

Railway station

1)Business Requirements Specification (BRS):

Introduction:

The Train Station Database is intended to serve as a centralized system to manage and store data related to train stations, including their infrastructure, schedules, ticketing, and passenger information. This BRS document outlines the key business requirements for the development of the Train Station Database.

Functional Requirements:

- **Station Information Management:** This requirement covers the management of station records, including details such as station name, location, facilities, and contact information. It relates to the management of station information in the database.
- **Train Schedule Management:** This requirement encompasses the management of train schedules, including arrival and departure times, platform assignments, and delays. It involves managing the schedules of trains in the database.
- **Ticketing System:** This requirement focuses on the sale and management of tickets for various train routes, including ticket reservations, cancellations, seat allocations, and associated passenger information. It pertains to the management of ticket-related data in the database.
- **Passenger Information Management:** This requirement involves storing and managing passenger information, including personal details, and booking history. It relates to the management of passenger data in the database.
- **Login Management:** Although not explicitly mentioned in the initial requirements, login management can be considered part of the system's functional requirements. It would involve providing functionality for user registration, login, and account management to access the database and perform authorized actions.

Non-functional requirements

Security:

- The system should ensure the confidentiality, integrity, and availability of data.
- User authentication and authorization mechanisms should be in place to control access to sensitive information.

Scalability:

- The system should be able to handle a growing number of stations, trains, and passengers without performance degradation.
- It should support concurrent access by multiple users.

Reliability:

- The system should have a backup and recovery mechanism to protect against data loss.
- It should minimize downtime and ensure high availability.

Usability:

- The system should have an intuitive user interface, making it easy for station staff to operate.
- User training and documentation should be provided to ensure smooth adoption.

Constraints:

The system should comply with relevant legal and regulatory requirements.

It should integrate with existing systems, such as payment gateways and train management systems, as necessary.

Assumptions:

Sufficient hardware and infrastructure will be available to support the system's operation.

Adequate network connectivity will be in place for data exchange between stations and the central database.

Glossary:

Station: A physical location where trains arrive and depart.

Train Schedule: Detailed information about train arrivals, departures, and routes.

Ticketing System: A subsystem responsible for ticket sales, reservations, and passenger management

2)System Operational Concept (OpsCon)

1. Introduction:

The System Operational Concept (OpsCon) for a railway station outlines the key operational aspects and functionalities of the system that supports the operations of the station. This OpsCon document provides a high-level overview of how the system is intended to be used and its role in facilitating the smooth functioning of the railway station.

2. System Overview:

The railway station system is designed to support various operational activities and processes within the station. It acts as a central hub for managing train schedules, ticketing, passenger information, and overall station operations. The system ensures efficient handling of passengers, trains, and associated services.

3. Stakeholders:

- **Station Staff:** Includes station managers, ticketing agents, platform supervisors, and other personnel responsible for station operations.
- **Passengers:** Individuals using the railway station for traveling purposes.
- **Train Operators:** Companies or organizations operating the train services at the station.
- **Maintenance Staff:** Personnel responsible for maintaining the station infrastructure, tracks, and equipment.

4. Operational Scenarios:

The OpsCon document should include specific operational scenarios that illustrate how the system will be used in various situations. These scenarios may include:

Passenger Check-in and Ticketing:

Passengers arrive at the station and proceed to ticket counters or self-service kiosks.

Station staff verifies passenger details, checks ticket availability, and issues tickets.

The system updates ticketing records and provides passengers with necessary information.

- Train Schedule Management:

Station staff access the system to manage train schedules, including arrivals, departures, and platform assignments.

Any changes to the schedules, delays, or cancellations are communicated to passengers through display boards or announcements.

- Passenger Boarding and Departure:

Passengers present their tickets for validation and proceed to the designated platform.

Station staff ensure a smooth boarding process, manage crowd control, and provide assistance as needed.

The system updates passenger boarding records and train departure information.

- Security and Safety:

Station staff monitor CCTV cameras and access control systems to ensure the safety and security of passengers and station premises.

The system may integrate with security systems to provide alerts or notifications in case of emergencies or security incidents.

5. System Interactions:

The OpsCon document should outline how the railway station system interacts with other systems or stakeholders. This may include:

-Integration with Train Management Systems:

The system may receive train arrival and departure information from train management systems to update the schedules and provide real-time updates to passengers.

- Integration with Payment Gateways:

The system may integrate with payment gateways to facilitate secure and seamless ticket purchases and payment transactions.

- Communication with Passenger Information Systems:

The system may provide data to passenger information systems, enabling them to display accurate train schedules, platform information, and other relevant details to passengers.

6. Operational Constraints:

The OpsCon document should highlight any operational constraints that need to be considered during the system's design and implementation. These constraints may include regulatory requirements, safety regulations, station infrastructure limitations, or other factors that impact the system's operations.

3)Stakeholder Requirements Specification (StRs)

Introduction

This document specifies the stakeholder requirements for a railway station database that will store and manage the information about the trains, stations, routes, schedules, tickets, and passengers of a railway system. The database will be used by various stakeholders, such as railway operators, passengers, staff, and developers, to access and update the data related to the railway system.

Stakeholder Identification

The following table lists the main stakeholders or stakeholder classes who have a legitimate interest in the railway station database throughout its life cycle.

