

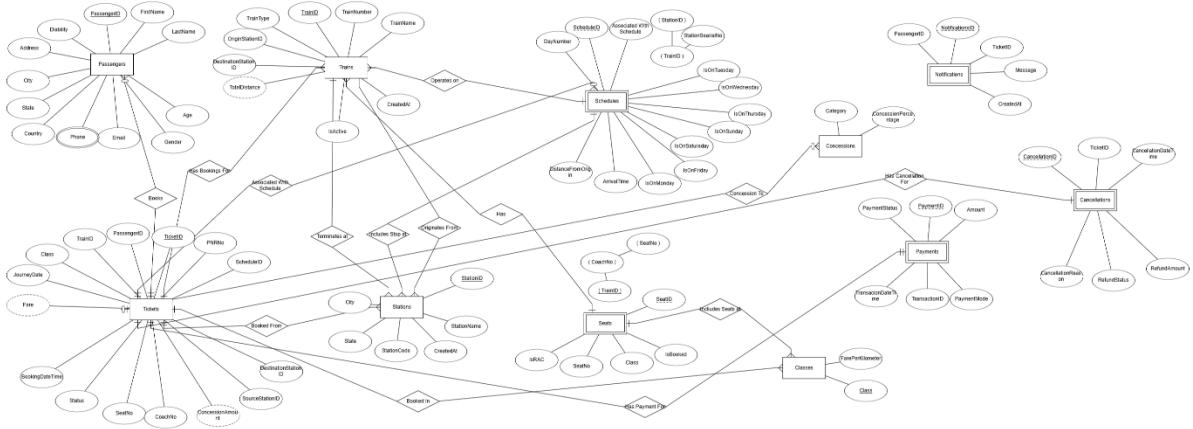
Railway Management System

Team member-

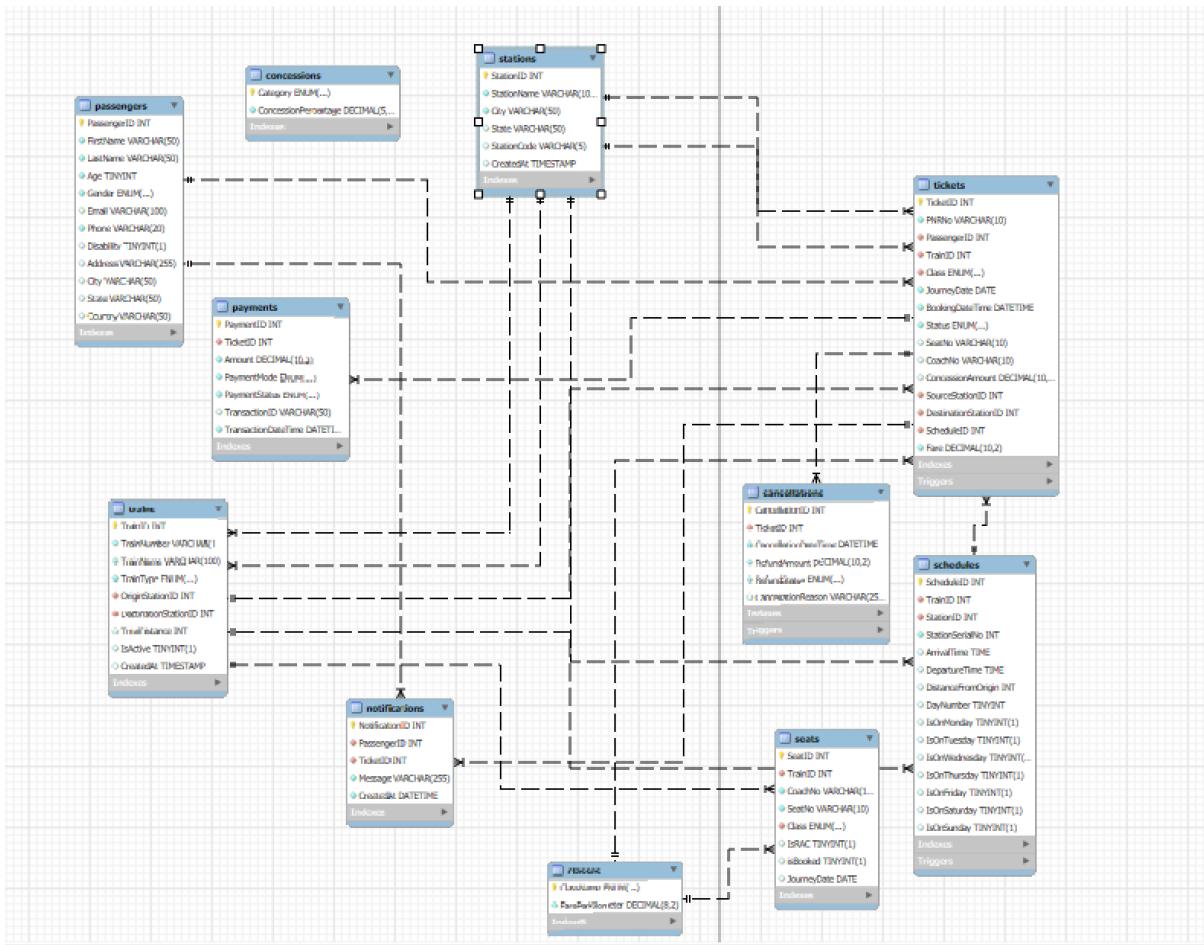
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- 3) Shobhit Raj 2301AI21

