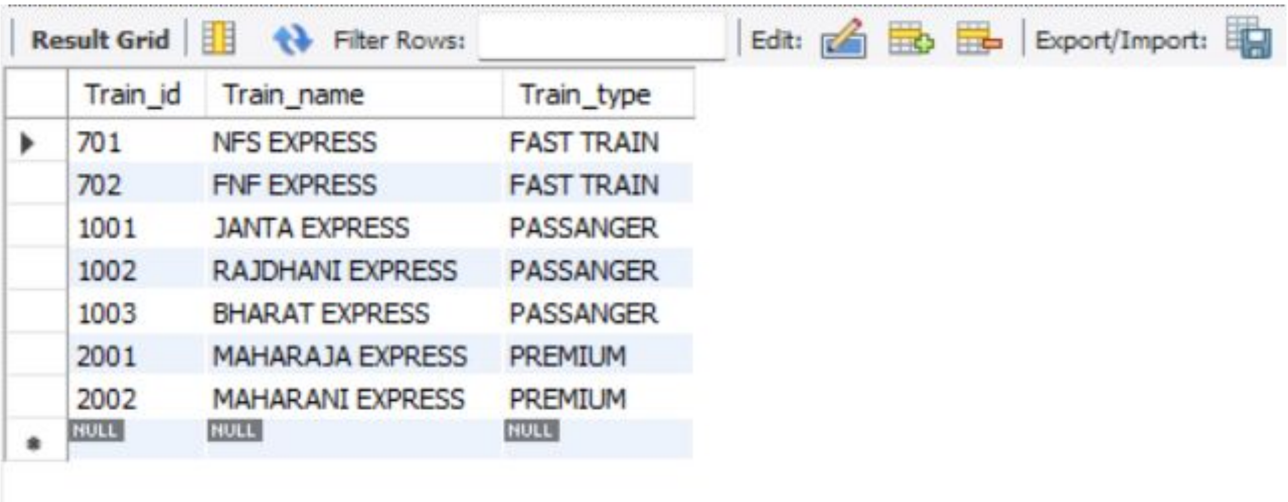
- Train status table
- Train
- Train Class
- Route (to keep things simple, we can assume that only one track runs between two stations)
- Stations
- Passengers
- Users (for online booking)
- Books(To show bookings made by users)

1) Train status table:



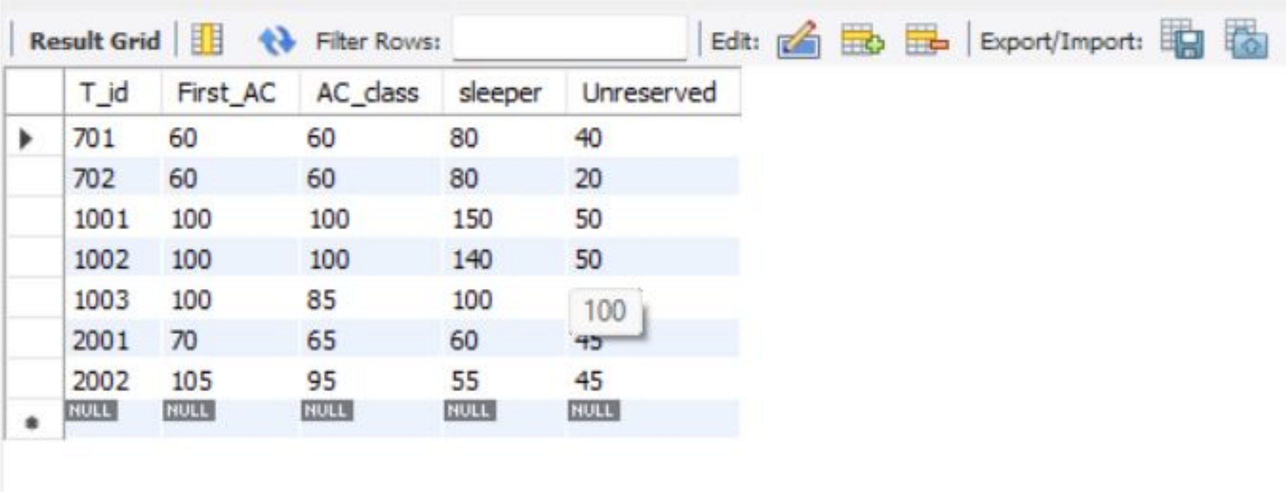
Train_id	Query_id	Available_date	Booked_seats	Waiting_seats	Available_seats
2001	56	2023-05-01	230	30	90
2002	62	2023-05-03	134	86	80
701	121	2023-05-04	[illegible]	66	150
1003	148	2023-05-03	204	26	175
1001	166	2023-05-02	156	48	196
1002	203	2023-05-04	178	50	162
702	221	2023-05-03	122	12	86
NULL	NULL	NULL	NULL	NULL	NULL

2) Train:



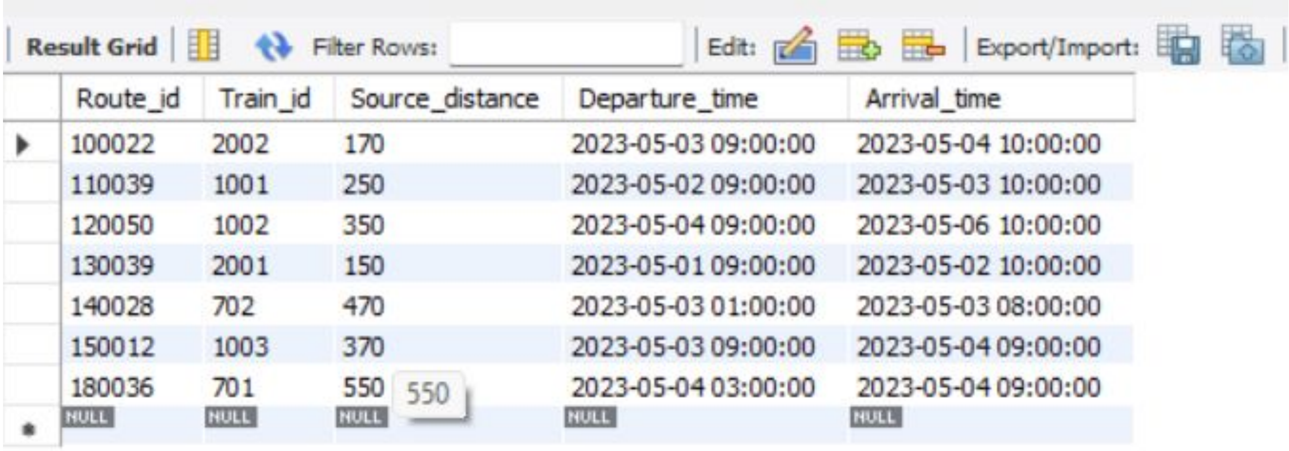
Train_id	Train_name	Train_type
701	NFS EXPRESS	FAST TRAIN
702	FNF EXPRESS	FAST TRAIN
1001	JANTA EXPRESS	PASSANGER
1002	RAJDHANI EXPRESS	PASSANGER
1003	BHARAT EXPRESS	PASSANGER
2001	MAHARAJA EXPRESS	PREMIUM
2002	MAHARANI EXPRESS	PREMIUM
NULL	NULL	NULL

3) Train Class:



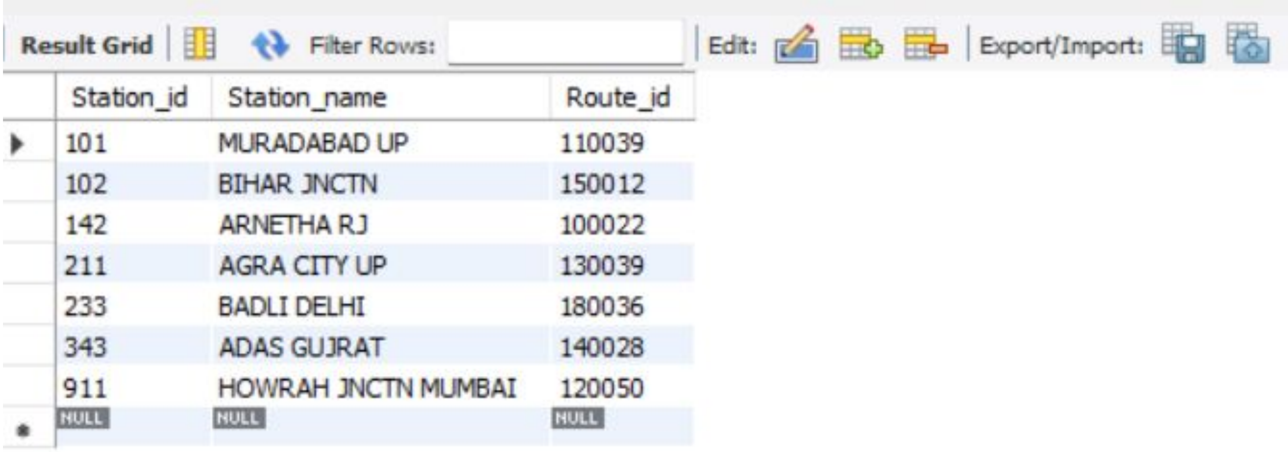
T_id	First_AC	AC_class	sleeper	Unreserved
701	60	60	80	40
702	60	60	80	20
1001	100	100	150	50
1002	100	100	140	50
1003	100	85	100	100
2001	70	65	60	45
2002	105	95	55	45
NULL	NULL	NULL	NULL	NULL

4) Route:



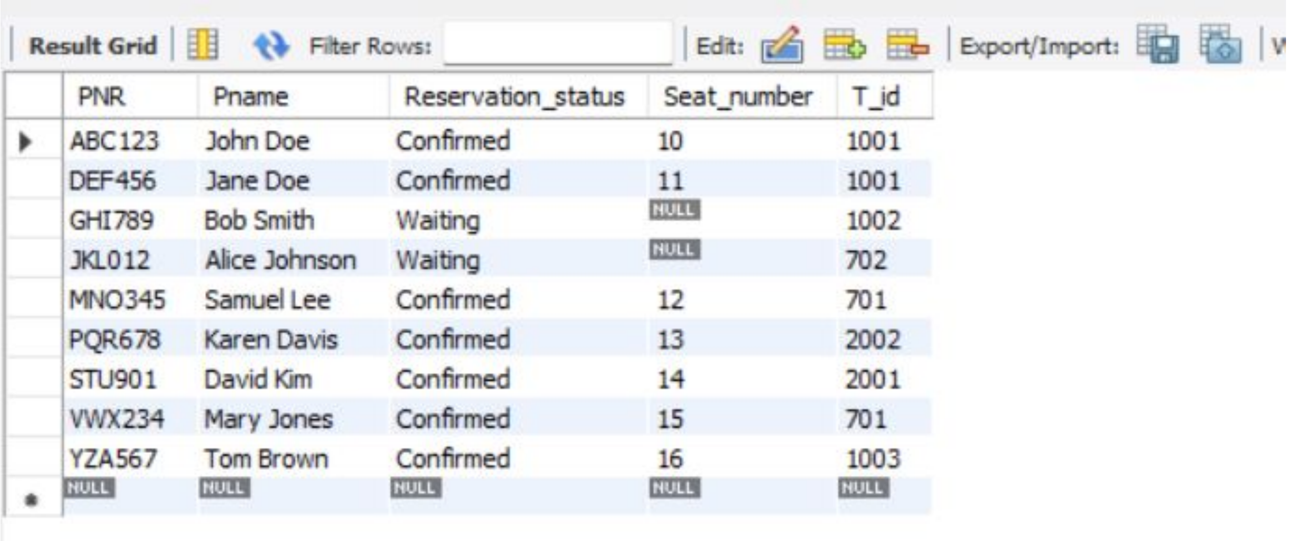
Route_id	Train_id	Source_distance	Departure_time	Arrival_time
100022	2002	170	2023-05-03 09:00:00	2023-05-04 10:00:00
110039	1001	250	2023-05-02 09:00:00	2023-05-03 10:00:00
120050	1002	350	2023-05-04 09:00:00	2023-05-06 10:00:00
130039	2001	150	2023-05-01 09:00:00	2023-05-02 10:00:00
140028	702	470	2023-05-03 01:00:00	2023-05-03 08:00:00
150012	1003	370	2023-05-03 09:00:00	2023-05-04 09:00:00
180036	701	550	2023-05-04 03:00:00	2023-05-04 09:00:00
NULL	NULL	NULL	NULL	NULL

5) Station:



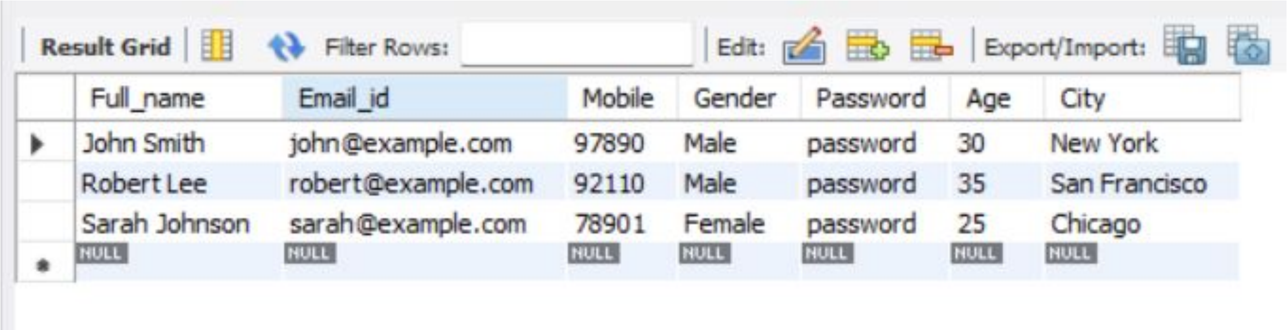
Station_id	Station_name	Route_id
101	MURADABAD UP	110039
102	BIHAR JNCTN	150012
142	ARNETHA RJ	100022
211	AGRA CITY UP	130039
233	BADLI DELHI	180036
343	ADAS GUJRAT	140028
911	HOWRAH JNCTN MUMBAI	120050
NULL	NULL	NULL

6) Passenger:



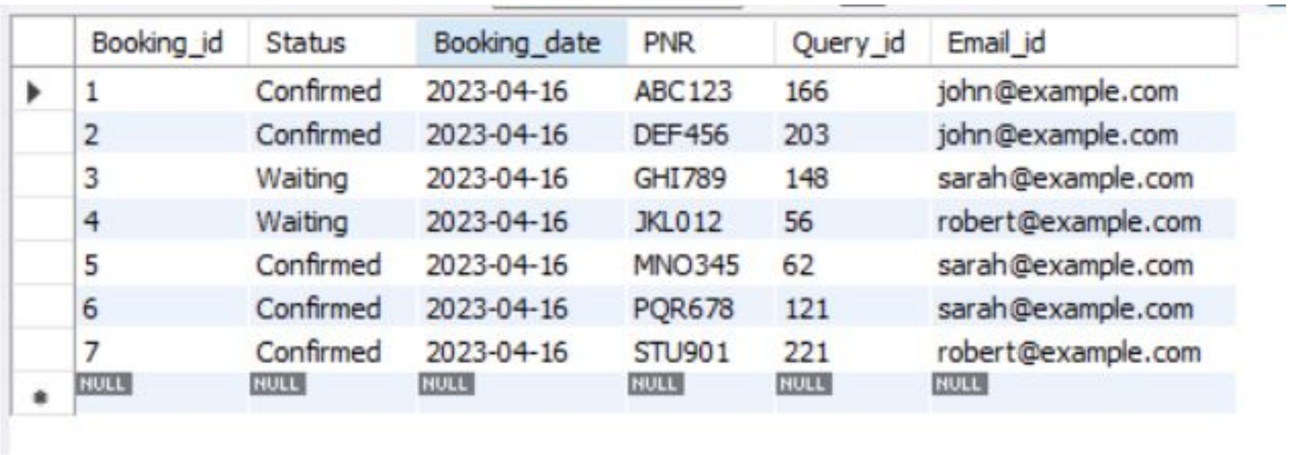
PNR	Pname	Reservation_status	Seat_number	T_id
ABC123	John Doe	Confirmed	10	1001
DEF456	Jane Doe	Confirmed	11	1001
GHI789	Bob Smith	Waiting	NULL	1002
JKL012	Alice Johnson	Waiting	NULL	702
MNO345	Samuel Lee	Confirmed	12	701
PQR678	Karen Davis	Confirmed	13	2002
STU901	David Kim	Confirmed	14	2001
VWX234	Mary Jones	Confirmed	15	701
YZA567	Tom Brown	Confirmed	16	1003
NULL	NULL	NULL	NULL	NULL

