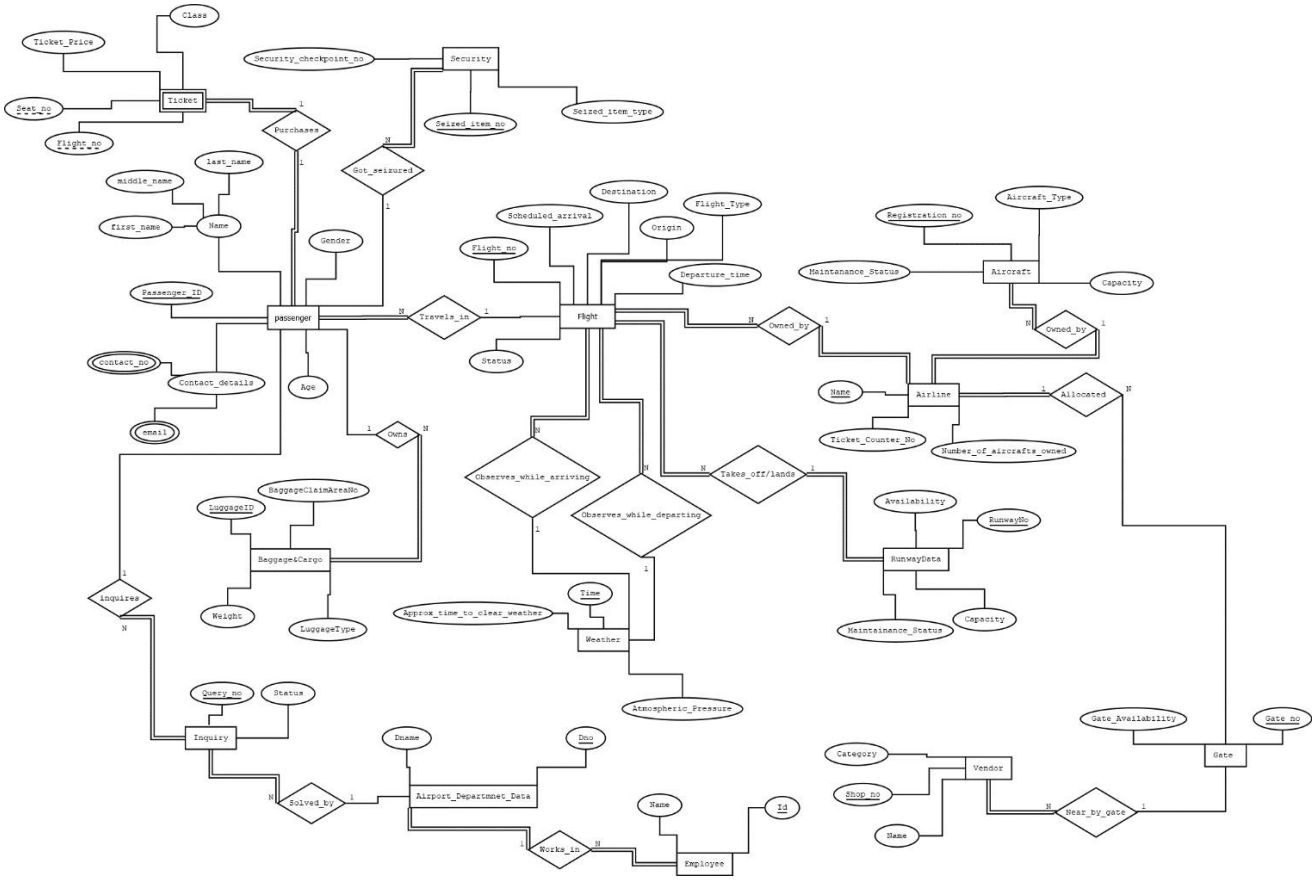
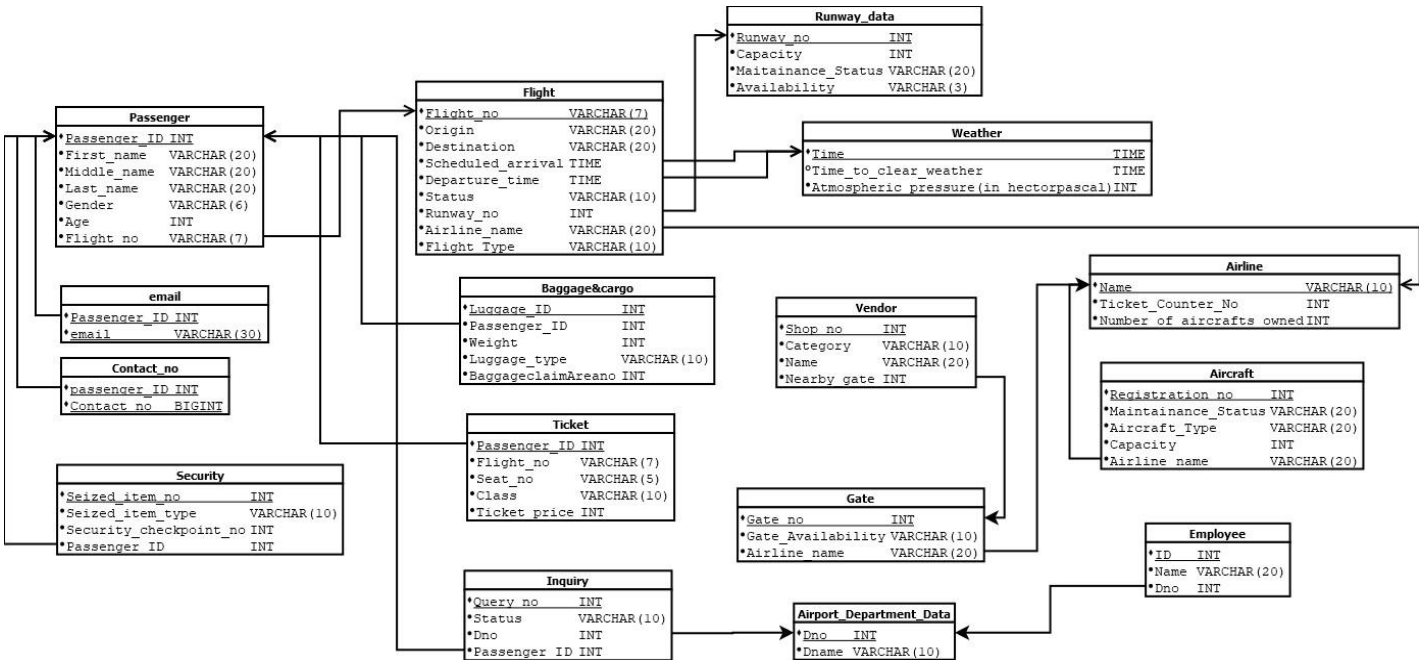
Airport Management System