From the given github link <https://github.com/manugrover/RailwayReseravationSystem>, you can access the dashboard, er diagram ,relation schema and all other details of the project.

ER Diagram and UI



Relational Schema



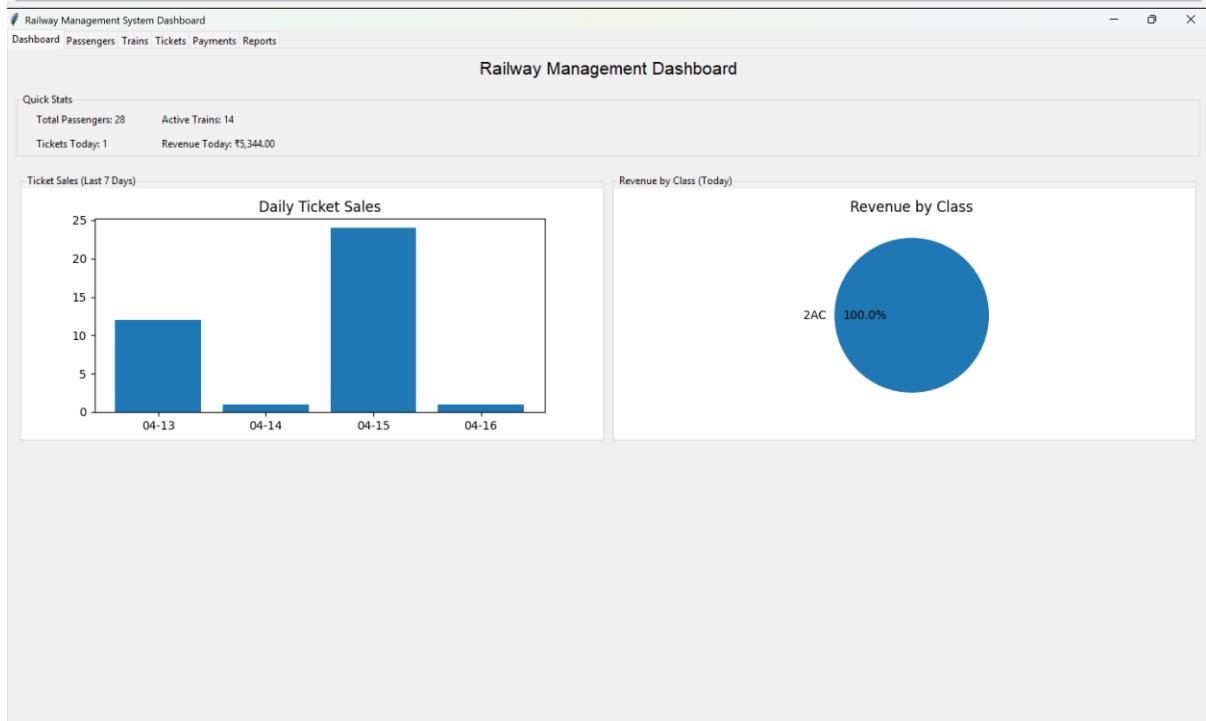
Railway Management System Dashboard

Dashboard Passengers Trains Tickets Payments Reports

Search Passengers

Search: Search Add New Passenger

ID	Name	Age	Gender	Email	Phone	Disability
1	Aarav Sharma	28	Male	aarav.s@mail.com	9123456780	No
2	Ananya Patel	35	Female	ananya.p@mail.com	9123456781	No
3	Rohan Singh	67	Male	rohan.s@mail.com	9123456782	No
4	Priya Gupta	19	Female	priya.g@mail.com	9123456783	No
5	Vikram Reddy	42	Male	vikram.r@mail.com	9123456784	Yes
6	Neha Verma	22	Female	neha.v@mail.com	9123456785	No
7	Agun Malhotra	71	Male	agun.m@mail.com	9123456786	No
8	Sneha Joshi	29	Female	sneha.j@mail.com	9123456787	No
9	Rahul Kumar	45	Male	rahul.k@mail.com	9123456788	Yes
10	Pooja Shah	31	Female	pooja.s@mail.com	9123456789	No