7) User:



	Full_name	Email_id	Mobile	Gender	Password	Age	City
▶	John Smith	john@example.com	97890	Male	password	30	New York
	Robert Lee	robert@example.com	92110	Male	password	35	San Francisco
	Sarah Johnson	sarah@example.com	78901	Female	password	25	Chicago
*	NULL	NULL	NULL	NULL	NULL	NULL	NULL

8) Books:

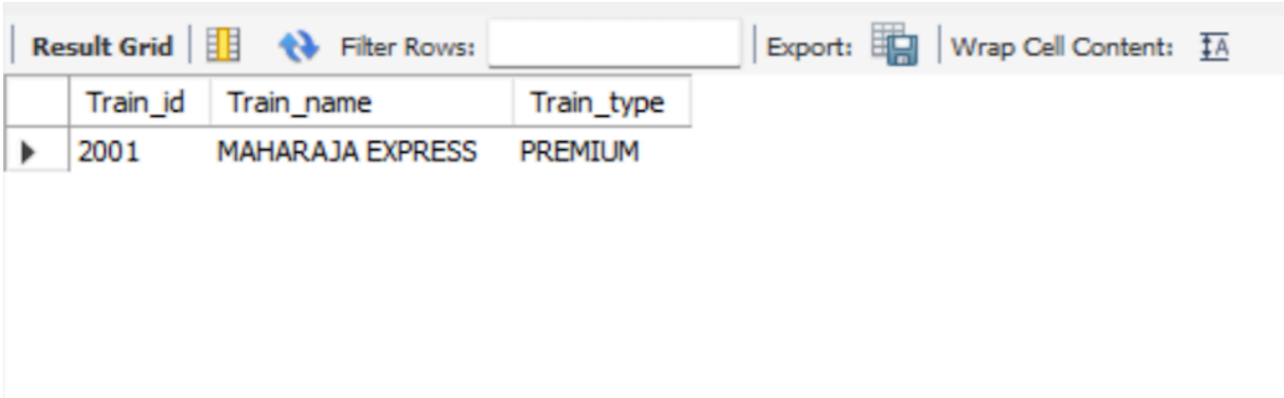


	Booking_id	Status	Booking_date	PNR	Query_id	Email_id
▶	1	Confirmed	2023-04-16	ABC123	166	john@example.com
	2	Confirmed	2023-04-16	DEF456	203	john@example.com
	3	Waiting	2023-04-16	GHI789	148	sarah@example.com
	4	Waiting	2023-04-16	JKL012	56	robert@example.com
	5	Confirmed	2023-04-16	MNO345	62	sarah@example.com
	6	Confirmed	2023-04-16	PQR678	121	sarah@example.com
	7	Confirmed	2023-04-16	STU901	221	robert@example.com
*	NULL	NULL	NULL	NULL	NULL	NULL

Queries:

1) Details of the train for which max seats have been allocated.

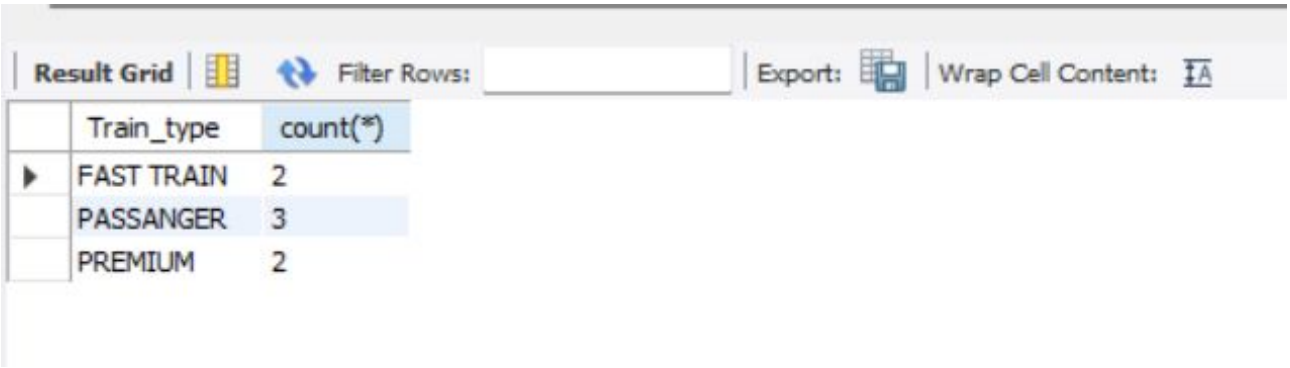
```
select T.Train_id, T.Train_name, T.Train_type
from Train as T, Train_status AS S
where T.Train_id=S.Train_id and S.Booked_seats in (select
max(Booked_seats) from Train_status);
```



	Train_id	Train_name	Train_type
▶	2001	MAHARAJA EXPRESS	PREMIUM

2) Count the train for each train type.

