A Project Report Submitted
for
Database Management System
(UEC-716)

By

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Submitted to
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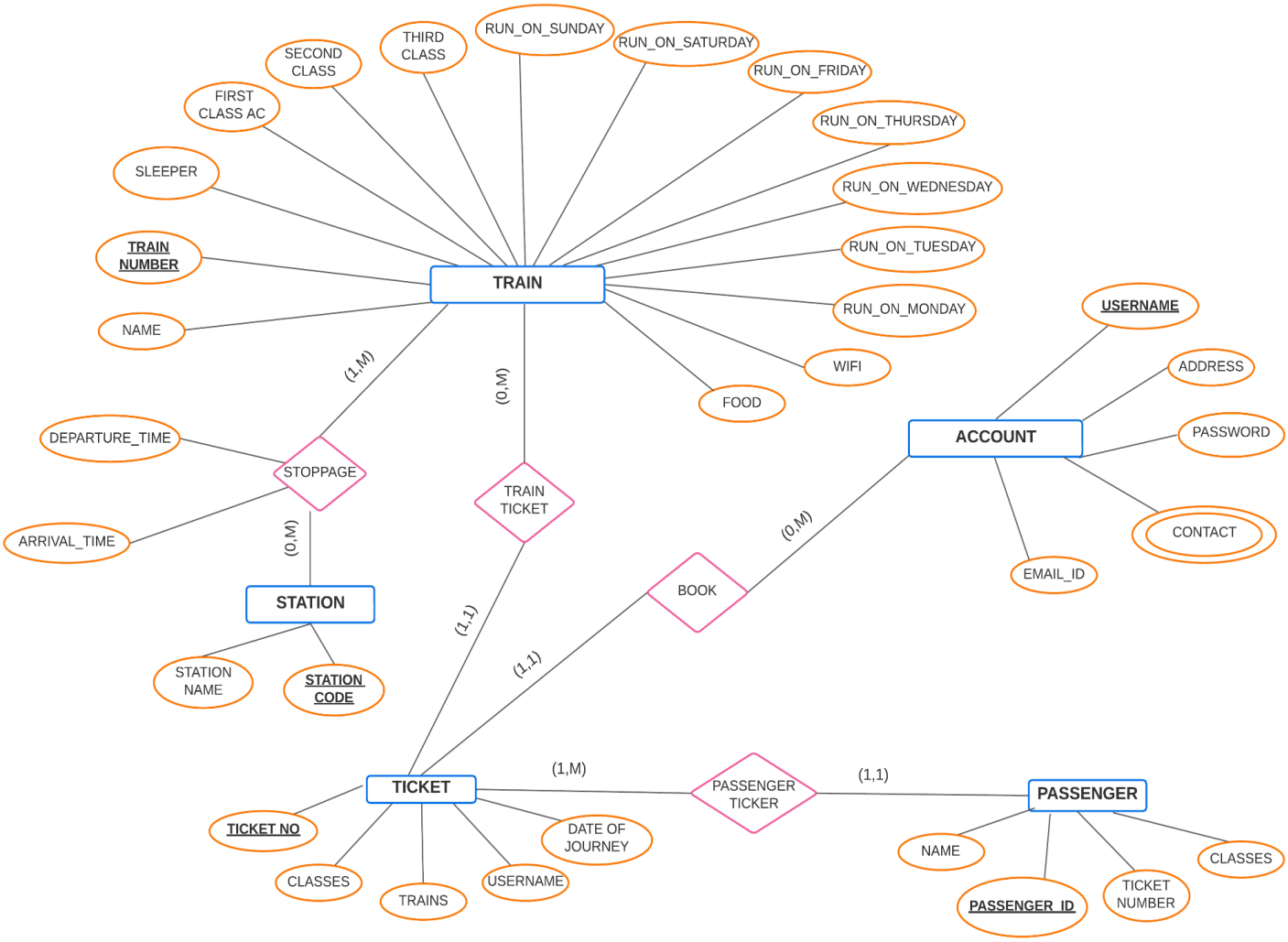
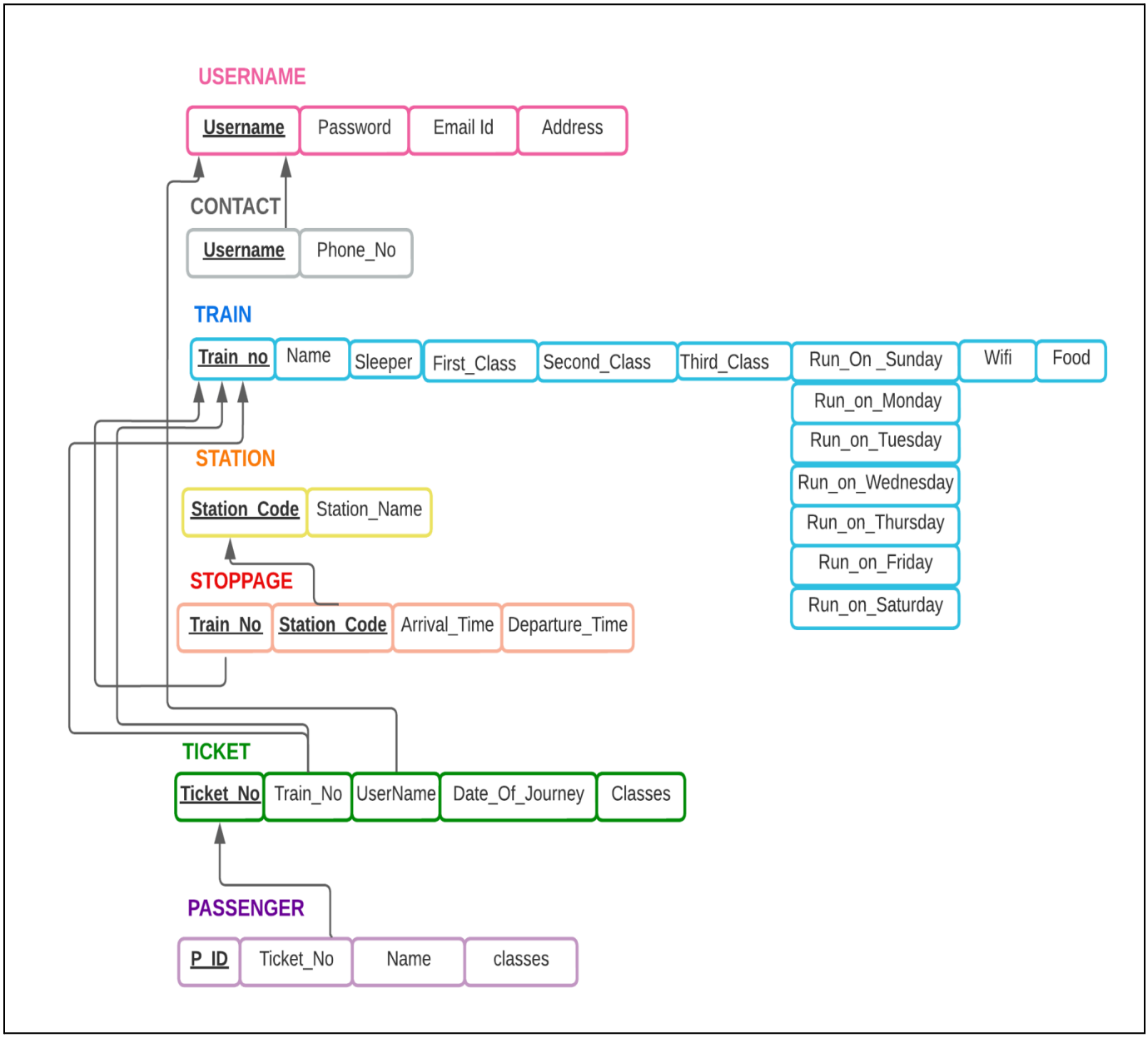
Problem Statement