<u>Stakeholder</u>	<u>Description</u>	<u>Needs and Expectations</u>
Railway operators	The organization that owns and operates the railway system.	To have a reliable and secure database that can store and manage the data related to the railway system. To have an easy and efficient way to update and query the data. To have a backup and recovery mechanism for the data. To have a performance and quality assurance mechanism for the data.
Passengers	The people who use the railway system for transportation.	To have accurate and timely information about the trains, stations, routes, schedules, and tickets To have a user-friendly and accessible interface to access the information. To have a booking and payment mechanism for the tickets. To have a feedback and complaint mechanism for the information and the service.
Staff	The people who work for the railway system, such as drivers, controllers, ticket sellers, etc.	To have relevant and updated information about the railway system for their work. To have an authorization and authentication mechanism to access the data To have a training and support mechanism for the data.
Developers	The people who design, develop, and maintain the railway station database and its related applications.	To have a clear and consistent specification of the data and its structure. To have a standard and flexible notation for the data and its manipulation. To have a testing and debugging mechanism for the data and its applications.

Stakeholder Requirements

The stakeholder requirements are expressed in terms of the services or functions that the database should provide, and the constraints or conditions that the database should satisfy. The stakeholder requirements are also prioritized by using the MoSCoW method, where M stands for must have, S for should have, C for could have, and W for won't have.

Stakeholder	Requirement	Priority
Railway operators	The database should store the data about the trains, stations, routes, schedules, tickets, and passengers.	M
Railway operators	The database should allow the railway operators to add, modify, delete, and query the data.	M
Railway operators	The database should ensure the data integrity, security, and consistency.	M
Railway operators	The database should have a backup and recovery mechanism for the data.	S
Railway operators	The database should have a performance and quality assurance mechanism for the data.	S
Passengers	The database should provide accurate and timely information about the trains, stations, routes, schedules, and tickets	M
Passengers	The database should have a user-friendly and accessible interface to access the information. The database should have a booking and payment mechanism for the tickets.	M
Passengers	he database should have a feedback and complaint mechanism for the information and the service.	M
Passengers	The database should provide relevant and updated information about the railway system for their work.	S
staff	The database should have an authorization and authentication mechanism to access the data.	M
Staff	The database should have a training and support mechanism for the data.	M
staff	The database should have a clear and consistent specification of the data and its structure.	S
Developers		M

Developers	The database should have a standard and flexible notation for the data and its manipulation	M
Developers	The database should have a standard and flexible notation for the data and its manipulation	S

System Requirements Specification (SyRS)

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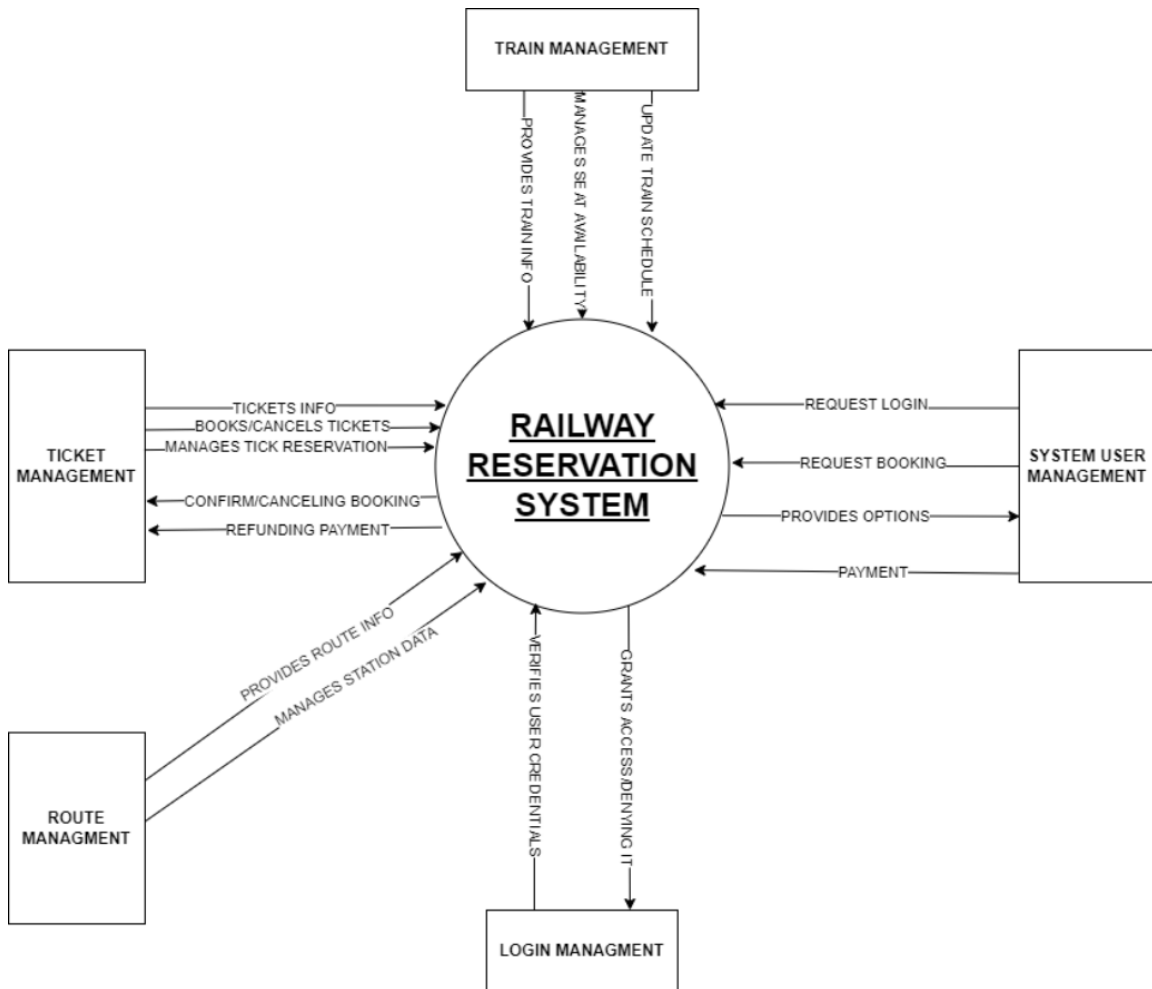
Glossary:

Station: A physical location where trains arrive and depart.