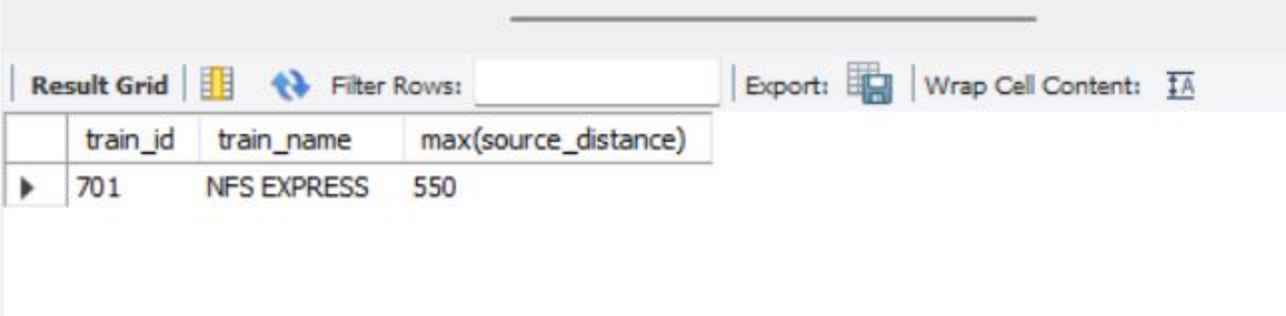
```
select Train_type, count(*)
from Train
group by Train_type;
```



	Train_type	count(*)
▶	FAST TRAIN	2
	PASSANGER	3
	PREMIUM	2

3) Details of the train which travels max distance.

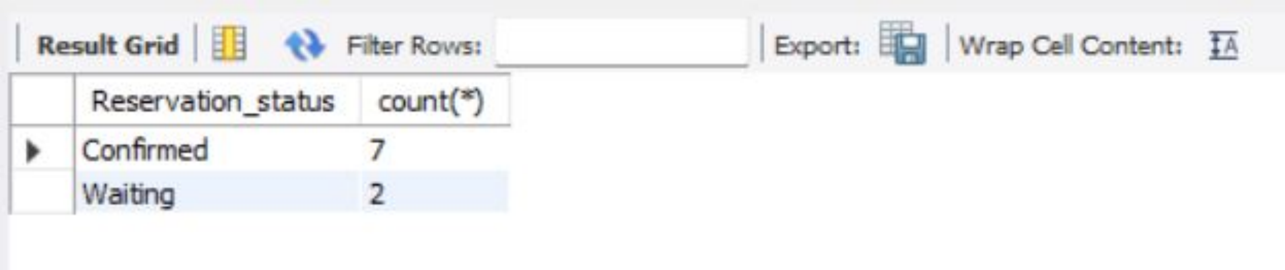
```
select T.Train_id, T.Train_name, R.Source_distance as
max(source_distance)
from Route AS R, Train AS T
where R.Train_id=T.Train_id and R.Source_distance = (select
max(Source_distance) from Route);
```



train_id	train_name	max(source_distance)
701	NFS EXPRESS	550

4) Count of confirmed and waiting passengers.

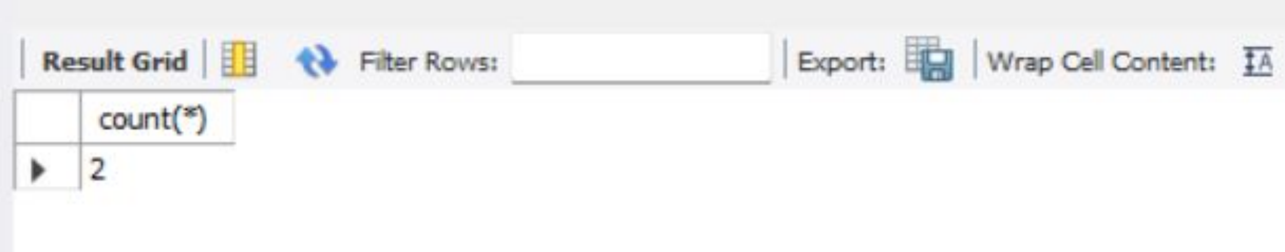
```
select Reservation_status, count(*)
from Passenger
group by Reservation_status;
```



Reservation_status	count(*)
Confirmed	7
Waiting	2

5) Count of passengers travelling through Janta Express.

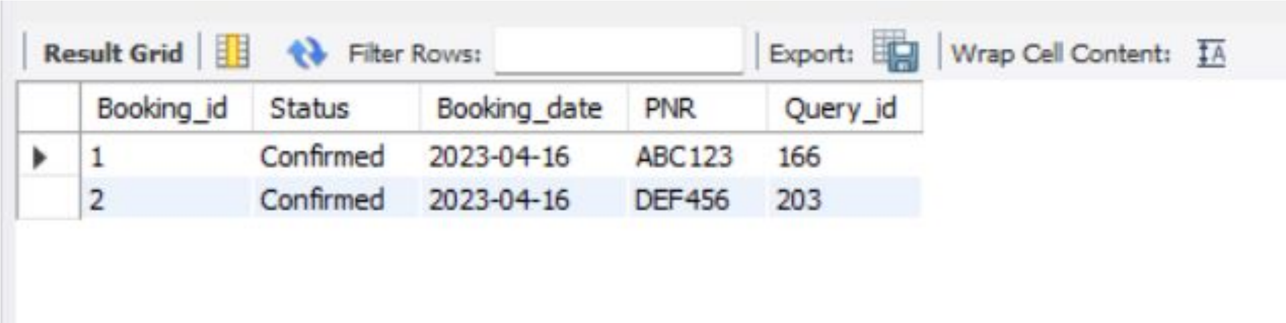
```
select count(*)
from Passenger
where T_id="1001";
```