This project is about creating a database about the **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. The aim of case study is to design and develop a database maintaining the records of different trains, stations, and passengers. The record of the train includes its number, name, days on which it is available etc. Passengers can book their tickets for the train in which seats are available. For this, passengers have to provide the desired train number and the date for which ticket is to be booked. Before booking a ticket for a passenger, the validity of train number and booking date is checked. Once the train number and booking date are validated, it is checked whether the seat is available. If yes, the ticket is booked with confirmed Normalization Normalization status and corresponding ticket No is generated which is stored along with other details of the passenger. The ticket once booked can be canceled 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.

ER DIAGRAM


TRAIN
TRAIN NUMBER
NAME
SLEEPER
FIRST CLASS AC
SECOND CLASS
THIRD CLASS
RUN_ON_SUNDAY
RUN_ON_SATURDAY
RUN_ON_FRIDAY
RUN_ON_THURSDAY
RUN_ON_WEDNESDAY
RUN_ON_TUESDAY
RUN_ON_MONDAY
WIFI
FOOD
(1,M)
(0,M)
STOPPAGE
DEPARTURE_TIME
ARRIVAL_TIME
STATION
STATION NAME
STATION CODE
TRAIN TICKET
(1,1)
(1,1)
TICKET
TICKET NO
CLASSES
TRAINS
USERNAME
DATE OF JOURNEY
(1,M)
PASSENGER TICKER
(1,1)
PASSENGER
NAME
PASSENGER_ID
TICKET NUMBER
CLASSES
BOOK
(0,M)
ACCOUNT
USERNAME
ADDRESS
PASSWORD
CONTACT
EMAIL_ID

ER TO TABLE


USERNAME
Username
Password
Email Id
Address
CONTACT
Username
Phone_No
TRAIN
Train_no
Name
Sleeper
First_Class
Second_Class
Third_Class
Run_On _Sunday
Wifi
Food
Run_on_Monday
Run_on_Tuesday
Run_on_Wednesday
Run_on_Thursday
Run_on_Friday
Run_on_Saturday
STATION
Station_Code
Station_Name
STOPPAGE
Train_No
Station_Code
Arrival_Time
Departure_Time
TICKET
Ticket_No
Train_No
UserName
Date_Of_Journey
Classes
PASSENGER
P_ID
Ticket_No
Name
classes

NORMALIZATION

FIRST NORMAL FORM: As per the rule of first normal form, an attribute (column) of a table cannot hold multiple values. It should hold only atomic values. The above schema is in 1NF since all the attributes are atomic and not multivalued. Since a passenger could have multiple phone numbers,it would violate the 1NF rules.Hence we have created a separate table called contact to handle this.

CONTACT

Username	Contact

SECOND NORMAL FORM: A table is said to be in 2NF if both the following conditions hold: -Table is in 1NF (First normal form) -No non-prime attribute is dependent on the proper subset of any candidate key of table. If in the Passenger table we consider ticket_no and first_name as the candidate key,then date_of_birth would depend only on the name and it would violate the 2NF.

THIRD NORMAL FORM: A table design is said to be in 3NF if both the following conditions hold: -Table must be in 2NF -Transitive functional dependency of non-prime attribute on any super key should be removed. Our schema follows the above rules and hence is in 3NF.

SQL/PLSQL CODE

```
--User account
CREATE TABLE Accountt
(
  Username varchar(15) NOT NULL,
  Passwordd varchar(20) NOT NULL,
  Email_Id varchar(35) NOT NULL,
  Address varchar(50),
  PRIMARY KEY (Username)
);
DESC Accountt
INSERT INTO Accountt VALUES
('Khwahish','KhwahishENC','kmittal2_be20@thapar.edu','Sirki Bazaar, Bathinda');
INSERT INTO Accountt VALUES
('Vaishnavi','VaishnaviENC','vvaishnavi_be20@thapar.edu','Near DMC, Ludhiana');
INSERT INTO Accountt VALUES ('Aditya','AdityaENC','agarg4_be20@thapar.edu','home,
Faridkot');
INSERT INTO Accountt VALUES ('Aradhya','Aradhya123','aru_be20@thapar.edu','GDC,
Amritsar');
INSERT INTO Accountt VALUES ('Vanshaj','VanshCOE','vsingla_be20@thapar.edu','Green
City, Patiala');
INSERT INTO Accountt VALUES ('Hiteshi','Hiteshi123','hgarg_be20@thapar.edu', 'Shiv
Colony, Fazilka');
SELECT * FROM Accountt;
```

