--LIVE TRAIN RUNNING STATUS– 2019B3A70317P AND 2019B3A70516P

1. System requirement specification (SRS)

1) Python
2) MySQL work bench

LIVE TRAIN RUNNING SYSTEM

:FOLDERS:
_____

/core : Contains all the files that are required by the project to work

Files: ___init___.py -> Makes the folder to be recognized as a module
User_Functions.py -> This file contains the function that allow a user to perform certain task
Other.py -> This file contains some commonly used functions

:ROOT FOLDER FILES:
_____

Main.py -> This is the main file that connects all the other modules and is used to run the project

requirements.txt -> It contains the required packages for this project to work that can be installed via the command
`pip3 install -r requirements.txt`

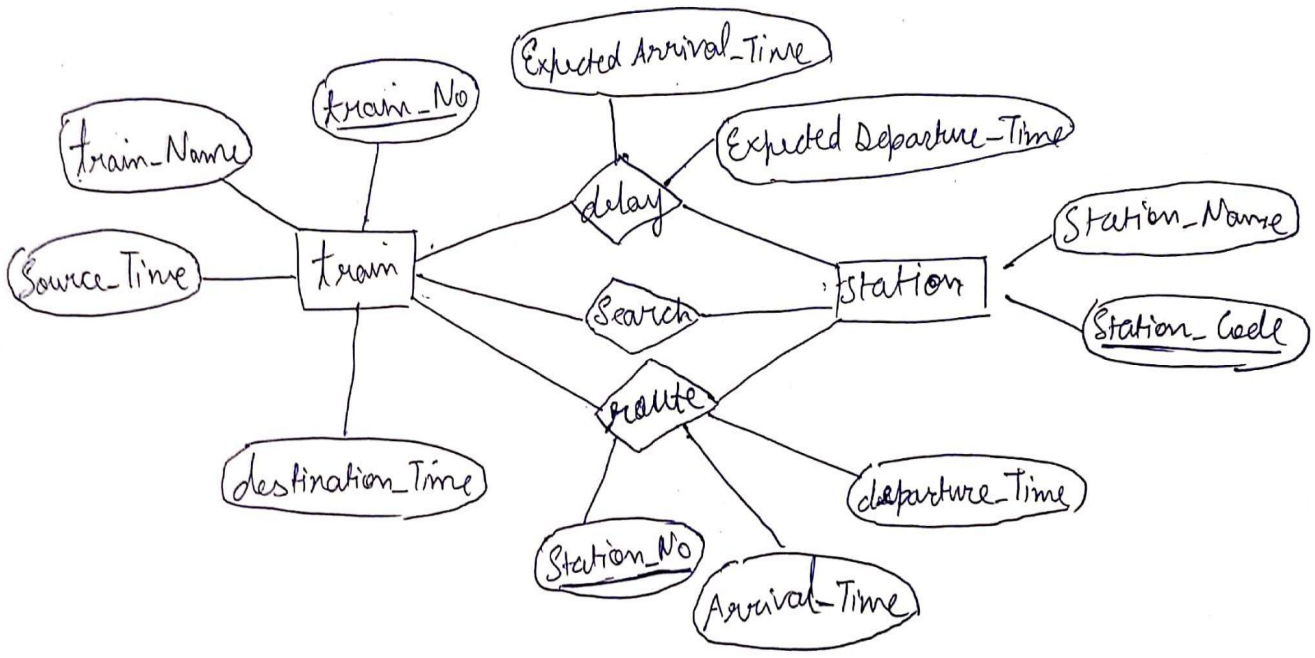
:ENVIRONMENT SETUP:
_____

1. Run DBS_PR_14_SQL_2019B3A70317P.sql in your sql server

2. Set password and username of your sql server in all the places where you find this line `mn = mysql.connector.connect(host='localhost',
user='root',password='Aviral!123', database='railway12')
cur = mn.cursor()
3. `pip3 install -r Requirements.txt` to install the required packages automatically.
4. Make sure the MySQL Service is running and change the YOUR_PASSWORD in the files with the password and the YOUR_USERNAME with the username of your local SQL server.
5. `python Main.py` to see if the program is running correctly and is able to connect to MySQL Server.

