Cairo University

Faculty of Engineering

Computer Engineering Department

SEM–team10

CMP 202

Introduction to Database Systems

Schema Report

Team Number: 10

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Problem definition:

This project is about creating the database of 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, train status, and passengers. The record of train includes its number, name, source, destination, and days on which it is available, whereas record of train status includes dates for which tickets can be booked, total number of seats available, and number of seats already booked.

Passengers can book their tickets for the train in which seats are available. For this, passenger has 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 confirm status and corresponding ticket ID is generated which is stored along with other details of the passenger. The ticket once booked can be cancelled 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. With this, the first ticket with waiting status also gets confirmed.

System Users:

1. Manager
2. Station Manager
3. Booking Clerk

1. Manager Functionalities:

    a. Hire / dismiss a Station Manager.

    b. Buy / Sell trains.

    c. Monitor the state of the trains.

    d. Open a new station.

    e. Change salaries of station managers.

    f. Add/remove a Subscription.

    g. Manage coach and repair yards.

    h. Update Station data.

    I. Review employees' information.

    J. Review passengers' information.

    K. Review the trips.

2.Station Manager:

    a. Hire / dismiss an employee.

    b. Update Station data.

    c. Review employees' data.

    d. Manage coach and repair yards.

    e. Determine the price of the ticket.

    f. Manage Trips.

    g. Change salaries of employees.

3.Booking Clerk:

a. Checks the availability of tickets.

b. View the information of trips.

c. Book a seat.

d. Cancel a Ticket.

e. Edit passenger data.

f. Edit Ticket data

g. Manage passenger subscription

Description of Entities:

1- Users

It is for saving the data of the users of the application.

2- Employee

It describes all of the people who work in the system (drivers, booking clerks,..etc), and data related to them(names, addresses,..etc).

3- Train

It describes the trains and their information and status (model, repairing,..etc).

4- Route

It describes the routes through which the trains will travel, and stations which they will pass on their way.

5- Subscription

Each passenger will have a subscription which can be null providing them offers.

6- Manager

It describes the manager of the system who hires and dismisses station managers along with other extension functionalities.

7- Passenger

It describes the passengers of the train.

8- Trip

It describes the offered train trips, it includes the start and destination stations as well as the train for the trip.

9- Station

It describes the train stations and their relation with nearby yards and stations and routes that pass by them.

10- Ticket

It describes the tickets for each trip and the seat number and degree.

11- Contact

It describes all information of workers and passengers

12- Repair yard

It describes the yards where damaged trains get repaired and become ready for work again as well as their controller station and number of trains currently being fixed.

13- Coach yard

It describes yards where trains rest when they are not assigned a trip and their controller station and the maximum number of trains it can hold.

14- Station manager

It describes the manager of the station who is responsible for hiring and dismissing workers and upgrade the station as well as managing the repair or coach yards if any is controlled by the station.

15- Booking clerk

It describes the workers who are responsible for booking tickets for the passengers.

List of Relations:

1.works_In:

It is a one- to-many relation between Employee and station that specifies in which station the employee works.

2.Assigned_to:

It is a many to one relation between Train and Trip that specifies which train the trip is assigned to.

3.Drives:

It is a one- to-one relation between Employee and train that specifies which train the employee drives.

4.Points_to:

It is a one-to-many relation between trip and ticket that specifies which trip the ticket belongs to.

5.Manages:

It is a one- to-one relation between Station Manager and station that specifies which station he manages.

6.HAS_Contact:

It is an identifying one-to-one relation between (User and Contact), (Employee and Contact) and passenger and Contact) that specifies which contact belongs to that User/Employee/Passenger.

This relation will contain the id of the User/Employee/Passenger as a forreign and his info

7. parks_In:

It is a many to one relation between Coach yard and Train that specifies in which yard the train is parking.

8. Repaired_In:

It is a many to one relation between Repair Yard and Train that specifies in which the train is being repaired.

9.Has_Ryard:

It is a one to one relation between Station and coach yard that specifies which coaching yard belongs to which Station.

10. Has-Cyard:

It is a one to one relation between Station and coach yard that specifies which repairing yard belongs to which Station.

11. Source:

It is a one to one relation between Station and Route that specifies the starting station of the Route.

12. Destination:

It is a one to one relation between Station and Route that specifies the ending station of the route.

13.Passes_By:

It is a many to many relation between Route and Station that specifies which Routes passes by which stations.

14. Has_route:

It is a many to one relation between Route and Trip that specifies which Route the Trip takes.

15. Has_subscription:

It is a many to one relation between Subscription and Passenger that specifies which Subscriptions he has.

16.Has_ticket:

It is a one to one relation between ticket and Passengers that specifies which ticket the passenger has.