USERNAME	PASSWORDD	EMAIL_ID	ADDRESS
Khwahish	KhwahishENC	kmittal2_be20@thapar.edu	Sirki Bazaar, Bathinda
Vaishnavi	VaishnaviENC	vvaishnavi_be20@thapar.edu	Near DMC, Ludhiana
Aditya	AdityaENC	agarg4_be20@thapar.edu	home, Faridkot
Aradhya	Aradhya123	aru_be20@thapar.edu	GDC, Amritsar
Vanshaj	VanshCOE	vsingla_be20@thapar.edu	Green City, Patiala
Hiteshi	Hiteshi123	hgarg_be20@thapar.edu	Shiv Colony, Fazilka

Download CSV

6 rows selected.

```
CREATE TABLE Contact (
  Username varchar(15) NOT NULL ,
  Phone_No char(10) NOT NULL,
  PRIMARY KEY (Username,Phone_No),
  CONSTRAINT Contact_ibfk_1 FOREIGN KEY (Username) REFERENCES Accountt
(Username) ON DELETE CASCADE
);
INSERT INTO Contact VALUES ('Khwahish','7009683067');
INSERT INTO Contact VALUES ('Khwahish','7986127036');
INSERT INTO Contact VALUES ('Vaishnavi','7889247929');
INSERT INTO Contact VALUES ('Vaishnavi','7889223949');
INSERT INTO Contact VALUES ('Aditya','7889003949');
INSERT INTO Contact VALUES ('Aditya','7889113949');
INSERT INTO Contact VALUES ('Aditya','7889223949');
INSERT INTO Contact VALUES ('Aditya','7889333949');
INSERT INTO Contact VALUES ('Aradhya','8889223949');
INSERT INTO Contact VALUES ('Hiteshi','7889333499');
INSERT INTO Contact VALUES ('Vanshaj','7888523949');
SELECT * FROM Contact;
```

USERNAME	PHONE_NO
Aditya	7889003949
Aditya	7889113949
Aditya	7889223949
Aditya	7889333949
Aradhya	8889223949
Hiteshi	7889333499
Khwahish	7009683067
Khwahish	7986127036
Vaishnavi	7889223949
Vaishnavi	7889247929
Vanshaj	7888523949

Download CSV

11 rows selected.

--Station table

```
CREATE TABLE Station
(
  Station_Code char(5) NOT NULL ,
  Station_Name varchar(25) NOT NULL,
  PRIMARY KEY (Station_Code)
);
DESC Station;
INSERT INTO Station VALUES('BTI','BATHINDA JUNCTION');
INSERT INTO Station VALUES('DUI','DHURI JUNCTION');
INSERT INTO Station VALUES('LDH','LUDHIANA JUNCTION');
INSERT INTO Station VALUES('FKA','FAZILKA JUNCTION');
INSERT INTO Station VALUES('ASR','AMRITSAR');
INSERT INTO Station VALUES('KKP','KOT KAPURA JUNCTION');
SELECT * FROM Station;
```

```
1 row(s) inserted.
```

STATION_CODE	STATION_NAME
BTI	BATHINDA JUNCTION
DUI	DHURI JUNCTION
LDH	LUDHIANA JUNCTION
FKA	FAZILKA JUNCTION
ASR	AMRITSAR
KKP	KOT KAPURA JUNCTION

```
Download CSV
6 rows selected.
```

```
--Train table
CREATE TABLE Train (
  Train_No number(6) NOT NULL ,
  Name varchar(25) NOT NULL,
  Sleeper integer NOT NULL,
  First_Class_AC number(4) NOT NULL,
  Second_Class_AC number(4) NOT NULL,
  Third_Class_AC number(4) NOT NULL,
  Wifi char(1) NOT NULL,
  Food char(1) NOT NULL,
  Run_On_Sunday char(1) NOT NULL,
  Run_On_Monday char(1) NOT NULL,
```

```
  Run_On_Tuesday char(1) NOT NULL,
  Run_On_Wednesday char(1) NOT NULL,
  Run_On_Thursday char(1) NOT NULL,
  Run_On_Friday char(1) NOT NULL,
  Run_On_Saturday char(1) NOT NULL,
  PRIMARY KEY (Train_No)
);
DESC Train
INSERT INTO Train VALUES(15099,'ASR FZL
EXP',479,47,96,192,'N','Y','Y','Y','Y','Y','Y','Y','Y');
INSERT INTO Train VALUES(15118,'SHIV GANGA
EXP',480,43,96,192,'N','Y','Y','Y','Y','Y','Y','Y','Y');
INSERT INTO Train VALUES(15119,'GNR BTI
EXP',432,48,80,144,'N','N','Y','Y','Y','Y','Y','Y','Y');
INSERT INTO Train VALUES(15120,'LDH ASR
EXP',443,50,70,164,'N','N','Y','Y','Y','Y','Y','Y','Y');
INSERT INTO Train VALUES(15122,'DUI BTI
EXP',444,78,30,145,'N','Y','Y','Y','Y','N','Y','Y','N');
SELECT * FROM Train;
```