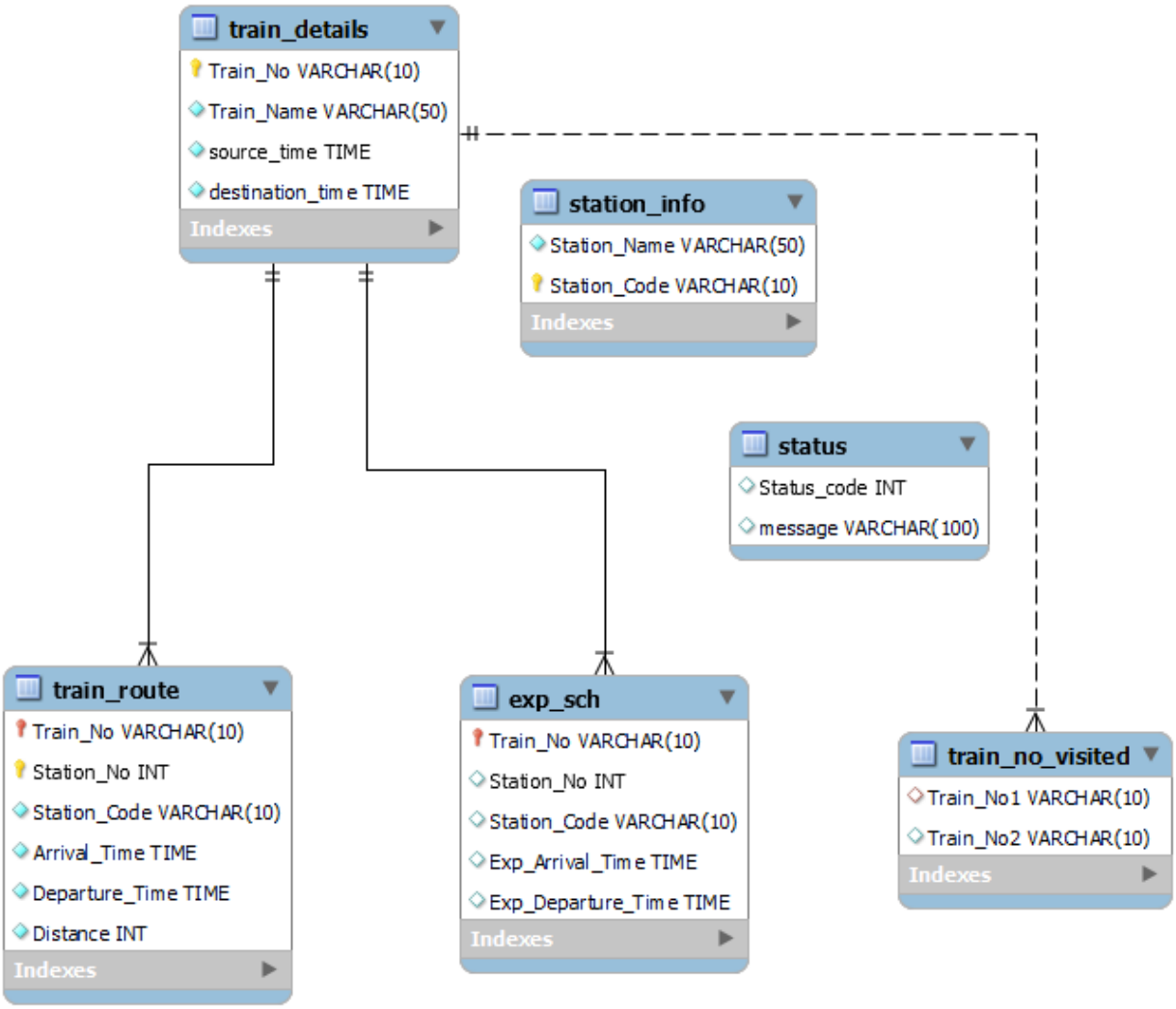
We require the following information for executing the live train running status
1)train_no (varchar)
2)train_name (varchar)
3)source_time for each train_no (time)
4)destination_time for each train_no (time)
5)Station_name in the route of each train_no (varchar)
6)Station_no corresponding to each Station_name on the route of each train_no (int)
7)Station_code corresponding to each Station_name (varchar)
8)Arrival_time corresponding to each Station_name on the route of each train_no (time)
9)Departure_time corresponding to each Station_name on the route of each train_no (time)

a. Entity-relationship (ER) diagram.



