

**Project Report**

**On**

**Airline Ticket Reservation System**

(CSD 2206-5 DATABASE DESIGN AND SQL)

**Submitted to: Submitted by:**

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# INTRODUCTION

Airline Ticket Reservation System is a database project that facilitate the reservation of the online air tickets through an effective and yet simple GUI for a normal passenger intending to travel in airways. The project is basically targeted all those people who would like to travel through air. Apart from reserving tickets, through this system a passenger can compare fares ‘from’ various cities ‘to’ various cities.

# REQUIREMENT ANALYSIS

## Overview:

The Airline Ticket Reservation System should fulfill the following requirements:

* Keeping records of different flights of a particular airline at various places.
* Keeping the records of a specific passengers like passport number, address and contact number etc.
* Keep record of total hours of a specific aircraft has served during a specific time interval.
* Provides details related to number of aircrafts belonging to a specific airline.
* The system will keep record of the total number of hours that a specific passenger has travelled during a specific time interval.
* The system will give information about the total number of hours that a specific airline has been running during a specific time interval.
* It provides list of all passengers who flew to a specific city during a specific time interval.
* Point out the most visited city during the last month.
* Generating a list of aircrafts that have not been in used from a specific source location.
* It creates list of airlines that run flight from a specific source to a destination.
* It provides the list of all options that a passenger can have when travelling from a source to a destination. This includes a connecting flight, for instance, a passenger is travelling from Toronto to Delhi and there is no direct flight, therefore, you have to find the options for this passenger.
* It provides the detailed description of minimum hours that it will take for a passenger to travel from a source city to a destination city. Again, consider the connecting flights as mentioned in item number 9, e.g. travelling from Toronto to Delhi.

