# DELHI TECHNOLOGICAL UNIVERSITY


## IT-202

(DATABASE MANAGEMENT SYSTEMS)

PROJECT REPORT ON

"Railway Database Management"


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# Problem Statement - Railway System

The railway network of our country is one of the most complex public establishments. Youcan design a database solution for this network and make the management of the samemore natural. Your system should have the following pieces of information:

## Station names

Tracks that connect those stations (to keep things simple, you can assume that only one track runs between two stations) Train IDs with names

## Schedules of the trains

The train schedules should have information on the stations from where the train starts and by when it reaches the destination. It should also include information on which stations it passes through during its journey.

To keep things simple, you can assume that every train completes its journey within a day, and they run daily. However, you'll also need to store information on the sequence of the stations a train passes through. For example, if a train starts from Delhi and goes to Kolkata through Lucknow, then you'll need to add the arrival and departure times of the train for all these stations. Keeping the stations in sequence will allow easy management of trains and their data.

Till here, the project is rather easy. You can make it more challenging by adding the passenger information of every train such as its coaches, seat numbers, types of coaches, passenger names, and so on. This project might take some time to complete, but it'll helpyou showcase your knowledge of database management solutions while solving a significant issue of a public authority.

## Objective and Scope of the project:

Database is an organised collection of data. The data is typically organised to model aspects of reality in a way that supports processes requiring information.
A DBMS makes it possible for end users to create read update and delete data in a database

The main purpose of maintaining database for railway reservation system is to reduce themanual errors involved in the booking and cancelling of tickets and make it convenient forthe customers and providers to maintain the data about their customers and also the seats available at them.

This project is about creating the database for railway reservation system.
The aim is to design and develop a database maintaining the records of different trains, passengers, tracks, stations, schedule and routes.

The project also consists of station names, the tracks that connect those stations, schedules of the train and the information of the station.

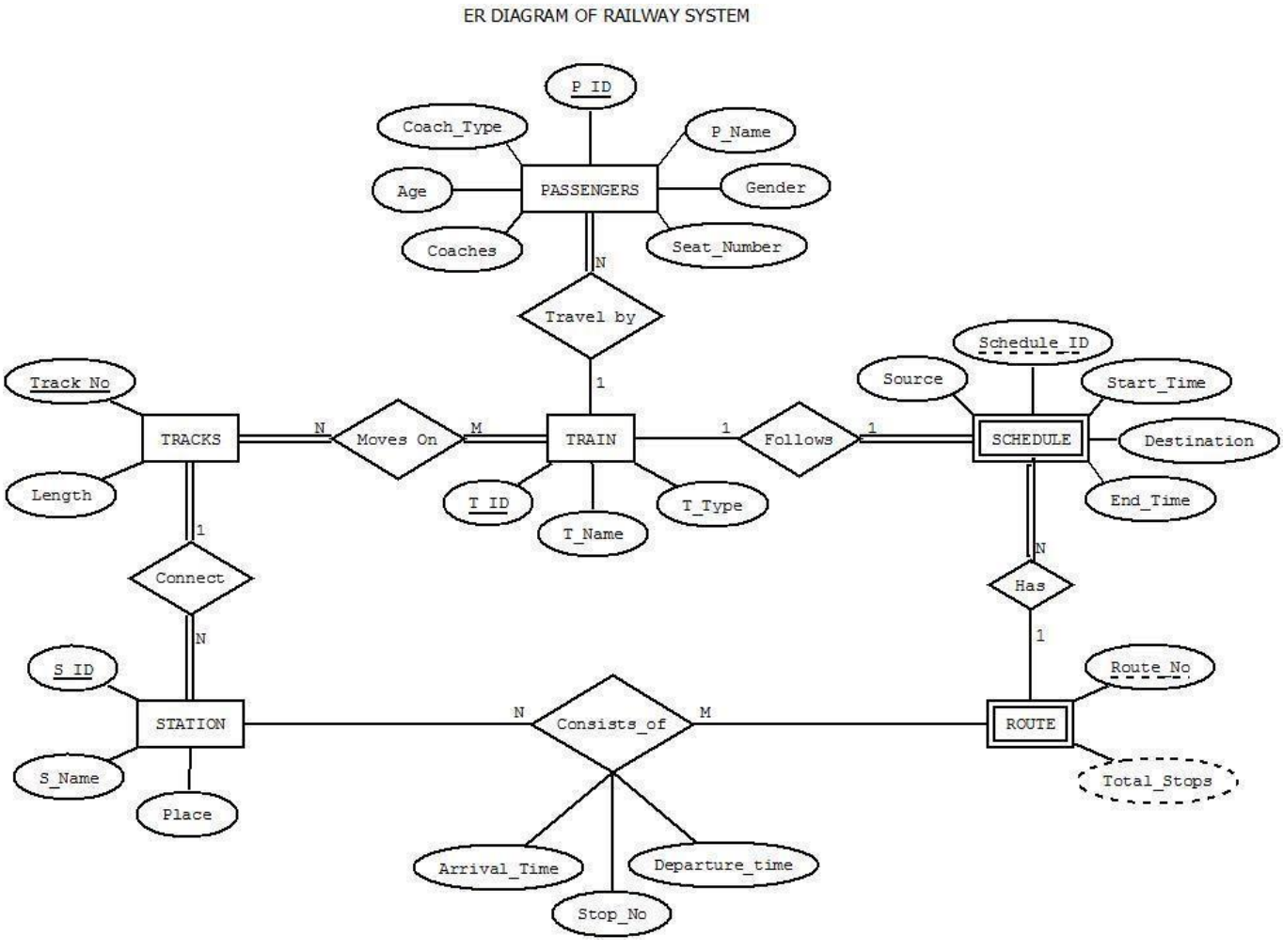
## Entities, Attributes, Key Attributes:

- TRAIN (T_ID, T_Name, T_Type)
- PASSENGERS (P_ID, P_Name, Gender, Seat_Number, Coaches, Age, Coach_Type)
- TRACKS (Track_No, Length)
- STATION (S_ID, S_Name, Place)
- SCHEDULE (Schedule_ID, Start_Time, Source, End_Time, Destination)
- ROUTE (Route_no, Total_Stops)

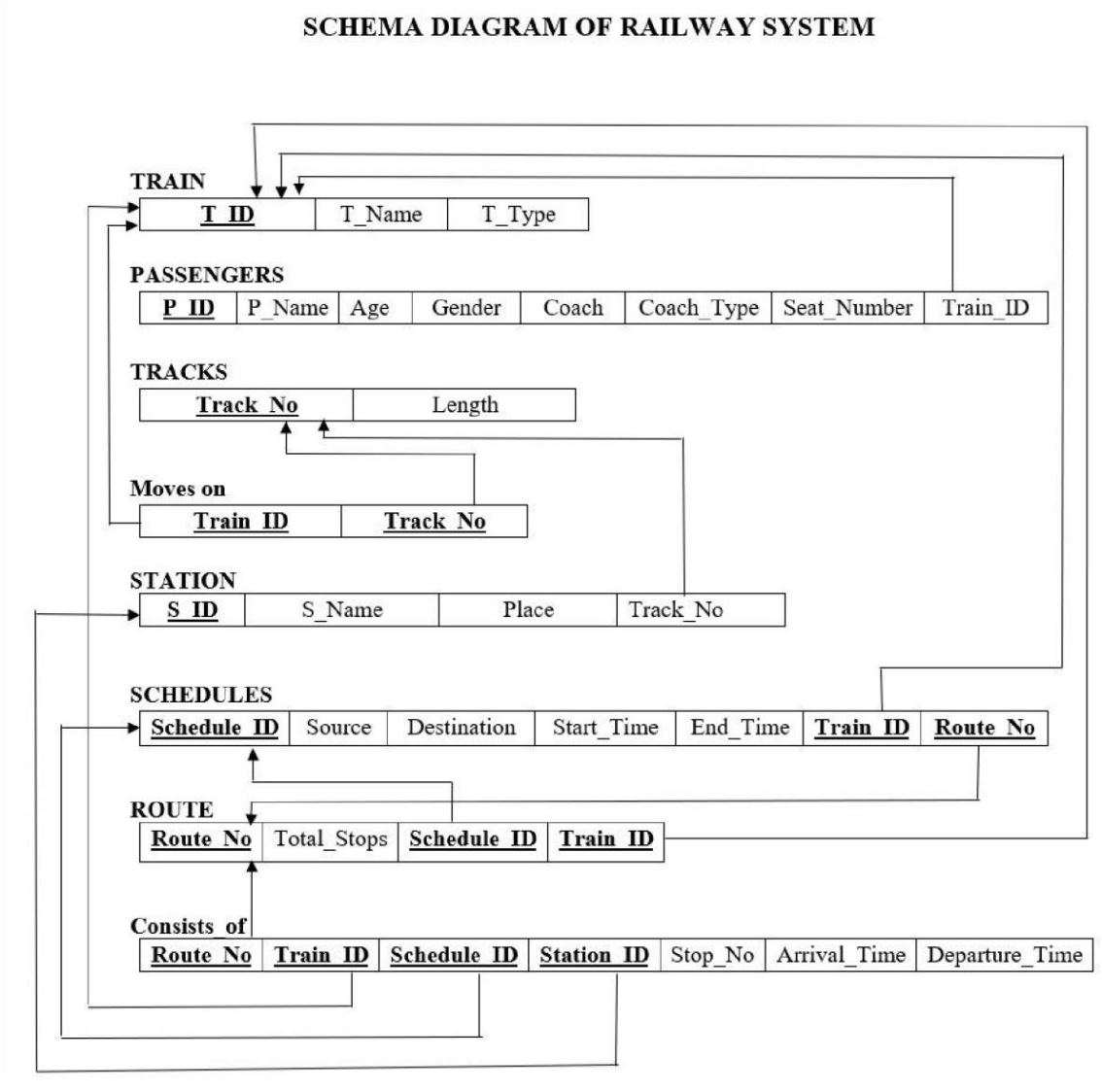
## Relationship and Cardinality Ratio

- PASSENGERS Travel by TRAIN (N:1)
- TRAIN Moves on TRACKS (M:N)
- TRACKS Connect STATION (1:N)
- TRAIN Follows SCHEDULE (1:1)
- SCHEDULE Has ROUTE (N:1)