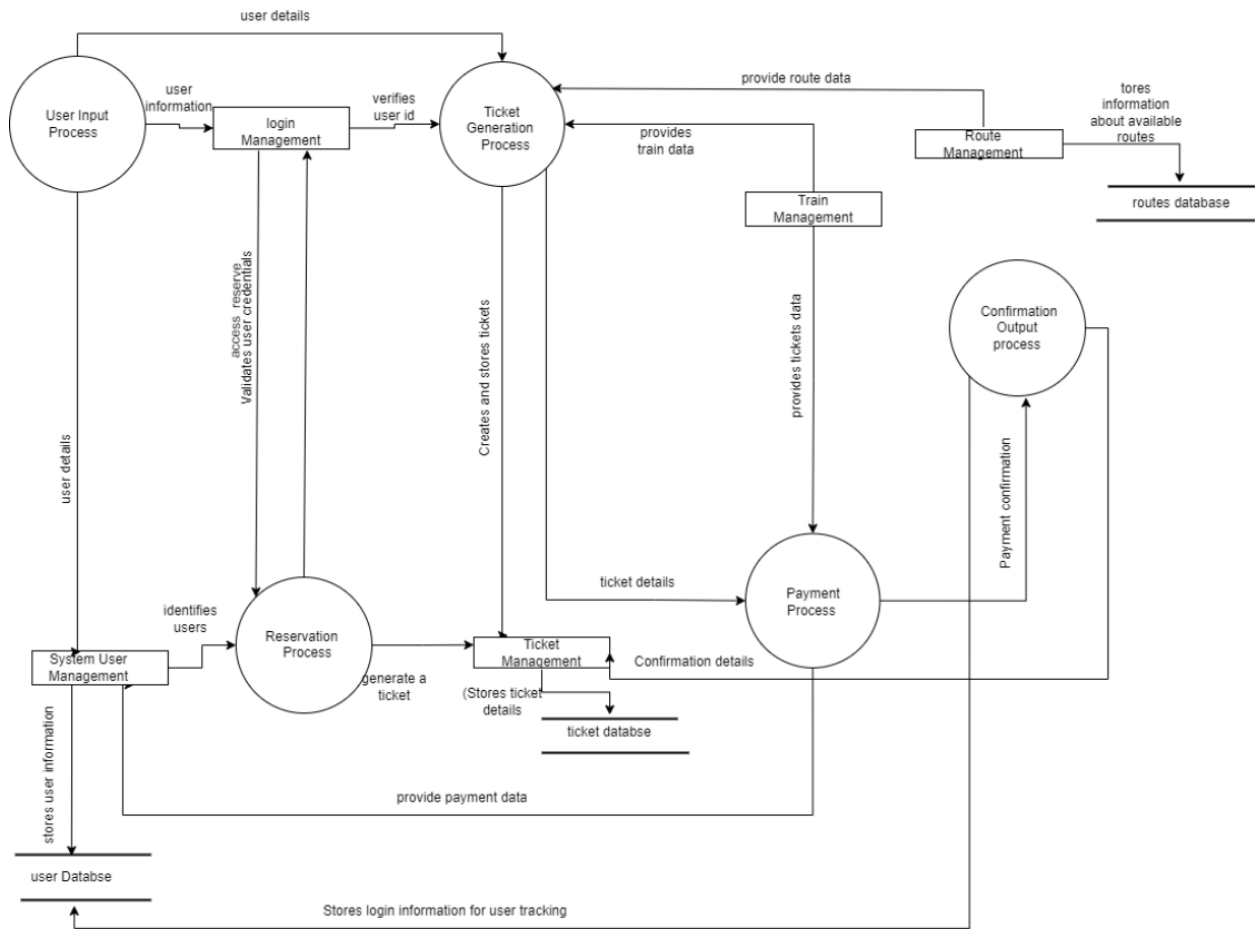
Train Schedule: Detailed information about train arrivals, departures, and routes.

Ticketing System: A subsystem responsible for ticket sales, reservations, and passenger management