11	Amit Yadav	53	Male	amit.y@mail.com	9123456790	No
12	Divya Nair	24	Female	divya.n@mail.com	9123456791	No
13	Sanjay Mishra	38	Male	sanjay.m@mail.com	9123456792	No
14	Anjali Das	63	Female	anjali.d@mail.com	9123456793	No
15	Karthik Rao	27	Male	karthik.r@mail.com	9123456794	No
16	Meera Khan	33	Female	meera.k@mail.com	9123456795	Yes
17	Rajesh Pillai	58	Male	rajesh.p@mail.com	9123456796	No
18	Sonia Menon	41	Female	sonia.m@mail.com	9123456797	No
19	Vivek Srinivasan	36	Male	vivek.s@mail.com	9123456798	No
20	Nisha Choudhury	47	Female	nisha.c@mail.com	9123456799	No
21	Alok Bose	29	Male	alok.b@mail.com	9123456700	No
22	Isha Raipuri	31	Female	isha.r@mail.com	9123456701	No
23	Deepak Mehta	65	Male	deepak.m@mail.com	9123456702	No
24	Swati Ganguly	22	Female	swati.g@mail.com	9123456703	No
25	Manoj Chatterjee	43	Male	manoj.c@mail.com	9123456704	Yes
26	Manuj Grover	20	Male	ad@email.com	23423	No
27	skdfh sdf	12	Male	df@email.com	879	Yes
28	MSdf sdf	23	Male	sdf	34	Yes