count(*)
2

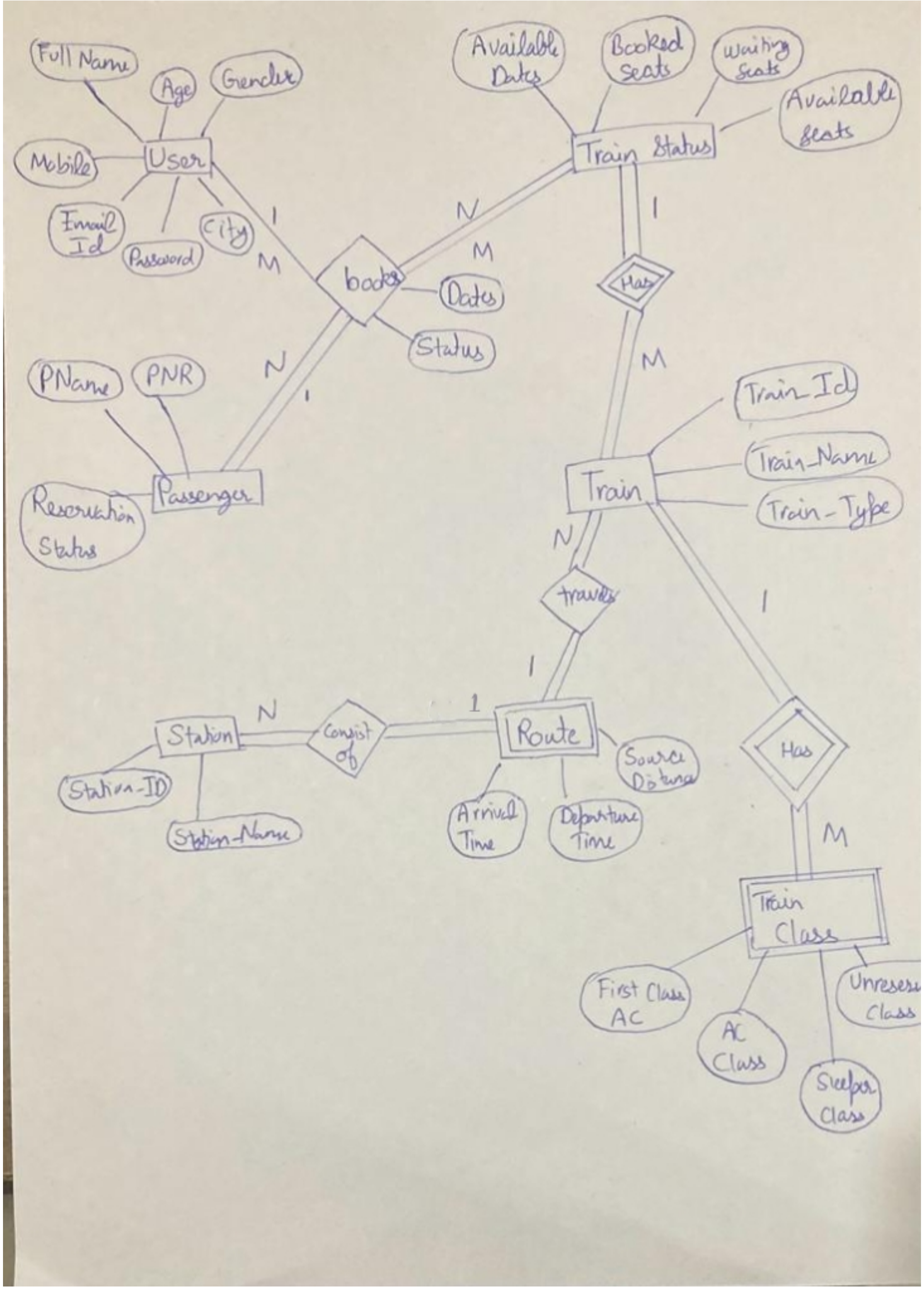
6) Details of all bookings made by John Smith.

```
select B.Booking_id, B.Status, B.Booking_date, B.PNR, B.Query_id
from operator AS O, Books AS B
where O.Email_id=B.Email_id and O.Full_name='John Smith’;
```