DFD Level 0



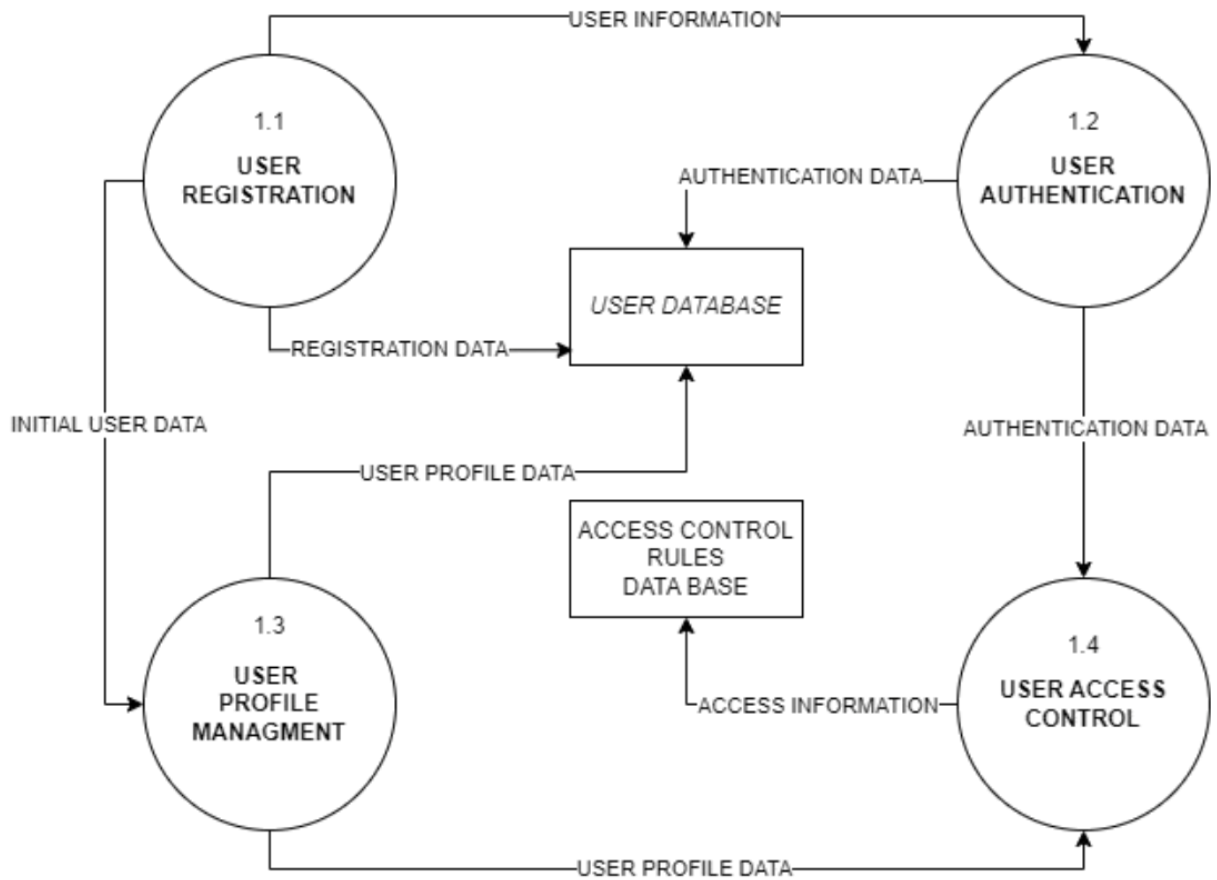
DFD Level 1



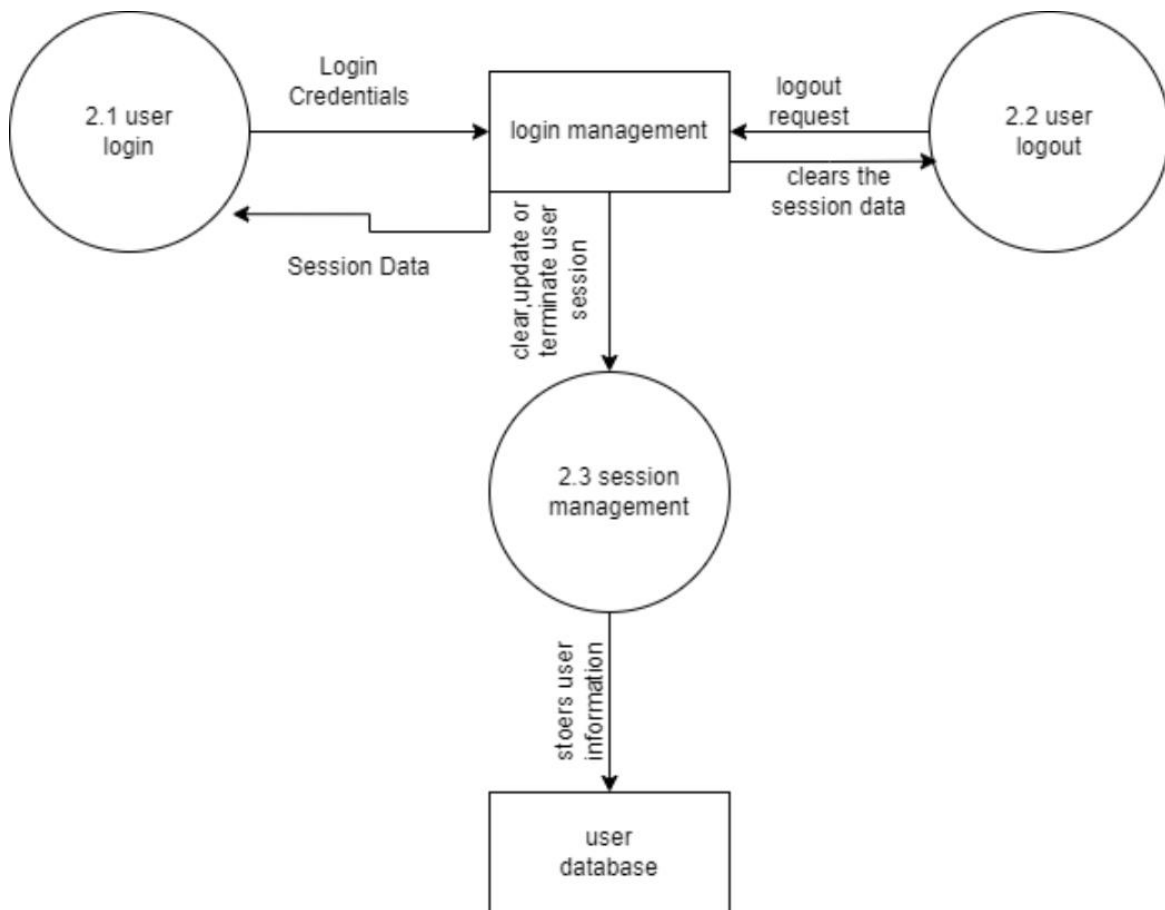
DFD Level 2

1) User input process