TRAIN_NO	NAME	SLEEPER	FIRST_CLASS_AC	SECOND_CLASS_AC	THIRD_CLASS_AC	WIFI	FOOD	RUN_ON_SUNDAY	RUN_ON_MONDAY	RUN_ON_TUESDAY	RUN_ON_WEDNESDAY	RUN_ON_THURSDAY	RUN_ON_FRIDAY	RUN_ON_SATURDAY
15099	ASR FZL EXP	479	47	96	192	N	Y	Y	Y	Y	Y	Y	Y	Y
15118	SHIV GANGA EXP	480	43	96	192	N	Y	Y	Y	Y	Y	Y	Y	Y
15119	GNR BTI EXP	432	48	80	144	N	N	Y	Y	Y	Y	Y	Y	Y
15120	LDH ASR EXP	443	50	70	164	N	N	Y	Y	Y	Y	Y	Y	Y
15122	DUI BTI EXP	444	78	30	145	N	Y	Y	Y	Y	N	Y	Y	N

Download CSV

5 rows selected.

```
–Stoppage
CREATE TABLE Stoppage
(
  Train_No number(6) NOT NULL ,
  Station_Code char(5) NOT NULL ,
  Arrival_Time varchar(10) DEFAULT NULL ,
  Departure_Time varchar(10) DEFAULT NULL,
  PRIMARY KEY (Train_No,Station_Code),
  CONSTRAINT Stoppage_ibfk_1 FOREIGN KEY (Train_No) REFERENCES Train
(Train_No) ON DELETE CASCADE ,
```

CONSTRAINT Stoppage_ibfk_2 FOREIGN KEY (Station_Code) REFERENCES Station (Station_Code) ON DELETE CASCADE
);
DESC Stoppage
INSERT INTO Stoppage VALUES(15099,'ASR','22:05:00','22:30:00');
INSERT INTO Stoppage VALUES(15099,'LDH','01:30:00','01:38:00');
INSERT INTO Stoppage VALUES(15099,'FKA','19:20:00','19:30:00');
INSERT INTO Stoppage VALUES(15118,'KKP','03:45:00','04:10:00');
INSERT INTO Stoppage VALUES(15118,'LDH','01:00:00','01:05:00');
INSERT INTO Stoppage VALUES(15118,'ASR','07:00:00','07:05:00');
INSERT INTO Stoppage VALUES(15119,'BTI','01:20:00','01:45:00');
INSERT INTO Stoppage VALUES(15119,'DUI','04:15:00','04:20:00');
INSERT INTO Stoppage VALUES(15119,'KKP','23:31:00','23:33:00');
INSERT INTO Stoppage VALUES(15119,'FKA','11:30:00','11:32:00');
INSERT INTO Stoppage VALUES(15120,'LDH','08:10:00','08:15:00');
INSERT INTO Stoppage VALUES(15120,'ASR','18:35:00','18:55:00');
INSERT INTO Stoppage VALUES(15122,'BTI','01:20:00','01:45:00');
INSERT INTO Stoppage VALUES(15122,'DUI','04:15:00','04:20:00');
SELECT * FROM Stoppage

1 row(s) inserted.