Railway Management System Dashboard

Dashboard Passengers Trains Tickets Payments Reports

Search Tickets

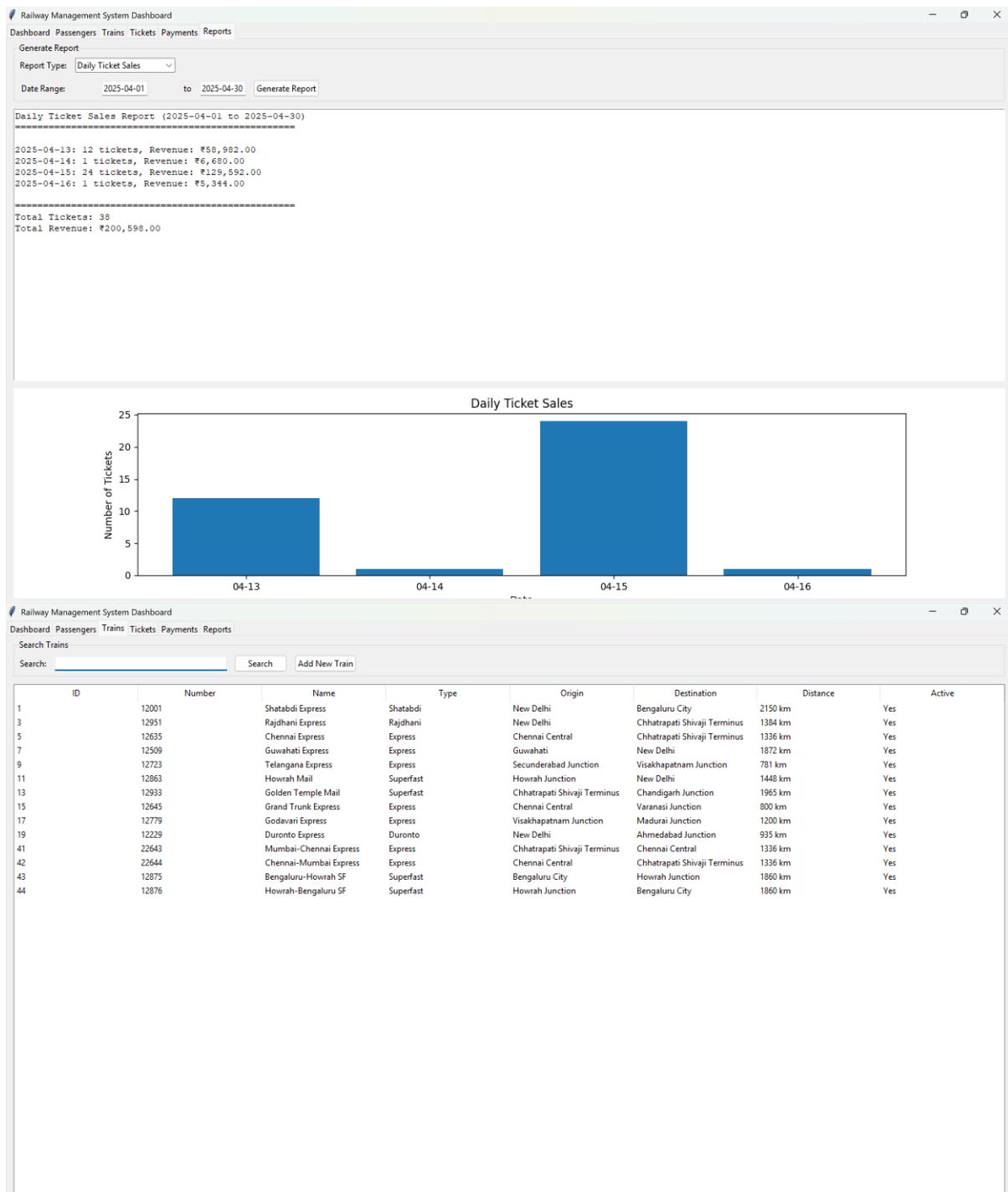
PNR Number:	Passenger	Train	Class	Journey Date	Status	Fare
PNR1005	Rahul Kumar	Shatabdi Express	3AC	2025-05-20	Cancelled	₹7,525.00
PNR1004	Arjun Malhotra	Rajdhani Express	Sleeper	2025-05-05	Confirmed	₹2,768.00
PNR1002	Rohan Singh	Shatabdi Express	3AC	2025-05-01	Confirmed	₹7,525.00
PNR1001	Aarav Sharma	Rajdhani Express	2AC	2025-04-28	Confirmed	₹5,536.00
PNR2005	Pooja Shah	Mumbai-Chennai Express	Sleeper	2025-04-28	RAC	₹6,672.00
PNR2007	Anjali Das	Mumbai-Chennai Express	Sleeper	2025-04-25	Confirmed	₹6,004.00
PNR2006	Divya Nair	Mumbai-Chennai Express	1AC	2025-04-22	Cancelled	₹6,680.00
PNR1003	Vikram Reddy	Rajdhani Express	1AC	2025-04-18	Confirmed	₹6,920.00
PNR2004	Sneha Joshi	Mumbai-Chennai Express	2AC	2025-04-18	WL	₹3,200.00
PNR2001	Ananya Patel	Mumbai-Chennai Express	1AC	2025-04-16	Confirmed	₹6,680.00
PNR2002	Priya Gupta	Mumbai-Chennai Express	2AC	2025-04-16	Confirmed	₹6,800.00
PNR2003	Neha Verma	Mumbai-Chennai Express	Sleeper	2025-04-15	WL	₹6,672.00
CSMA150444	Aarav Sharma	Mumbai-Chennai Express	2AC	2025-04-15	Cancelled	₹5,344.00
CSMA150454	Aarav Sharma	Mumbai-Chennai Express	2AC	2025-04-15	Confirmed	₹5,344.00
CSMA150494	Aarav Sharma	Mumbai-Chennai Express	2AC	2025-04-15	Confirmed	₹5,344.00