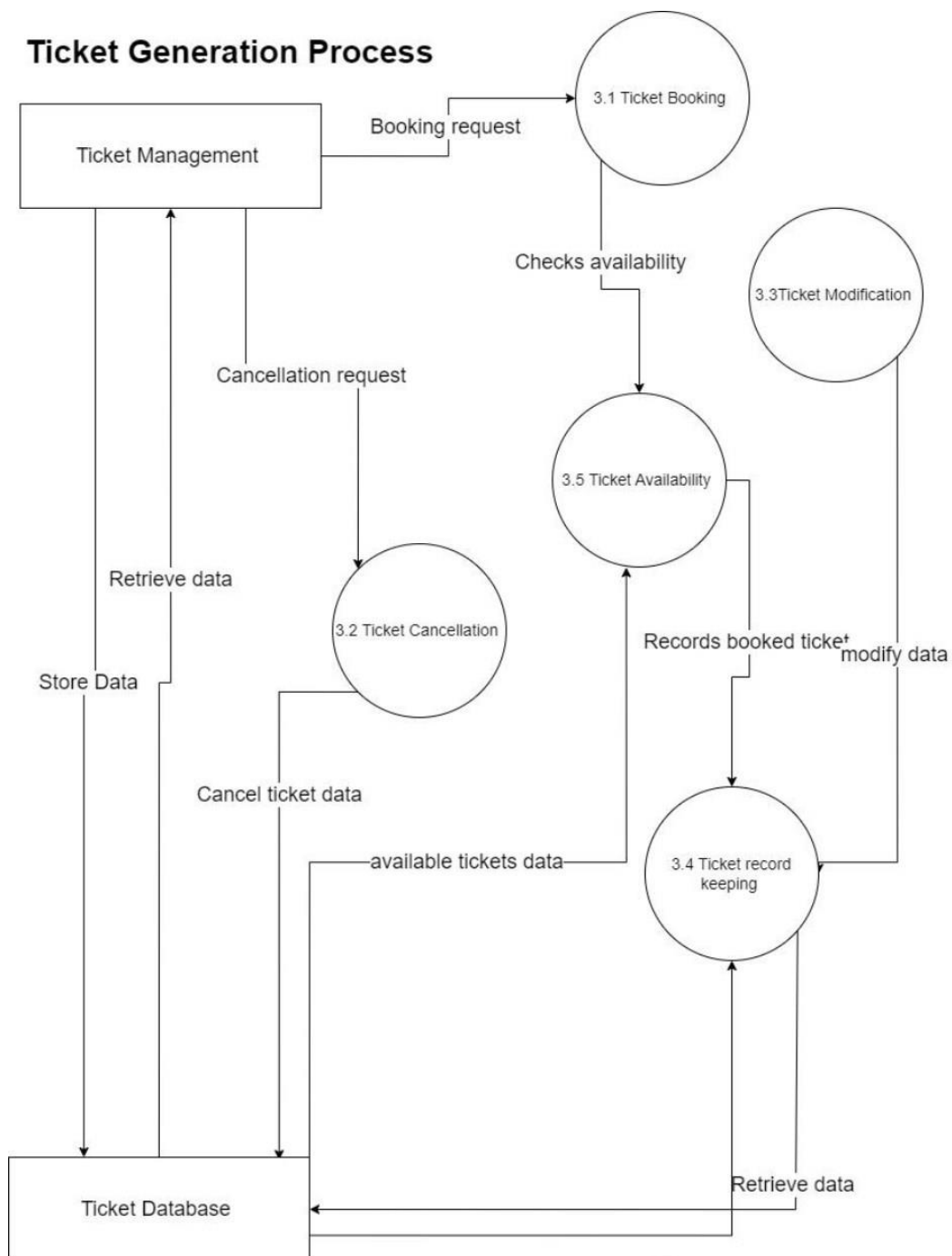
SYSTEM USER
MANAGEMENT



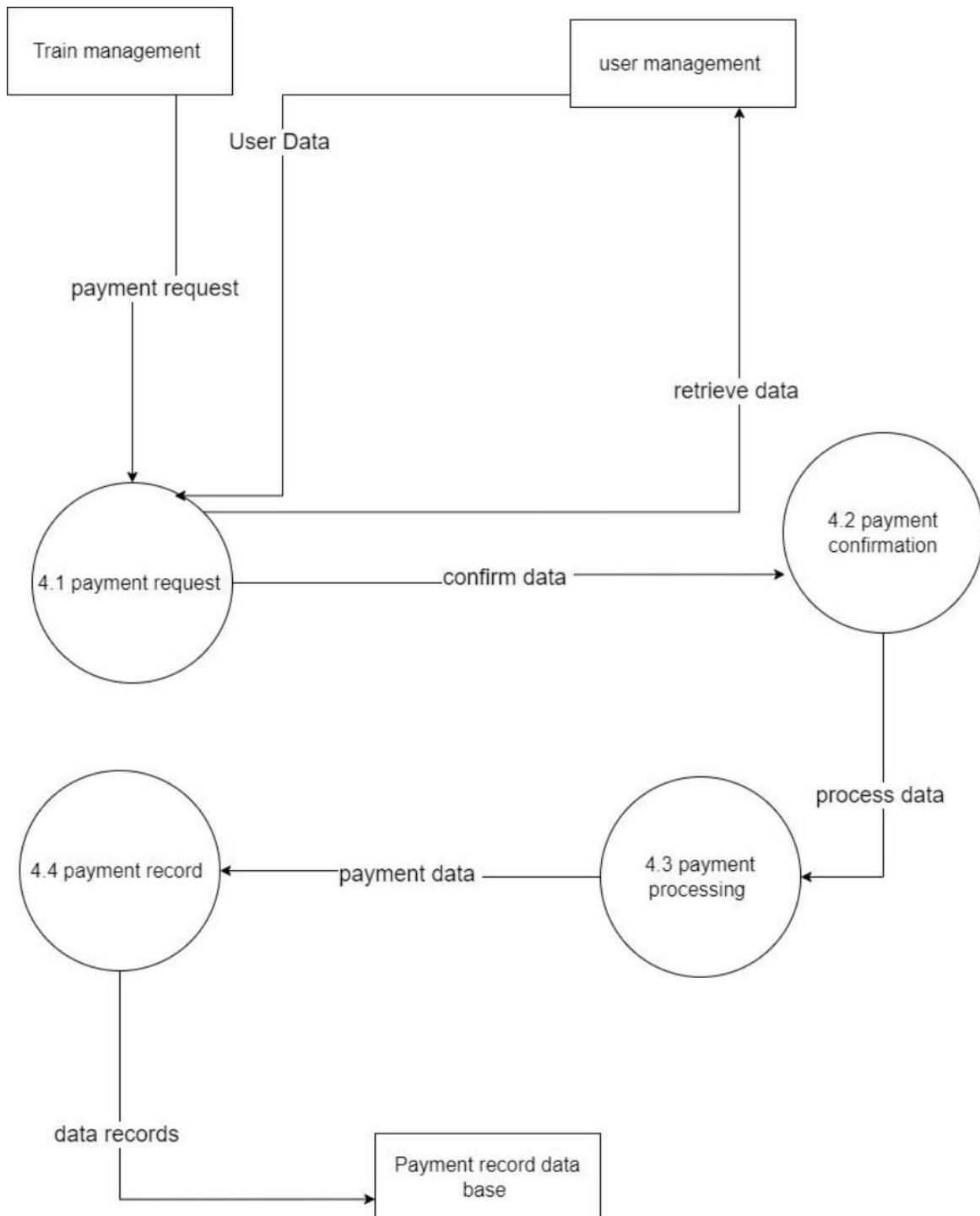
2) Reservation process



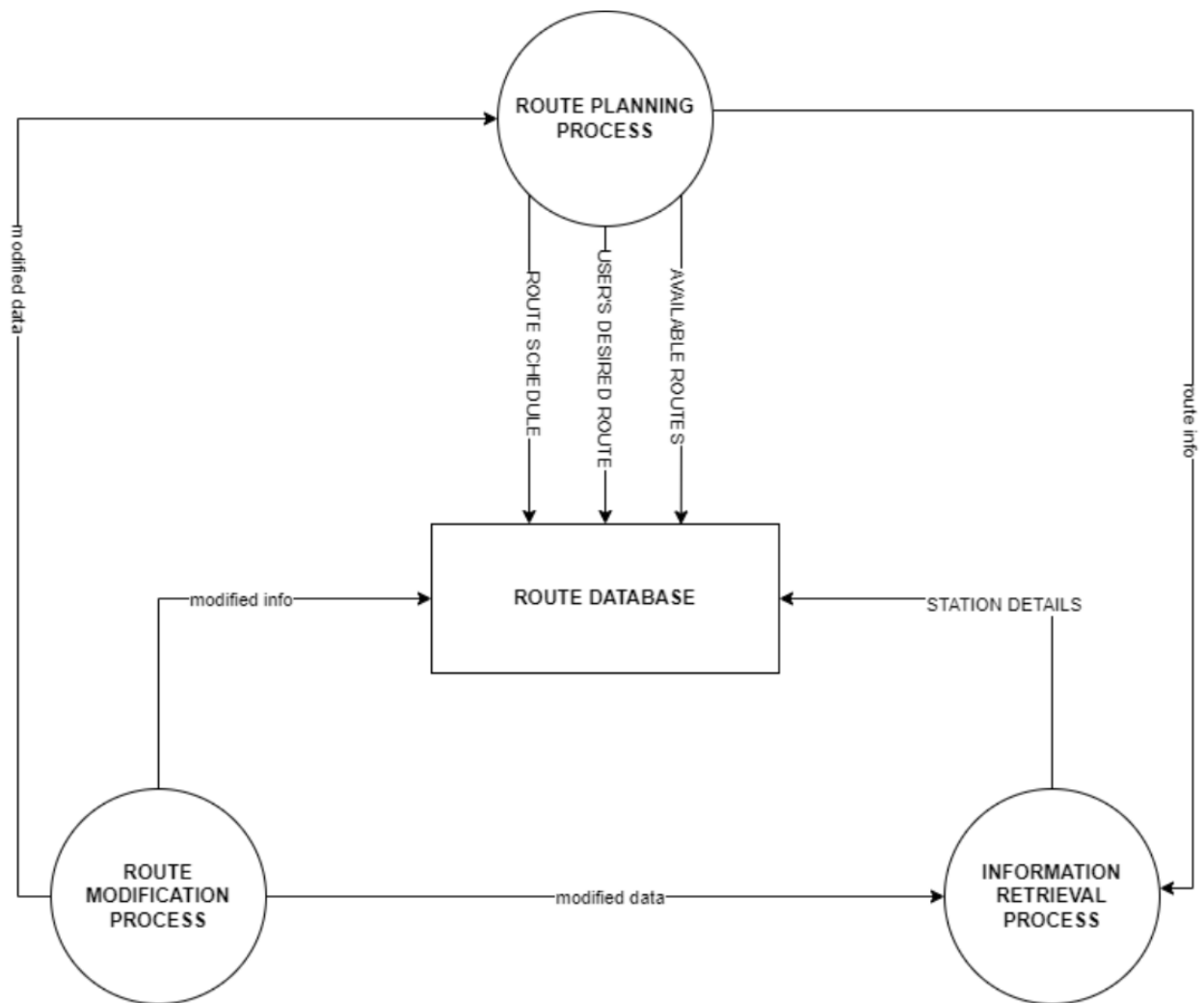