TRAIN_NO	STATION_CODE	ARRIVAL_TIME	DEPARTURE_TIME
15099	ASR	22:05:00	22:30:00
15099	LDH	01:30:00	01:38:00
15099	FKA	19:20:00	19:30:00
15118	KKP	03:45:00	04:10:00
15118	LDH	01:00:00	01:05:00
15118	ASR	07:00:00	07:05:00
15119	BTI	01:20:00	01:45:00
15119	DUI	04:15:00	04:20:00
15119	KKP	23:31:00	23:33:00
15119	FKA	11:30:00	11:32:00
15120	LDH	08:10:00	08:15:00
15120	ASR	18:35:00	18:55:00
15122	BTI	01:20:00	01:45:00
15122	DUI	04:15:00	04:20:00

Download CSV
14 rows selected.

```
CREATE TABLE Ticket(
  Ticket_No number(10) NOT NULL ,
  Train_No number(6) NOT NULL,
  Date_of_Journey date NOT NULL,
  Username varchar(15) NOT NULL,
  classes varchar(20) NOT NULL,
  PRIMARY KEY (Ticket_No),
  CONSTRAINT Ticket_ibfk_1 FOREIGN KEY (Username) REFERENCES Accountt
(Username) ON  DELETE CASCADE,
  CONSTRAINT Ticket_ibfk_2 FOREIGN KEY (Train_No) REFERENCES Train (Train_No)
);

–Passenger
CREATE TABLE Passenger (
  Passenger_Id number(11) NOT NULL ,
  Name varchar(20) NOT NULL,

  Ticket_No number(10) NOT NULL,

  classes varchar(20) NOT NULL,
  PRIMARY KEY (Passenger_Id),
  CONSTRAINT Passenger_ibfk_1 FOREIGN KEY (Ticket_No) REFERENCES Ticket
(Ticket_No) ON DELETE CASCADE
);

--Query to fetch the train number going from a particular station to other;
SELECT Depart.Train_No,Depart.Station_code,Depart.Arrival_Time,Depart.Departure_Time,
arrival.Station_code, arrival.Arrival_Time, arrival.Departure_Time FROM Stoppage depart
JOIN Stoppage arrival ON depart.Train_No = arrival.Train_No  WHERE ( depart.Station_Code
= 'ASR' AND arrival.Station_Code = 'FKA');
```

TRAIN_NO	STATION_CODE	ARRIVAL_TIME	DEPARTURE_TIME	STATION_CODE	ARRIVAL_TIME	DEPARTURE_TIME
15099	ASR	22:05:00	22:30:00	FKA	19:20:00	19:30:00

Download CSV

```
--Query to find total number of first class seats available on any train that runs from FAZILKA
.*/
SELECT Train.Train_no,
Train.Name,Train.First_Class_AC,Stoppage.Arrival_Time,Stoppage.Departure_Time  FROM
```

Train INNER JOIN Stoppage on Train.Train_No=Stoppage.Train_no where Stoppage.Station_code='FKA';

TRAIN_NO	NAME	FIRST_CLASS_AC	ARRIVAL_TIME	DEPARTURE_TIME
15099	ASR FZL EXP	47	19:20:00	19:30:00
15119	GNR BTI EXP	48	11:30:00	11:32:00

Download CSV

2 rows selected.

--Query that fetch all the trains which run from BTI to DUI that Run all the days of the week
SELECT * FROM (SELECT * FROM TRAIN WHERE Train_No IN
(SELECT depart.Train_no FROM Stoppage depart JOIN Stoppage arrival ON depart.Train_No = arrival.Train_No WHERE depart.Station_Code = 'BTI' AND arrival.Station_Code = 'DUI'))
WHERE RUN_ON_SUNDAY='Y' AND RUN_ON_MONDAY='Y' AND
RUN_ON_TUESDAY='Y' AND RUN_ON_WEDNESDAY='Y' AND
RUN_ON_THURSDAY='Y' AND RUN_ON_FRIDAY='Y' AND RUN_ON_SATURDAY='Y';

TRAIN_NO	NAME	SLEEPER	FIRST_CLASS_AC	SECOND_CLASS_AC	THIRD_CLASS_AC	WIFI	FOOD	RUN_ON_SUNDAY	RUN_ON_MONDAY	RUN_ON_TUESDAY	RUN_ON_WEDNESDAY	RUN_ON_THURSDAY	RUN_ON_FRIDAY	RUN_ON_SATURDAY
15119	GNR BTI EXP	432	48	80	144	N	N	Y	Y	Y	Y	Y	Y	Y
15122	DUI BTI EXP	444	78	30	145	N	Y	Y	Y	Y	N	Y	Y	N

Download CSV

2 rows selected.