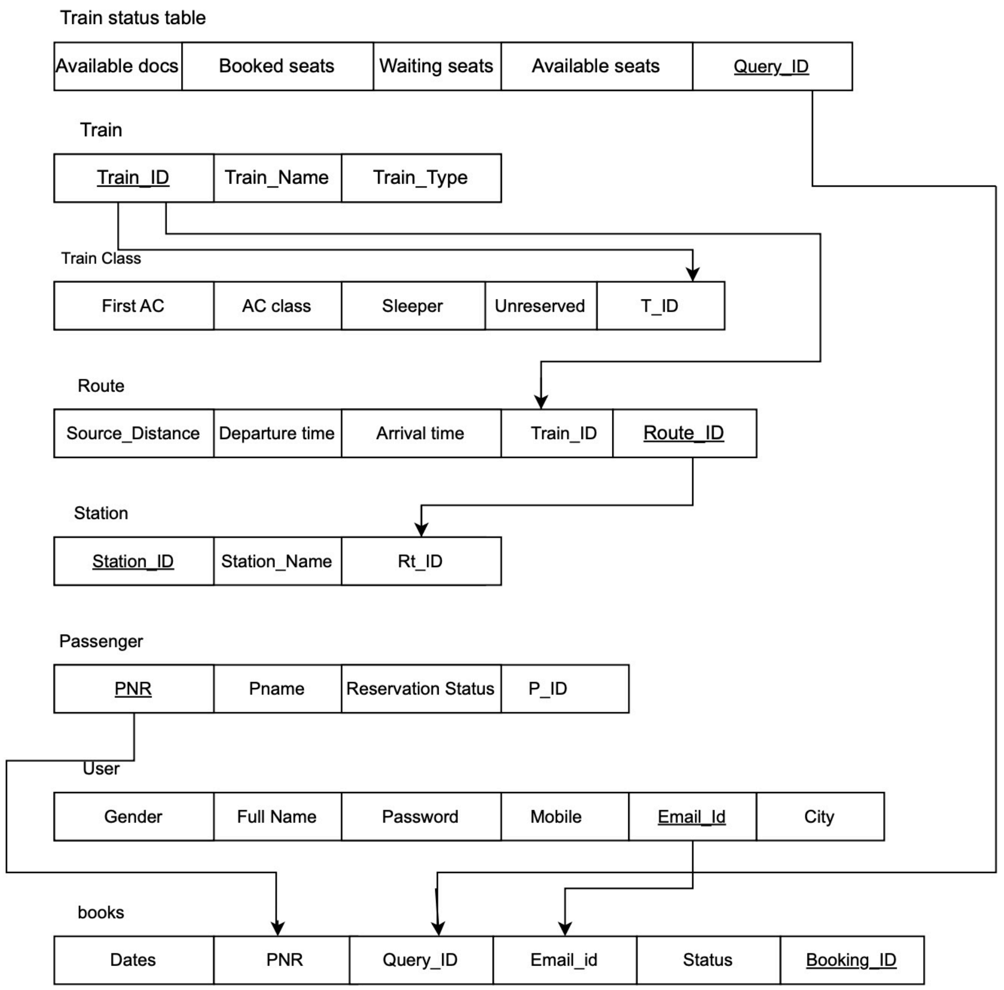


Booking_id	Status	Booking_date	PNR	Query_id
1	Confirmed	2023-04-16	ABC123	166
2	Confirmed	2023-04-16	DEF456	203

ER diagram:


Full Name
Age
Gender
Mobile
User
Email Id
Password
City
1
M
books
Dates
Status
N
M
N
1
PName
PNR
Passenger
Reservation Status
Available Dates
Booked seats
waiting seats
Available seats
Train Status
1
Has
M
Train_Id
Train_Name
Train_Type
Train
N
travels
1
1
Has
M
Train Class
First Class AC
AC Class
Sleeper Class
Unreserved Class
Station
N
Consist of
1
Route
Source Distance
Arrival Time
Departure Time
Station_ID
Station_Name