3) Ticket generation process



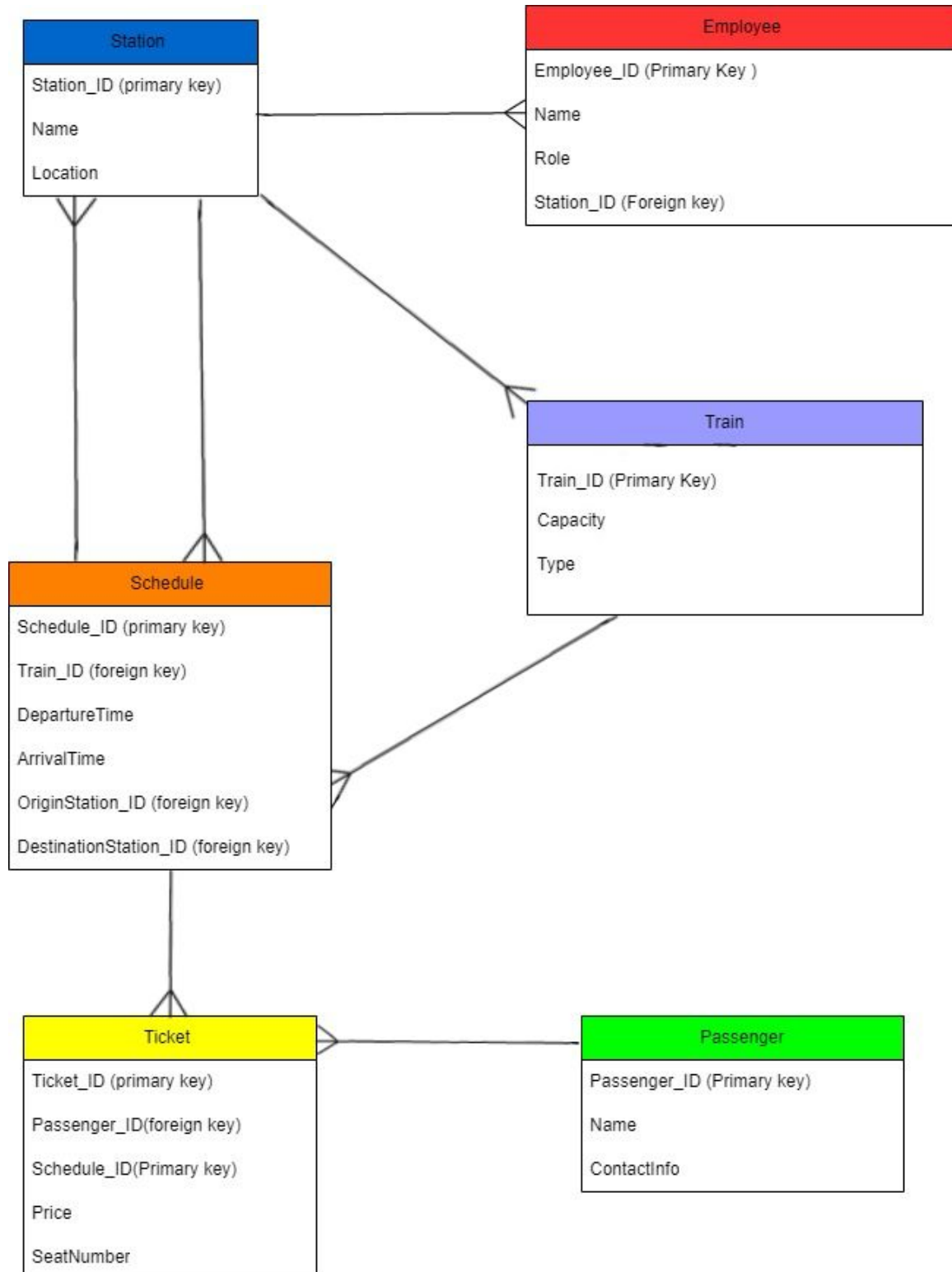
4) Payment process



5) Route management process



Data Base Schema



Data Dictionary:

1. Station

- **Station_ID:** Unique identifier for each station.
- **Name:** Name of the train station.
- **Location:** Geographical location of the station.