CSMA150442	Aarav Sharma	Mumbai-Chennai Express	2AC	2025-04-15	Cancelled	₹5,344.00
CSMA140495	Aarav Sharma	Mumbai-Chennai Express	2AC	2025-04-14	Cancelled	₹5,344.00
CSMA140494	Aarav Sharma	Mumbai-Chennai Express	2AC	2025-04-14	Cancelled	₹5,344.00
CSMA140438	Aarav Sharma	Mumbai-Chennai Express	2AC	2025-04-14	Cancelled	₹5,344.00
CSMA140465	Aarav Sharma	Mumbai-Chennai Express	2AC	2025-04-14	Cancelled	₹5,344.00
CSMA140487	Aarav Sharma	Mumbai-Chennai Express	2AC	2025-04-14	Cancelled	₹5,344.00
CSMA140486	Aarav Sharma	Mumbai-Chennai Express	2AC	2025-04-14	Cancelled	₹5,344.00
CSMA140446	Aarav Sharma	Mumbai-Chennai Express	2AC	2025-04-14	Cancelled	₹5,344.00
CSMA140412	Aarav Sharma	Mumbai-Chennai Express	2AC	2025-04-14	Cancelled	₹5,344.00
CSMA140497	Aarav Sharma	Mumbai-Chennai Express	2AC	2025-04-14	Cancelled	₹5,344.00
CSMA140431	Aarav Sharma	Mumbai-Chennai Express	2AC	2025-04-14	Cancelled	₹5,344.00
CSMA140484	Aarav Sharma	Mumbai-Chennai Express	2AC	2025-04-14	Cancelled	₹5,344.00
CSMA140452	Aarav Sharma	Mumbai-Chennai Express	2AC	2025-04-14	Confirmed	₹5,344.00
CSMA140467	Aarav Sharma	Mumbai-Chennai Express	2AC	2025-04-14	Confirmed	₹5,344.00
CSMA140491	Aarav Sharma	Mumbai-Chennai Express	2AC	2025-04-14	Confirmed	₹5,344.00
CSMA140443	Aarav Sharma	Mumbai-Chennai Express	2AC	2025-04-14	Confirmed	₹5,344.00
CSMA140492	Aarav Sharma	Mumbai-Chennai Express	2AC	2025-04-14	Confirmed	₹5,344.00