- ROUTE Consists_of STATION (M:N)

# ER Diagram:


ER DIAGRAM OF RAILWAY SYSTEM
P_ID
Coach_Type
P_Name
Age
PASSENGERS
Gender
Coaches
Seat_Number
N
Travel by
1
Schedule_ID
Source
Start_Time
Track_No
TRACKS
N
Moves On
M
TRAIN
1
Follows
1
SCHEDULE
Destination
Length
T_ID
T_Type
End_Time
T_Name
1
N
Connect
Has
N
1
S_ID
Route_No
STATION
N
Consists_of
M
ROUTE
S_Name
Total_Stops
Place
Arrival_Time
Departure_time
Stop_No

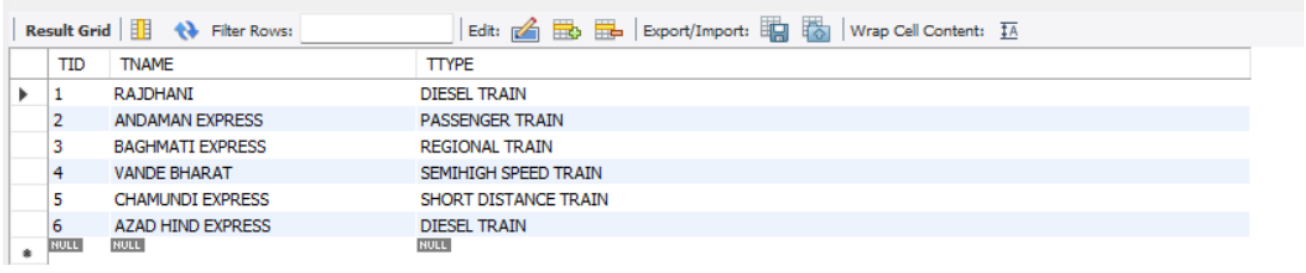
# Schema Diagram:



## Create Table Statements and their Outputs:

### 1) TRAIN

```
CREATE TABLE TRAIN
(
TID INT PRIMARY KEY,
TNAME VARCHAR(20),
TTYPE VARCHAR(20)
);
```



Result Grid | Filter Rows: | Edit: | Export/Import: | Wrap Cell Content:

| TID | TNAME | TTYPE |
|---|---|---|
| 1 | RAJDHANI | DIESEL TRAIN |
| 2 | ANDAMAN EXPRESS | PASSENGER TRAIN |
| 3 | BAGHMATI EXPRESS | REGIONAL TRAIN |
| 4 | VANDE BHARAT | SEMIHIGH SPEED TRAIN |
| 5 | CHAMUNDI EXPRESS | SHORT DISTANCE TRAIN |
| 6 | AZAD HIND EXPRESS | DIESEL TRAIN |
| NULL | NULL | NULL |

### 2)PASSENGERS

```
CREATE TABLE PASSENGERS
(
PID INT PRIMARY KEY,
P_NAME VARCHAR(20),
AGE INT,
GENDER VARCHAR(20),
COACH INT,
COACH_TYPE VARCHAR(20),
SEAT_NO VARCHAR(20),
TRAIN_ID INT,
FOREIGN KEY (TRAIN_ID) REFERENCES TRAIN(TID)
);
```

| PID | P_NAME | AGE | GENDER | COACH | COACH_TYPE | SEAT_NO | TRAIN_ID |
|---|---|---|---|---|---|---|---|
| 200 | HARSHITA | 20 | FEMALE | 1 | FIRST CLASS | 25A | 1 |
| 201 | TANISHA | 20 | FEMALE | 1 | FIRST CLASS | 28 | 3 |
| 202 | NOSHIKI | 19 | FEMALE | 3 | SUPREME CLASS | 2E | 4 |
| 203 | PRIYANSHI | 20 | FEMALE | 3 | SUPREME CLASS | 6D | 4 |
| 204 | DEVVART | 21 | MALE | 4 | SECOND CLASS | 7D | 6 |
| 205 | ABHISHEK | 20 | MALE | 4 | SECOND CLASS | 8D | 1 |
| 206 | PRIYANSHU | 20 | MALE | 2 | SLEEPER CLASS | 2A | 2 |
| 207 | SHAHEEN | 21 | FEMALE | 2 | SLEEPER CLASS | 2B | 5 |
| NULL | NULL | NULL | NULL | NULL | NULL | NULL | NULL |

## 3)TRACKS

```
CREATE TABLE TRACKS
(
TRACK_NO INT PRIMARY KEY,
LENGTH INT
);
```

Result Grid | Filter Rows:

| TRACK_NO | LENGTH |
|---|---|
| 10 | 160 |
| 12 | 100 |
| 20 | 560 |
| 34 | 1200 |
| 53 | 791 |
| 61 | 911 |
| NULL | NULL |

## 4)MOVES_ON

```
CREATE TABLE MOVES_ON
(
TRAIN_ID INT ,
TRACK_NO INT ,
primary key(TRAIN_ID,TRACK_NO),
FOREIGN KEY(TRAIN_ID) REFERENCES TRAIN(TID),
FOREIGN KEY(TRACK_NO) REFERENCES TRACKS(TRACK_NO)
);
```

