**<Train Reservation System>**

**Section: A**

**Group Members:**

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**Submitted to:**

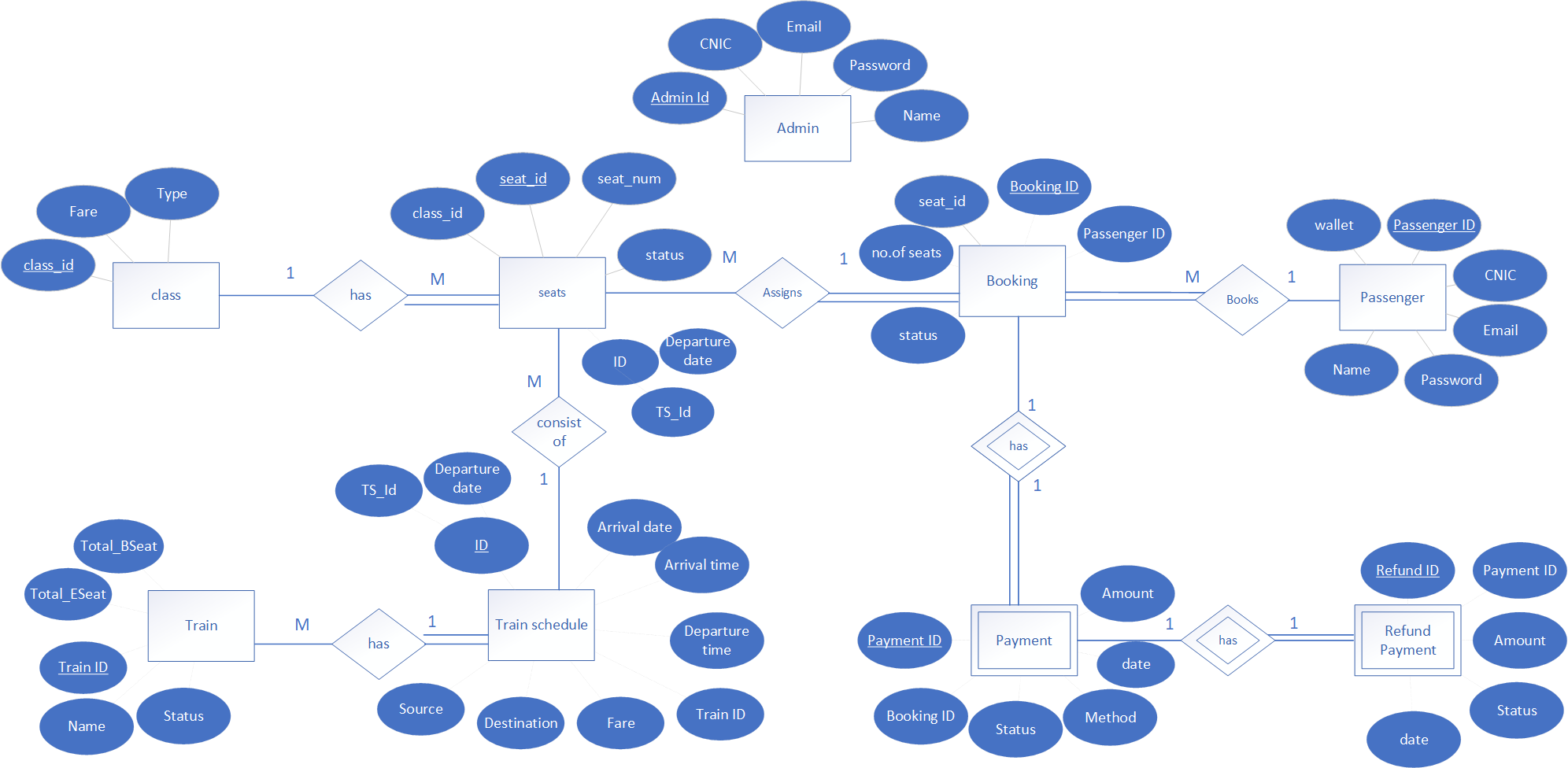
**Mam Anam Shahzadi**

**Submission date: 20-Aug-2024**

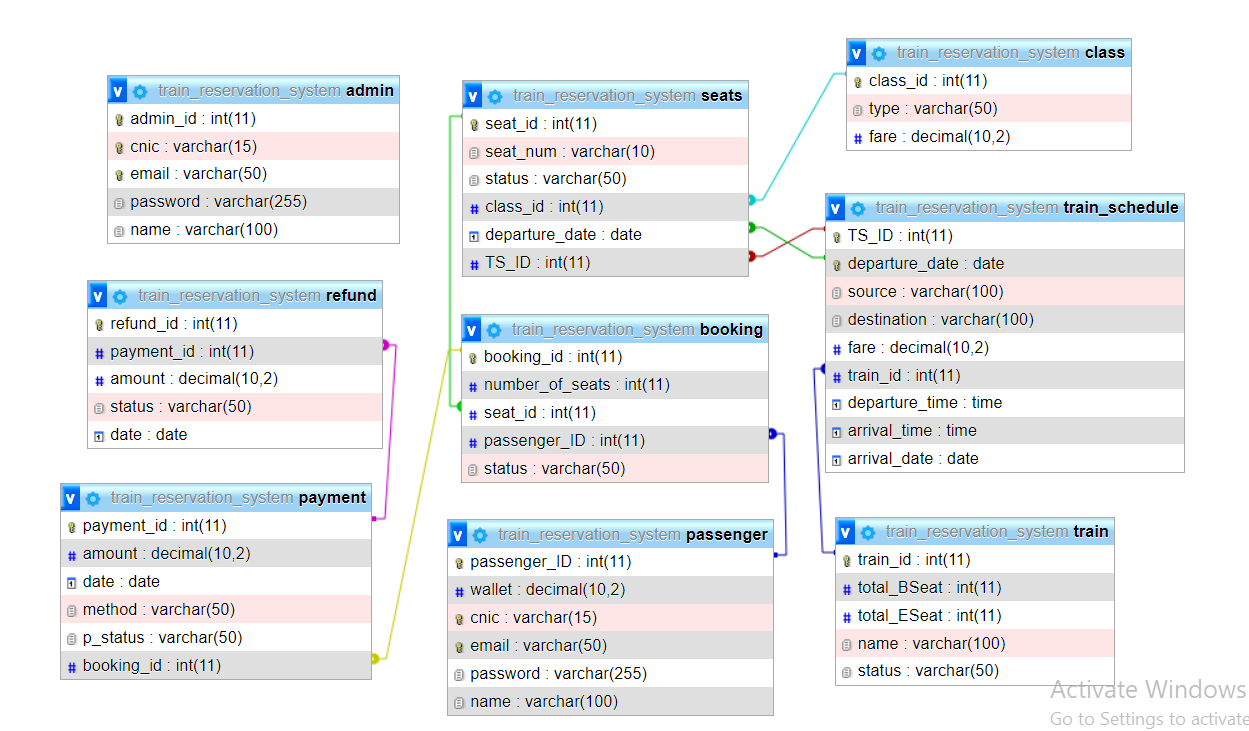
**Project Requirements:**

* System will allow admin to login and logout.
* System will allow passenger to login and logout.
* System will allow admin to book passenger(s) in a particular train (out of a list of trains in the particular route) in a particular class, up to a maximum seat limit.
* System will allow admin to remove passenger (s) from train who cancelled the booking.
* System will allow admin to get passengers list.
* System will allow passenger to check the availability of trains accordingly to the source and destination.
* System will allow passenger(s) to book ticket (mention class – 1st , Economy), mentioning the fare as well as number of people traveling.
* System will allow passenger(s) to choose (jazz cash/bank detail) and add payment details.
* System will allow passenger(s) to confirm booking at least 3 days before departure.
* System will allow passenger(s) to cancel ticket, without charges if done 3 days before departure; otherwise 50% deduction.

**Entity Relationship Diagram (ERD)**

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**Relational Model**

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**Normalization Schema**

**1st Normal Form (1NF):**

A table is in the 1st Normal Form if:

* It contains only atomic (indivisible) values.
* Each column contains values of a single type.

Since all columns contain atomic values and each column has a unique name and contains a single type of data, so ERD is already in 1NF.

**2nd Normal Form (2NF):**

A table is in the 2nd Normal Form if:

* It is in 1NF.
* There is no partial dependency.