ER Diagram:



Relational Schema:



FDs and Normalization Proof:

➔ We know that the relation is in BCNF, if the determinant of every functional dependency which holds on a relation is a super key of that relation.
Here we can see that,

- **Passenger:**

  Passenger_ID -> {First_name, Middle_name, Last_name, gender, age, flight_no}

  In the Passenger relation, Passenger_ID is the key and it determines all the other attributes of the relation Passenger. So we can confirm that this relation is in BCNF.

- **Email:**

  {Passenger_ID, email} -> {Passenger_ID, email}

  In the Email relation, {Passenger_ID, email} is the key and it determines all the other attributes of the relation Email. So we can confirm that this relation is in BCNF.

- **Contact_no:**

  {Passenger_ID, Contact_no} -> {Passenger_ID, Contact_no}

  In the Contact_no relation, {Passenger_ID, Contact_no} is the key and it determines all the other attributes of the relation Contact_no. So we can confirm that this relation is in BCNF.

- **Flight:**

  Flight_no -> {Origin, Destination, Scheduled_arrival, Departure_time, Runway_no, Airline_name, Flight_type, status}

  In the flight relation, flight_no is the key and it determines all the other attributes of the relation flight. So we can confirm that this relation is in BCNF.

- **Ticket:**

  Passenger_ID -> {flight_no, seat_no, class, ticket_price}

  In the Ticket relation, passenger_ID is the key and it determines all the other attributes of the relation Ticket. So we can confirm that this relation is in BCNF.

- **Airline:**

  Name -> {ticket_counter_no, number_of_aircrafts_owned}

  In the Airline relation, name is the key and it determines all the other attributes of the relation Airline. So we can confirm that this relation is in BCNF.

- **Aircraft:**

  Registration no -> {Maintainance_Status, Aircraft_Type,
  Capacity, Airline_name}

  In the Aircraft relation, Registration_no is the key and it determines all the other attributes of the relation Aircraft. So we can confirm that this relation is in BCNF.

- **Security:**

  Seized_item_no -> {Seized_item_type, Security_checkpoint_no,
  Passenger_ID}

  In the Security relation, seized_item_no is the key and it determines all the other attributes of the relation security. So we can confirm that this relation is in BCNF.

- **Baggage_and_cargo:**

  Luggage_ID -> {Passenger_ID, flight_no, Luggage_type, weight,
  baggageclaimarea}

  In the Baggage_and_cargo relation, Luggage_ID is the key and it determines all the other attributes of the relation Baggage_and_cargo. So we can confirm that this relation is in BCNF.

- **Inquiry:**

  Query_no -> {Passenger_Id, status, dno}

  In the Inquiry relation, Query_no is the key and it determines all the other attributes of the relation Inquiry. So we can confirm that this relation is in BCNF.

- **Runway_Data:**

  Runway_no -> {Capacity, Maintainance_status, Availability}

  In the Runway_Data relation, rumway_no is the key and it determines all the other attributes of the relation Runway_Data. So we can confirm that this relation is in BCNF.

- **Weather:**

  Time -> {Time_to_clear_weather, Atmospheric_pressure}

  In the Weather relation, Time is the key and it determines all the other attributes of the relation weather. So we can confirm that this relation is in BCNF.

- **Vendor:**

  Shop_no -> {Category, name, nearyby_gate}

  In the Vendor relation, shop_no is the key and it determines all the other attributes of the relation Vendor. So we can confirm that this relation is in BCNF.

- **Gate:**

  Gate_no -> {Gate_availability, airline_name}

  In the Gate relation, gate_no is the key and it determines all the other attributes of the relation Gate. So we can confirm that this relation is in BCNF.

- **Airport_department_data:**

  Dno -> dname

  In the Airport_department_data relation, Dno is the key and it determines all the other attributes of the relation Airport_department_data. So we can confirm that this relation is in BCNF.

- **Employee:**

  Id -> {name, dno}

  In the Employee relation, ID is the key and it determines all the other attributes of the relation Employee. So we can confirm that this relation is in BCNF.

➔ So, We can see that all the relations are in BCNF.