Result Grid | Filter Rows:

| TRAIN_ID | TRACK_NO |
|---|---|
| 3 | 10 |
| 1 | 12 |
| 2 | 20 |
| 4 | 34 |
| 5 | 53 |
| 6 | 61 |
| NULL | NULL |

## 5)STATION

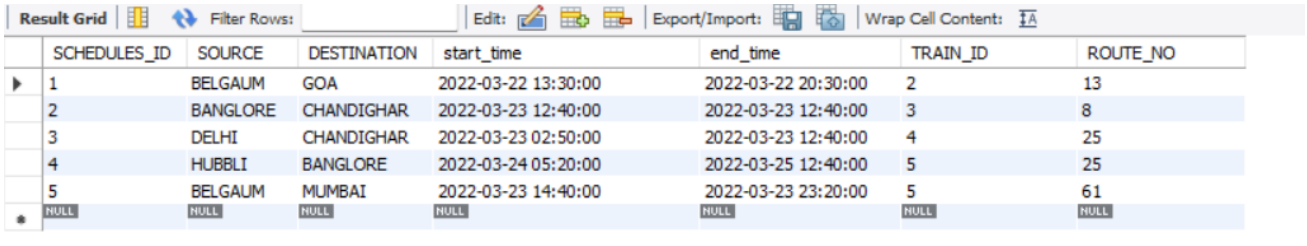
```
CREATE TABLE
STATION(

S_ID INT PRIMARY KEY,

S_NAME VARCHAR(20),

PLACE VARCHAR(20),

TRACK_NO INT,

FOREIGN KEY
(TRACK_NO)
REFERENCES
TRACKS(TRACK_NO));
```

Result Grid | Filter Rows: | Edit: | Export/Im

| S_ID | S_NAME | PLACE | TRACK_NO |
|---|---|---|---|
| 1 | AGRA CANTT | AGRA | 10 |
| 2 | BANGLORE MAJES... | BANGLORE | 20 |
| 3 | HUBBLI JUNCTION | HUBBLI | 53 |
| 4 | CHANDIGHAR | CHANDIGHAR ROAD | 61 |
| 5 | COONOOR JUNCT... | COONOOR | 12 |
| NULL | NULL | NULL | NULL |

## 6) SCHEDULES

```
CREATE TABLE SCHEDULES(
SCHEDULES_ID INT,
SOURCE VARCHAR(20),
DESTINATION VARCHAR(20),
START_TIME datetime,
END_TIME datetime,
TRAIN_ID INT,
ROUTE_NO INT,
PRIMARY KEY(SCHEDULES_ID,TRAIN_ID,ROUTE_NO),
FOREIGN KEY(TRAIN_ID) REFERENCES TRAIN(TID),
FOREIGN KEY(ROUTE_NO) REFERENCES ROUTE(ROUTE_NO)
);
```



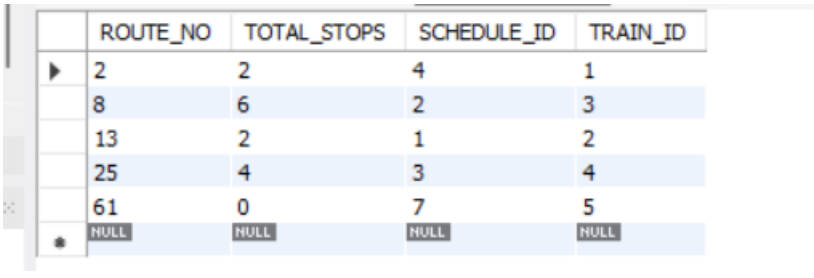
Result Grid | Filter Rows: | Edit: | Export/Import: | Wrap Cell Content:

| SCHEDULES_ID | SOURCE | DESTINATION | start_time | end_time | TRAIN_ID | ROUTE_NO |
|---|---|---|---|---|---|---|
| 1 | BELGAUM | GOA | 2022-03-22 13:30:00 | 2022-03-22 20:30:00 | 2 | 13 |
| 2 | BANGLORE | CHANDIGHAR | 2022-03-23 12:40:00 | 2022-03-23 12:40:00 | 3 | 8 |
| 3 | DELHI | CHANDIGHAR | 2022-03-23 02:50:00 | 2022-03-23 12:40:00 | 4 | 25 |
| 4 | HUBBLI | BANGLORE | 2022-03-24 05:20:00 | 2022-03-25 12:40:00 | 5 | 25 |
| 5 | BELGAUM | MUMBAI | 2022-03-23 14:40:00 | 2022-03-23 23:20:00 | 5 | 61 |
| NULL | NULL | NULL | NULL | NULL | NULL | NULL |