# Entity, Attribute and Relationship Identification

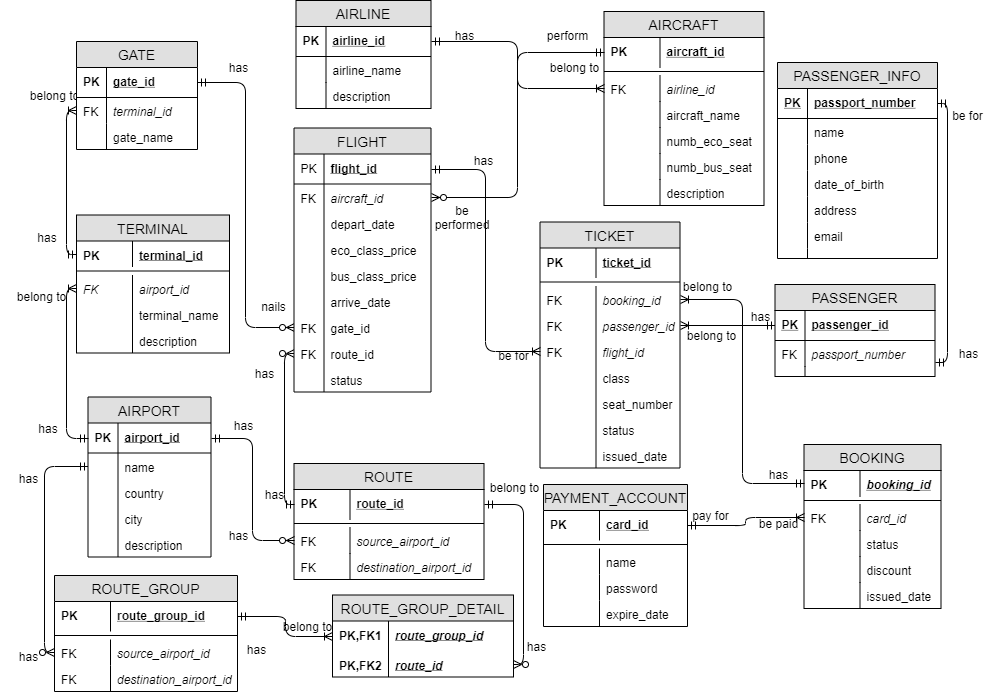
## **Entities and Attributes:**

1. TICKET has attributes: ticket\_id (primary key), booking\_id (foreign key), passenger\_id(foreign key), flight\_id(foreign key), class, seat\_number, status, issued\_date
2. FLIGHT stores all information of all flights and it has attributes: flight\_id(primary key), aircraft\_id(foreign key), depart\_date, eco\_class\_price, bus\_class\_price, arrival\_date, gate\_id(foreign key), route\_id(foreign key), status
3. AIRLINE has attributes: airline\_id(primary key), airline\_name, description
4. AIRCRAFT has attributes: aircraft\_id(primary key), airline\_id (foreign key), aircraft\_name, number\_eco\_seat, number\_bus\_seat, description
5. PASSENGER has attributes: passenger\_id(primary key), passport\_number(foreign key)
6. PASSENGER\_INFO has attributes: passport\_number(primary key), name, phone, date\_of\_birth, address, email
7. TERMINAL has attributes: terminal\_id(primary key), airport\_id(foreign key), terminal\_name, description
8. GATE has attributes: gate\_id(primary key), terminal\_id(foreign key), gate\_name
9. AIRPORT has attributes: airport\_id(primary key), name, country, city, description
10. PAYMENT\_ACCOUNT has attributes: card\_id(primary key), name, password, expire\_date
11. BOOKING has attributes: booking\_id(primary\_key), card\_id(foreign key), status, discount, issued\_date
12. ROUTE entity provides details about direct route from one source to a destination. It has attributes: route\_id(primary key), source\_airport\_id(foreign key), destination\_airport\_id(foreign key)
13. ROUTE\_GROUP entity is especially for getting information about connecting flights from one destination to other. It has attributes: route\_group\_id(primary key), source\_airport\_id(foreign key), destination\_airport\_id(foreign key)

## **Relationships:**

1. ROUTE\_GROUP\_DETAIL plays a role of solving many to many relationship problem between ROUTE and ROUTE\_GROUP entities. It has attributes: route\_group\_id ( primary key, foreign key), route\_id (primary key, foreign key)

# CONCEPTUAL MODEL (E-R DIAGRAM)

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The ER diagram fulfils the following user requirements:

* The airline ticket reservation system can keep track of different flights of a particular airline at various places.
* Also, this system can keep the records of a specific passengers like passport number, address and contact number etc.
* The system can keep record of total hours of a specific aircraft has served during a specific time interval
* This can provide details related to number of aircrafts belonging to a specific airline
* The system can keep record of the total number of hours that a specific passenger has travelled during a specific time interval
* The system can give information about the total number of hours that a specific airline has been running during a specific time interval
* It provides list of all passengers who flew to a specific city during a specific time interval
* This ERD point out the most visited city during the last month
* It can generate a list of aircrafts that have **not** been in used from a specific source location
* It can create list of airlines that run flight from a specific source to a destination
* This airline system can provide the list of all options that a passenger can have when travelling from a source to a destination. This includes a connecting flight, for instance, a passenger is travelling from Toronto to Delhi and there is no direct flight, therefore, you have to find the options for this passenger
* This ERD results the detailed description of minimum hours that it will take for a passenger to travel from a source city to a destination city. Again, consider the connecting flights as mentioned in item number 9, e.g. travelling from Toronto to Delhi.

# LOGICAL DESIGN

**Relational schemas:**

TICKET (**ticket\_id**, *booking\_id, passenger\_id, flight\_id,* class, seat\_number, status, issued\_date)

PASSENGER (**passenger\_id**, *passport\_number*)

PASSENGER\_INFO (**passport\_number**, name, phone, date\_of\_birth, address, email)

GATE (**gate\_id**, *terminal\_id*, gate\_name)

TERMINAL (**terminal\_id**, *airport\_id*, terminal\_name, description)

BOOKING (**booking\_id**, *card\_id,* status, discount, issued\_date)

PAYMENT\_ACCOUNT (**card\_id**, name, password, expire\_date)