b. Schema design

1) **train_details**
Fields: Train_No, Train_Name, source_time, destination_time
2) **train_route**
Fields: Train_No, Station_No, Arrival_time, Departure_Time, Distance
3)**Station_info**
Fields: Station_code, Station_name
4) **Exp_sch**
Fields: Train_No, Station_No,Exp_ Arrival_time, Exp_Departure_Time, Distance
5) **train_no_visited**
Fields: Train_no1,Train_no2
6)**Status**
Fields:Status_code,message



c. Data normalization:

We have normalized the data into 3NF .
It is clearly visible that all tables are in 1NF as there are no tables with multivalued attributes.
We have ensured that in all the tables, all attributes depend upon the candidate key only and not on any part of the candidate key hence there are no partial dependencies. Hence all tables as in 2NF.
Also, we have ensured that no non-prime attributes are able to identify other non-prime attributes in the tables. Hence the schema is in 3NF.

we have used 6 tables
1) train_details - Train_no is used as an primary key

There exsists no partial dependency and no transitive dependency
2) train_route - Train_no and Station_no is used as a primary key
There exsists no partial dependency and no transitive dependency
3) Station_info - Station_Code is used as a primary key
There exsists no partial dependency and no transitive dependency
4) Exp_sch - Train_No is used as primary key ,foreign key is train_no referenced to train_details table
There exsists no partial dependency and no transitive dependency
5) train_no_visited - foreign key is train_no1 referenced to train_details.
There exsists no partial dependency and no transitive dependency
6)Status- no primary key and is independent of other tables.
Required for only displaying purpose.

d. List of tables required:

1) Table named train_details having column entries (attribute) Train_No, Train_Name, source_time, destination_time
2) Table named train_route having column entries (attribute) Train_No, Station_No, Arrival_time, Departure_Time, Distance
3) Table named Station_info having column entries (attribute) Station_Name, Station_Code
4) Table named Exp_sch having column entries(attribute) Train_No, Station_No,Exp_ Arrival_time, Exp_Departure_Time, Distance
5) Table named train_no_visited having column entry (attribute) Train_no1,Train_no2
6)Table named Status having column entries(attribute) Status_code,message

temporary tables: (these table will be dropped after execution of procedures)
1) temporary tables named temporary formed from the train_route natural join station_info having column entries (attribute) as Train_No,Station_No,Station_Code,station_info.Station_Name,Arrival_Time,Departure_Time,Distance
2) temporary table named station_code_search formed from temporary having column entry (attribute) as station_code
3) temporary table c1 formed from train_route having column entries (attribute) as station_no,train_no,departure_time
4) temporary table c2 formed from train_route having column entries (attribute) as station_no,train_no,arrival_time

5) temporary table exp_sch having column entries (attribute) as Train_No, Station_No, Station_Cod, Expected Arrival_Time, Expected Departure_Time primary key is Train_No, foreign key is train_no referenced on train_details

e) Procedures required for smooth functioning of the system

procedure to checkstatus of train it takes input variables as Train_no, Station_code and give output in the form of its current status
When train is running on time and standing on selected station then set status to 1
When Train is running on time and will arrive on selected station then set status to 2
When Train is running on time and has departed from selected station then set status to 3
If the Train has not started from source yet then set status to 4
If the Train has arrived at its final destination then set status to 5

procedure to find train between stations
It takes input variables as Src_code and des_code and displays the available trains between the selected station codes using different veiws.

Procedure to add delay to scheduled Arrival_time and departure time of a particular train_no, it outputs expected Arrival_time and departure time of the train at particular station using a temporary table exp_sch having columns Expected Arrival_Time, Expected Departure_Time.