## 7) ROUTE

```
CREATE TABLE ROUTE(
ROUTE_NO INT,
TOTAL_STOPS INT,
SCHEDULE_ID INT,
```

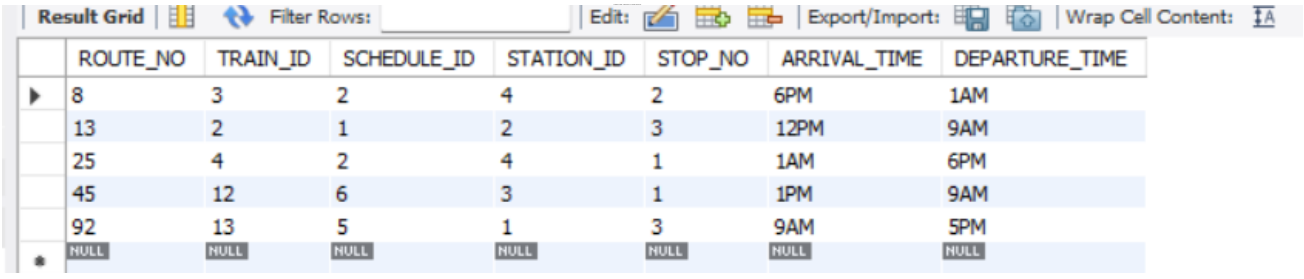
```
TRAIN_ID INT,

PRIMARY
KEY(ROUTE_NO,SCHEDU
LE_ID,TRAIN_ID),

FOREIGN KEY(TRAIN_ID)
REFERENCES TRAIN(TID)

);
```



| ROUTE_NO | TOTAL_STOPS | SCHEDULE_ID | TRAIN_ID |
|---|---|---|---|
| 2 | 2 | 4 | 1 |
| 8 | 6 | 2 | 3 |
| 13 | 2 | 1 | 2 |
| 25 | 4 | 3 | 4 |
| 61 | 0 | 7 | 5 |
| NULL | NULL | NULL | NULL |

## 8) CONSISTS_OF

```
CREATE CREATE TABLE
CONSISTS_OF(

ROUTE_NO INT,

TRAIN_ID INT,

SCHEDULE_ID INT,

STATION_ID INT,

STOP_NO INT,

ARRIVAL_TIME
VARCHAR(20),

DEPARTURE_TIME
VARCHAR(20),

PRIMARY
KEY(ROUTE_NO,TRAIN_ID,SC
HEDULE_ID,STATION_ID)

);
```



Result Grid | Filter Rows: | Edit: | Export/Import: | Wrap Cell Content:

| ROUTE_NO | TRAIN_ID | SCHEDULE_ID | STATION_ID | STOP_NO | ARRIVAL_TIME | DEPARTURE_TIME |
|---|---|---|---|---|---|---|
| 8 | 3 | 2 | 4 | 2 | 6PM | 1AM |
| 13 | 2 | 1 | 2 | 3 | 12PM | 9AM |
| 25 | 4 | 2 | 4 | 1 | 1AM | 6PM |
| 45 | 12 | 6 | 3 | 1 | 1PM | 9AM |
| 92 | 13 | 5 | 1 | 3 | 9AM | 5PM |
| NULL | NULL | NULL | NULL | NULL | NULL | NULL |

# Conclusion:

In our project railway system, we have all the information saved regarding the train, passengers, tracks, where and how The Train moves, station, schedules, routes and what it consists of. We had considered the most important requirements only many more features and details can be added to our project in order to obtain even more user-friendly applications. These applications are already in progress and in future they can be upgraded and may become part of Amazing Technology.