Railway Management System Dashboard

Dashboard Passengers Trains Tickets Payments Reports

Search Payments

Date Range:	to	Status:	All	Search		
38	CSMA140456	₹5,344.00	Credit Card	Completed	2025-04-16 18:54	TXN977874
37	CSMA150442	₹5,344.00	Credit Card	Completed	2025-04-15 22:03	TXN103653
36	CSMA150494	₹5,344.00	Credit Card	Completed	2025-04-15 22:03	TXN237545
35	CSMA150454	₹5,344.00	Credit Card	Completed	2025-04-15 21:35	TXN58337
34	CSMA150444	₹5,344.00	Credit Card	Completed	2025-04-15 21:34	TXN129658
33	CSMA140420	₹5,344.00	Credit Card	Completed	2025-04-15 20:09	TXN623845
32	CSMA140492	₹5,344.00	Credit Card	Completed	2025-04-15 19:54	TXN845235
31	CSMA140443	₹5,344.00	Credit Card	Completed	2025-04-15 19:53	TXN204454
30	CSMA140491	₹5,344.00	Credit Card	Completed	2025-04-15 19:53	TXN215489
29	CSMA140467	₹5,344.00	Credit Card	Completed	2025-04-15 19:53	TXN765538
28	CSMA140452	₹5,344.00	Credit Card	Completed	2025-04-15 19:53	TXN140414
27	CSMA140484	₹5,344.00	Credit Card	Completed	2025-04-15 19:48	TXN189816
26	CSMA140431	₹5,344.00	Credit Card	Completed	2025-04-15 19:48	TXN10232
25	CSMA140497	₹5,344.00	Credit Card	Completed	2025-04-15 19:48	TXN633844
24	CSMA140412	₹5,344.00	Credit Card	Completed	2025-04-15 19:48	TXN414757
23	CSMA140446	₹5,344.00	Credit Card	Completed	2025-04-15 19:48	TXN249617
22	CSMA140486	₹5,344.00	Credit Card	Completed	2025-04-15 19:48	TXN591996
21	CSMA140487	₹5,344.00	Credit Card	Completed	2025-04-15 19:48	TXN888702
20	CSMA140465	₹5,344.00	Credit Card	Completed	2025-04-15 19:48	TXN143706
19	CSMA140438	₹5,344.00	Credit Card	Completed	2025-04-15 19:48	TXN151746
18	CSMA140494	₹5,344.00	Credit Card	Completed	2025-04-15 19:48	TXN428386
17	CSMA140495	₹5,344.00	Credit Card	Completed	2025-04-15 19:48	TXN78176
16	CSMA140461	₹5,344.00	Credit Card	Completed	2025-04-15 19:48	TXN30774
15	CSMA140488	₹5,344.00	Credit Card	Completed	2025-04-15 19:45	TXN836282
12	PNR2007	₹2,004.00	Cash	Completed	2025-04-15 18:11	TXN2007
11	PNR2006	₹6,680.00	Credit Card	Refunded	2025-04-15 18:11	TXN2006
10	PNR2005	₹2,672.00	Wallet	Completed	2025-04-15 18:11	TXN2005
9	PNR2004	₹3,200.00	Net Banking	Completed	2025-04-15 18:11	TXN2004
8	PNR2003	₹2,672.00	UPI	Pending	2025-04-15 18:11	TXN2003
7	PNR2002	₹4,800.00	Debit Card	Completed	2025-04-15 18:11	TXN2002
6	PNR2001	₹6,680.00	Credit Card	Completed	2025-04-15 18:11	TXN2001
14	CSMA140458	₹6,680.00	Credit Card	Completed	2025-04-15 17:46	TXN72328
13	CSMA140468	₹6,680.00	Credit Card	Completed	2025-04-14 16:28	TXN823291
2	PNR1002	₹7,525.00	Debit Card	Completed	2025-04-13 12:10	TXN1002
5	PNR1005	₹7,525.00	Wallet	Refunded	2025-04-13 12:10	TXN1005



How to Run This Project

Method 1: Using SQL File Loading

1. Download MySQL Workbench

Click here to download: <https://dev.mysql.com/downloads/workbench/>

2. Execute SQL Files

After loading, run the files in the following order:

- 1) CreatingDatabaseStructure.sql
- 2) InsertionUpdationQueries.sql
- 3) Procedures.sql
- 4) Queries.sql

3. Run the Dashboard Application

If you want to use the dashboard, proceed with this step: -

Download main.py from the same Google Drive link above. -

Open the file in Visual Studio Code (VS Code). -

Open a terminal in VS Code and install the required Python packages by running:

`pip install tk`

`pip install mysql-connector-python`

- Important: Update the MySQL password in main.py to your MySQL root password.

- Run the application using: `python main.py`

- Do not use `python3 main.py`.

4. View Procedures and Queries

- To explore stored procedures and SQL queries manually, run them directly in MySQL Workbench.

Method 2: Using PDF Files

1, Copy and Execute SQL from PDFs

- Download the PDF files from github
- Open each of the following SQL files:
 - 1) CreatingDatabaseStructure.sql
 - 2) InsertionUpdationQueries.sql
 - 3) Procedures.sql
 - 4) Queries.sql

Copy the SQL code from each file and paste it into the MySQL terminal in the above given order.