**Analysis for each table:**

* **Passenger:** This table has a single primary key (passenger\_ID). All other columns are fully dependent on passenger\_ID, so it is in 2NF.
* **Class:** This table also has a single primary key (class\_id). All columns are fully dependent on class\_id, so it is in 2NF.
* **Train:** This table has a single primary key (train\_id). All columns are fully dependent on train\_id, so it is in 2NF.
* **Train\_Schedule:** This table has a composite primary key (TS\_ID, departure\_date). All non-key attributes (departure\_date, source, destination, fare, train\_id, departure\_time, arrival\_time, arrival\_date) are dependent on both parts of the primary key, which satisfies 2NF.
* **Seats:** This table has a primary key (seat\_id). All other attributes (seat\_num, status, class\_id, departure\_date, TS\_ID) are dependent on seat\_id. The foreign key references to Class and Train\_Schedule are correctly maintained, ensuring 2NF.
* **Admin:** This table has a single primary key (admin\_id). All other columns are dependent on admin\_id, so it is in 2NF.
* **Booking:** This table has a primary key (booking\_id). All other columns (number\_of\_seats, seat\_id, passenger\_ID) are fully dependent on booking\_id, so it is in 2NF.
* **Payment:** This table has a primary key (payment\_id). All other columns (amount, date, method, status, booking\_id) are dependent on payment\_id, so it is in 2NF.
* **Refund:** This table has a primary key (refund\_id). All other columns (payment\_id, amount, status, date) are dependent on refund\_id, so it is in 2NF.

**3rd Normal Form (3NF):**

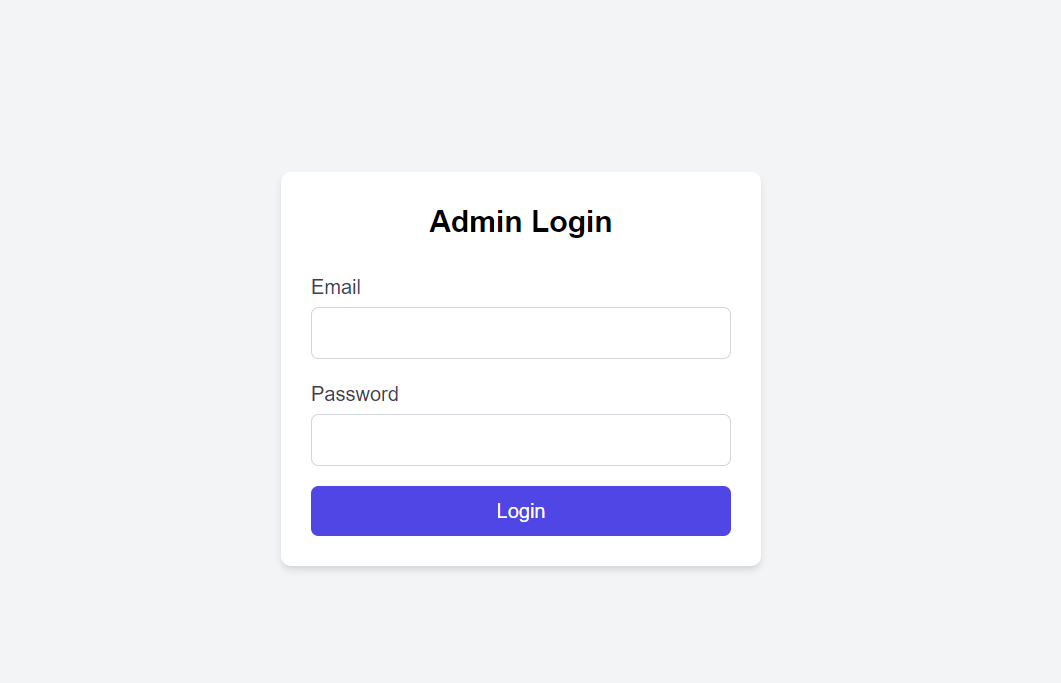
A table is in the 3rd Normal Form if:

* It is in 2NF.
* There are no transitive dependencies (i.e., non-key attributes do not depend on other non-key attributes).

Since in the ERD no non- prime attribute identifies any other non-prime attribute so it is in 3NF.

**Project Screenshots**

**<Here add screenshots of pages against each functional requirement. To fulfill requirement which page you show in your front-end, take screenshot and put here. Maximum 10 pages>**

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