2. Train

- **Train_ID:** Unique identifier for each train.
- **Capacity:** Number of passengers the train can hold.
- **Type:** Type of the train (e.g., cargo, passenger).

3. Schedule

- **Schedule_ID:** Unique identifier for each schedule.
- **Train_ID:** Identifier of the train assigned to this schedule.
- **DepartureTime:** Time when the train departs.
- **ArrivalTime:** Time when the train arrives.
- **OriginStation_ID:** The station from where the train departs.
- **DestinationStation_ID:** The station where the train arrives.

4. Ticket

- **Ticket_ID:** Unique identifier for each ticket.
- **Passenger_ID:** Identifier of the passenger holding the ticket.
- **Schedule_ID:** Identifier of the train schedule.
- **Price:** Cost of the ticket.
- **SeatNumber:** Seat assigned to the ticket holder.

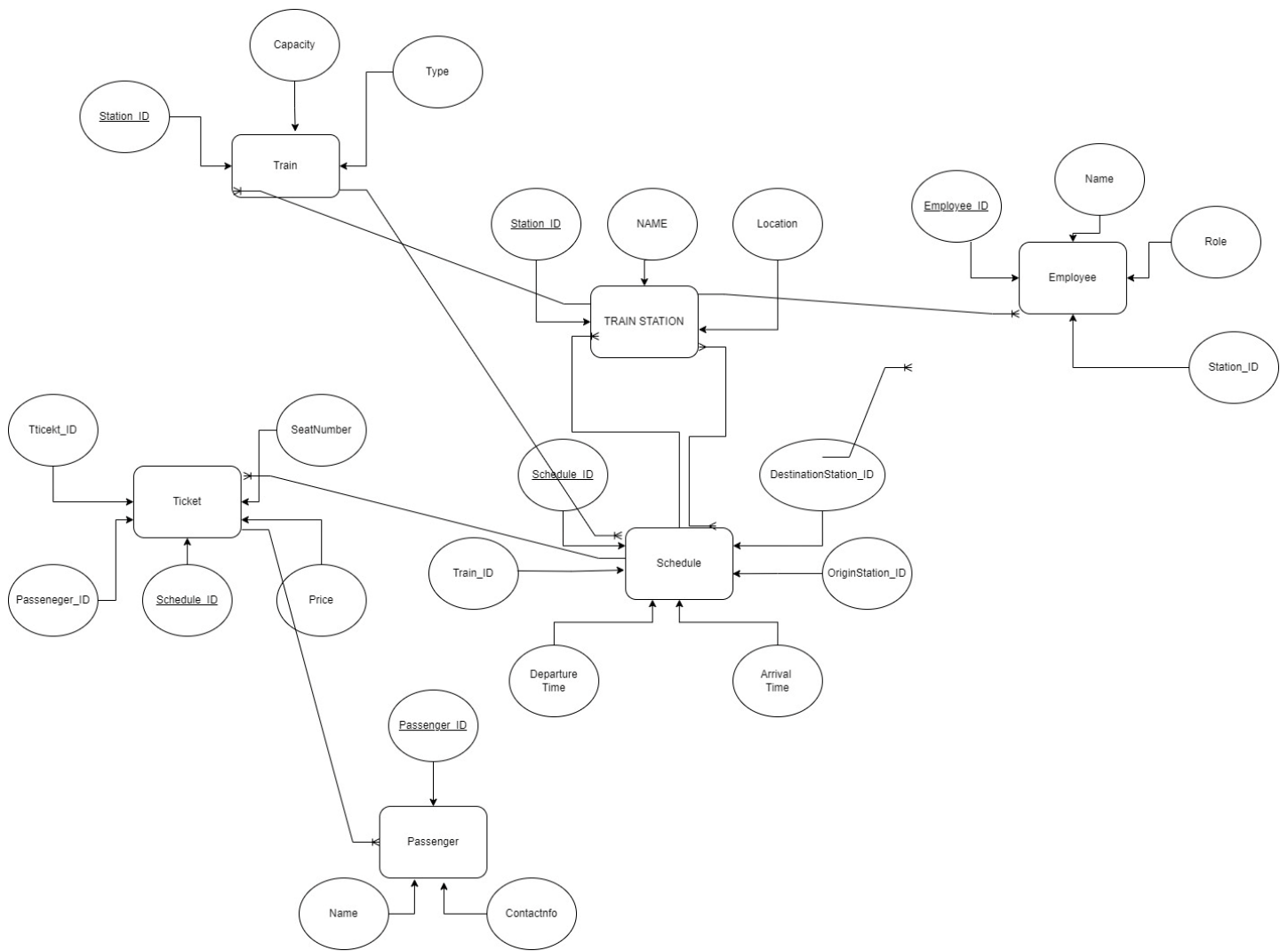
5. Passenger

- **Passenger_ID:** Unique identifier for each passenger.
- **Name:** Name of the passenger.
- **ContactInfo:** Contact information of the passenger.

6. Employee

- **Employee_ID:** Unique identifier for each employee.
- **Name:** Name of the employee.
- **Role:** Role of the employee at the station.
- **Station_ID:** Identifier of the station where the employee works.

ER DIAGRAM



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