TRAIN_NO	NAME	SLEEPER	FIRST_CLASS_AC	SECOND_CLASS_AC	THIRD_CLASS_AC	WIFI	FOOD	RUN_ON_SUNDAY	RUN_ON_MONDAY	RUN_ON_TUESDAY	RUN_ON_WEDNESDAY	RUN_ON_THURSDAY	RUN_ON_FRIDAY	RUN_ON_SATURDAY
15119	GNR BTI EXP	432	48	80	144	N	N	Y	Y	Y	Y	Y	Y	Y

Download CSV

--Find the time at which last train leaves Ludhiana station
select max(to_number(substr(Departure_time,1,2))) from Stoppage WHERE Station_Code IN (SELECT Station_code FROM station WHERE Station_Name='LUDHIANA JUNCTION')));

TIME_FOR_LASTTRAIN
8

```
-- Tickets Auto Incrementer
CREATE SEQUENCE tno
MINVALUE 1
START WITH 1
INCREMENT BY 1
CACHE 10;

-- Passenger Auto Incrementer
CREATE SEQUENCE pid
MINVALUE 1
START WITH 1
INCREMENT BY 1
CACHE 10;

--Book tickets and updating passenger table
CREATE OR REPLACE PROCEDURE Update_pass(classes varchar,ticket_no
number,username varchar)
is
begin
INSERT INTO Passenger VALUES(pid.nextval,username,ticket_no,classes);
end;
```

```
Procedure created.
```

```
CREATE OR REPLACE PROCEDURE book_ticket(Train_No number,Username
varchar,Date_of_Journey date,classes varchar)
is
tn number;
begin
tn:=tno.nextval;
INSERT INTO Ticket VALUES(tn,Train_no,Date_of_Journey,Username,classes);
dbms_output.put_line(Train_No);
Update_pass(classes,tn,username);
end;
```

```
Procedure created.
```

```
declare
begin
book_ticket(15118,'Vaishnavi','21-oct-2023','First_Class_AC');
```

end;

select * from ticket;
select * from Passenger;

PASSENGER_ID	NAME	TICKET_NO	CLASSES
1	Vaishnavi	1	First_Class_AC

TICKET_NO	TRAIN_NO	DATE_OF_JOURNEY	USERNAME	CLASSES
1	15118	21-OCT-23	Vaishnavi	First_Class_AC

```
CREATE OR REPLACE TRIGGER CANCEL_TICKET
  BEFORE DELETE ON Ticket
  FOR EACH ROW
  declare
  cl varchar(20);
  trainno number(6);
  tno number(10);
  BEGIN
      tno:=:old.Ticket_no;
    SELECT classes into cl FROM Ticket t  WHERE Ticket_no = tno;
    -- delete from Passenger where Ticket_no=:old.Ticket_no;
    select Train_no into trainno from Ticket where Ticket_No=:old.Ticket_No;
    if cl='First_Class_Ac' then
    UPDATE Train set Seat_First_Class_AC = Seat_First_Class_AC+1 WHERE
Train_No=trainno ;
  elsif cl='Sleeper' then
    UPDATE Train set Seat_Sleeper = Seat_Sleeper+1 WHERE Train_No = trainno ;
  elsif cl='second class ac' then
    UPDATE Train set Seat_Second_Class_AC = Seat_Second_Class_AC+1 WHERE Train_No
= trainno ;
  elsif cl='third class ac' then
    UPDATE Train set  Seat_Third_Class_AC = Seat_Third_Class_AC+1 WHERE Train_No =
trainno ;
end if;
END;
```

```
Trigger created.
```