Schema



Train status table

Available docs	Booked seats	Waiting seats	Available seats	Query_ID

Train

Train_ID	Train_Name	Train_Type

Train Class

First AC	AC class	Sleeper	Unreserved	T_ID

Route

Source_Distance	Departure time	Arrival time	Train_ID	Route_ID

Station

Station_ID	Station_Name	Rt_ID

Passenger

PNR	Pname	Reservation Status	P_ID

User

Gender	Full Name	Password	Mobile	Email_Id	City

books

Dates	PNR	Query_ID	Email_id	Status	Booking_ID

Database:

```
create database railway_DB;
use railway_DB;


create table Train (Train_id int not null,
Train_name varchar(50) not null,
Train_type varchar(50) not null,
primary key(Train_ID));


INSERT INTO train
(Train_id ,Train_name ,Train_type) VALUES
( 01001 ,'JANTA EXPRESS' ,'PASSANGER') ,
( 01002 ,'RAJDHANI EXPRESS' ,'PASSANGER') ,
( 01003 ,'BHARAT EXPRESS' ,'PASSANGER') ,
( 02001 ,'MAHARAJA EXPRESS' ,'PREMIUM') ,
( 02002 ,'MAHARANI EXPRESS' ,'PREMIUM') ,
( 00702 ,'FNF EXPRESS' ,'FAST TRAIN') ,
( 00701 ,'NFS EXPRESS' ,'FAST TRAIN') ;


SELECT * FROM Train;


create table Train_status (Train_id int not null,
Query_id int not null,
Available_date date not null,
Booked_seats int null,
Waiting_seats int null,
Available_seats int null,
primary key (Query_id),
foreign key(Train_id) references Train(Train_id) on update cascade on delete cascade);
```

```
INSERT INTO Train_status
(Train_id ,Query_id ,Available_Date ,Booked_seats ,Waiting_seats ,Available_seats) VALUES
(01001 ,166 ,'23-05-02' ,156 ,48 ,196),
(01002 ,203 ,'23-05-04' ,178 ,50 ,162),
(01003 ,148 ,'23-05-03' ,204 ,26 ,175),
(02001 ,56 ,'23-05-01' ,230 ,30 ,90),
(02002 ,62 ,'23-05-03' ,134 ,86 ,80),
(00701 ,121 ,'23-05-04' ,24 ,66 ,150),
(00702 ,221 ,'23-05-03' , 122,12 ,86);

SELECT * FROM Train_status;


create table Train_class (T_id int not null,
First_AC int not null,
AC_class int not null,
sleeper int not null,
Unreserved int not null,
primary key (T_id),
foreign key(T_id) references Train(Train_id) );

INSERT INTO Train_class
(T_id ,First_AC ,AC_class ,sleeper ,unreserved) VALUES
(02001 ,70 ,65 ,60 ,45),
(02002 ,105 ,95 ,55 ,45),
(01001 ,100 ,100 ,150 ,50),
(01002 ,100 ,100 ,140 ,50),
(01003 ,100 ,85 ,100 ,100),
(00701 ,60 ,60 ,80 ,40),
(00702 ,60 ,60 ,80 ,20);
```

```
SELECT * FROM Train_class;

create table Route (Route_id int not null,
Train_id int not null,
Source_distance int not null,
Departure_time datetime,
Arrival_time datetime,
primary key(Route_id),
foreign key(Train_id) references Train(Train_id) on update cascade on delete cascade );

INSERT INTO Route
(Route_id ,Train_id ,Source_distance ,Departure_time ,Arrival_time) VALUES
(110039, 01001 ,250 ,'23-05-02 9:00:00' ,'23-05-03 10:00:00'),
(120050, 01002 ,350 ,'23-05-04 9:00:00' ,'23-05-06 10:00:00'),
(150012, 01003 ,370 ,'23-05-03 9:00:00' ,'23-05-04 09:00:00'),
(130039, 02001 ,150 ,'23-05-01 9:00:00' ,'23-05-02 10:00:00'),
(100022, 02002 ,170 ,'23-05-03 9:00:00' ,'23-05-04 10:00:00'),
(180036, 00701 ,550 ,'23-05-04 3:00:00' ,'23-05-04 9:00:00'),
(140028, 00702 ,470 ,'23-05-03 1:00:00' ,'23-05-03 8:00:00');

SELECT * FROM Route;


create table Station (Station_id int not null,
Station_name varchar(20) not null,
Route_id int not null,
primary key(Station_id, Route_id),
foreign key (Route_id) references Route(Route_id));
```

```
        INSERT INTO Station
        (Route_id ,Station_name ,Station_id) VALUES
        (110039 , 'MURADABAD UP' ,101),
        (120050 , 'HOWRAH JNCTN MUMBAI' ,911),
        (150012 , 'BIHAR JNCTN' ,102),
        (130039 , 'AGRA CITY UP' ,211),
        (100022 , 'ARNETHA RJ' ,142),
        (180036 , 'BADLI DELHI' ,233),
        (140028 ,'ADAS GUJRAT' ,343);

  SELECT * FROM Station;

create table Passenger (PNR varchar(20) not null,
Pname varchar(20),
Reservation_status varchar(20),
Seat_number int null,
T_id int null,
primary key (PNR),
foreign key (T_id) references Train(Train_id) on update cascade on delete cascade);

INSERT INTO Passenger (PNR, Pname, Reservation_status, Seat_number, T_id) VALUES
('ABC123', 'John Doe', 'Confirmed', 10, 01001),
('DEF456', 'Jane Doe', 'Confirmed', 11, 01001),
('GHI789', 'Bob Smith', 'Waiting', NULL, 01002),
('JKL012', 'Alice Johnson', 'Waiting', NULL, 00702),
('MNO345', 'Samuel Lee', 'Confirmed', 12, 00701),
('PQR678', 'Karen Davis', 'Confirmed', 13, 02002),
('STU901', 'David Kim', 'Confirmed', 14, 02001),
('VWX234', 'Mary Jones', 'Confirmed', 15, 00701),
('YZA567', 'Tom Brown', 'Confirmed', 16, 01003);
```

```
SELECT * FROM Passenger;


create table operator(Full_name varchar(20) not null,
Email_id varchar(30) not null,
Mobile int not null,
Gender varchar(10) not null,
Password varchar(20) not null,
Age int not null,
City varchar(20) not null,
primary key (Email_id));

INSERT INTO operator (Full_name, Email_id, Mobile, Gender, Password, Age, City)
VALUES
('John Smith', 'john@example.com', 97890, 'Male', 'password', 30, 'New York'),
('Sarah Johnson', 'sarah@example.com',78901, 'Female', 'password', 25, 'Chicago'),
('Robert Lee', 'robert@example.com', 92110, 'Male', 'password', 35, 'San Francisco');

select * from operator ;

create table Books (Booking_id int not null,
Status varchar(20) not null,
Booking_date date,
PNR varchar(20) not null,
Query_id int not null,
Email_id varchar(30) not null,
primary key(Booking_id),
foreign key (PNR) references Passenger(PNR),
foreign key (Query_id) references Train_status(Query_id),
foreign key (Email_id) references operator(Email_id)
);

INSERT INTO Books (Booking_id, Status, Booking_date, PNR, Query_id, Email_id)
VALUES
(1, 'Confirmed', '2023-04-16', 'ABC123', 166, 'john@example.com'),
(2, 'Confirmed', '2023-04-16', 'DEF456', 203, 'john@example.com'),
(3, 'Waiting', '2023-04-16', 'GHI789', 148, 'sarah@example.com'),
(4, 'Waiting', '2023-04-16', 'JKL012', 56, 'robert@example.com'),
(5, 'Confirmed', '2023-04-16', 'MNO345', 62, 'sarah@example.com'),
(6, 'Confirmed', '2023-04-16', 'PQR678', 121, 'sarah@example.com'),
(7, 'Confirmed', '2023-04-16', 'STU901', 221, 'robert@example.com');

SELECT * FROM Books;
```