Railway Management Procedures

Passenger Procedures

P1. CalculateTicketFare – Calculates fare based on train, class, passenger's concession eligibility.

Inputs: train_id, class, passenger_id

Outputs: fare amount

P2. GeneratePNR – Generates a unique PNR using source, destination, date, and random digits.

Inputs: source station id, destination station id, journey date

Outputs: PNR string

P3. BookTicket – Books a ticket, assigns seat, calculates fare, generates PNR, records payment.

Inputs: passenger_id, train_id, class, journey date, payment mode

Outputs: booking created with ticket id and PNR

P4. CancelTicket – Cancels a ticket by updating status.

Inputs: ticket id

Outputs: None

Cancellation & Refunds

C1. AfterCancellation (Trigger) – Automatically marks the seat available when a ticket is canceled.

Inputs: ticket id (from cancellation insert)

Outputs: None

Schedule Management

S1. UpdateSchedule – Updates train arrival and departure times for a station in the schedule.

Inputs: train_id, station_id, arrival time, departure time

Outputs: None

S2. BeforeScheduleUpdate (Trigger) – Validates that departure time is not before arrival time during schedule updates.

Inputs: schedule update

Outputs: Error signal if invalid

Payments

F1. ReconcilePayments – Marks payments pending over 24 hours as failed and cancels their tickets.

Inputs: None

Outputs: Payments and ticket statuses updated

Waitlist Management

W1. PromoteWaitlist (Event) – Promotes waitlisted passengers every 15 minutes if seats free up.

Actions:

- RAC to Confirmed
- WL to RAC

Inputs: None

Outputs: Ticket status updates

 **Reports**

R1. GenerateOccupancyReport – Generates booking status stats per class for a train on a given date.

Inputs: train_id, journey date

Outputs: Class-wise counts of Confirmed, RAC, WL, Cancelled tickets

 **Notifications**

N1. AfterTicketStatusUpdate (Trigger) – Sends a notification when a RAC or WL ticket gets confirmed.

Inputs: ticket update

Outputs: Insert notification message

Query

- Displays PNR status, train details, stations, passenger info, and seat details for a given PNR number.
- Fetches the complete schedule of a given train, listing station sequence, timings, and distance.
- Creates a procedure to check available seats for a train, date, and class.
- Lists all passengers booked on a specific train and journey date excluding cancellations.
- Retrieves waitlisted passengers' details for a train with future journey dates.
- Calculates the total refundable amount for future bookings of a given train.
- Calculates total revenue collected from completed payments within a specified period.
- Displays all cancellation records with refund details within a given date range.
- Identifies the busiest route based on passenger count between station pairs.
- Generates an itemized bill for a given PNR showing fare breakdown and payment details.
- Computes average fare per kilometer for each class category.
- Calculates seat utilization percentage for each train based on bookings.
- Counts disabled passengers accommodated per train.
- Summarizes monthly cancellation counts and total refund amounts.

- Shows the distribution of payment methods and their transaction percentages.
- Classifies passengers into age groups and counts passengers in each category.
- Ranks routes by the number of bookings to determine popularity.
- Lists frequent travelers based on the number of journeys undertaken.
- Calculates ticket confirmation rate percentage for each travel class.
- Ranks stations based on the number of different trains connecting them.
- Summarizes total revenue generated by each type of train.
- Identifies peak booking hours based on ticket booking time distribution.
- Analyzes reasons for ticket cancellations along with average refund amounts.
- Evaluates payment failure rates across different payment modes.
- Counts inter-station passenger traffic by linking ticket source and destination stations.
- Breaks down gender distribution of passengers in each class category.
- Analyzes monthly seasonal demand based on the number of bookings.
- Identifies the most frequently cancelled trains based on ticket cancellation records.
- Finds the top two stations generating the highest revenue from ticket bookings.
- Lists trains with the least bookings in the next 7 days, suitable for maintenance.

The Above Query are in Queries.sql file in github Project link.