FLIGHT (**flight\_id,** *aircraft\_id,* depart\_date, eco\_class\_price, bus\_class\_price, arrive\_date, *route\_id*, *gate\_id*, status)

AIRLINE (**airline id,** airline\_name, description)

AIRCRAFT (**aircraft\_id,** *airline\_id,* aircraft\_name, numb\_eco\_seat, numb\_bus\_seat, description)

ROUTE (**route id,** *source\_airport\_id, destination\_airport\_id*)

ROUTE\_GROUP (**route group id,** *source\_airport\_id, destination\_airport\_id*)

ROUTE\_GROUP\_DETAIL (***route group id***, ***route id***)

AIRPORT (**airport id**, name, country, city, description)

## **Third Normalization Form:**

The ERD is already in third normalization form.

# Physical Table Representation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **TERMINAL** | | | | |
| **Column Description** | **Optionality** | **Data Type** | **Size, Digits** | **SQL short name** |
| Terminal ID (PK) | NOT NULL | SMALLINT | 2 | terminal\_id |
| IATA Airport ID (FK) | NOT NULL | CHAR | 3 | airport\_id |
| Terminal name | NOT NULL | CHAR | 3 | terminal\_name |
| Description | NULL | VARCHAR | 10 | description |

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| --- | --- | --- | --- | --- |
| **GATE** | | | | |
| **Column Description** | **Optionality** | **Data Type** | **Size, Digits** | **SQL short name** |
| Gate ID (PK) | NOT NULL | SMALLINT | 2 | gate\_id |
| Terminal ID (FK) | NOT NULL | SMALLINT | 2 | terminal\_id |
| Name of the gate | NOT NULL | VARCHAR | 10 | gate\_name |

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| --- | --- | --- | --- | --- |
| **AIRPORT** | | | | |
| **Column Description** | **Optionality** | **Data Type** | **Size, Digits** | **SQL short name** |
| IATA Airport ID (PK) | NOT NULL | CHAR | 3 | airport\_id |
| Name of airport | NOT NULL | VARCHAR | 50 | name |
| Country | NOT NULL | VARCHAR | 20 | country |
| City | NOT NULL | VARCHAR | 20 | city |
| Description | NULL | VARCHAR | 10 | description |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **AIRLINE** | | | | |
| **Column Description** | **Optionality** | **Data Type** | **Size, Digits** | **SQL short name** |
| IATA ID of Airline (PK) | NOT NULL | CHAR | 2 | airline\_id |
| Airline name | NOT NULL | VARCHAR | 50 | airline\_name |
| Description | NULL | VARCHAR | 50 | description |

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| --- | --- | --- | --- | --- |
| **AIRCRAFT** | | | | |
| **Column Description** | **Optionality** | **Data Type** | **Size, Digits** | **SQL short name** |
| Aircraft ID (PK) | NOT NULL | VARCHAR | 10 | aircraft\_id |
| IATA ID of Airline (FK) | NOT NULL | CHAR | 2 | airline\_id |
| Aircraft name | NOT NULL | VARCHAR | 50 | aircraft\_name |
| Number of eco class seat | NOT NULL | SMALLINT | 3 | number\_eco\_seat |
| Number of business class seat | NOT NULL | SMALLINT | 3 | number\_bus\_seat |
| Description | NULL | VARCHAR | 50 | description |

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| --- | --- | --- | --- | --- |
| **FLIGHT** | | | | |
| **Column Description** | **Optionality** | **Data Type** | **Size, Digits** | **SQL short name** |
| Flight ID (PK) | NOT NULL | VARCHAR | 10 | flight\_id |
| Aircraft ID (FK) | NOT NULL | VARCHAR | 10 | aircraft\_id |
| Route ID (FK) | NOT NULL | VARCHAR | 10 | route\_id |
| Gate ID (FK) | NOT NULL | SMALLINT | 2 | gate\_id |
| Departure date and time | NOT NULL | DATETIME |  | depart\_date |
| Arrival date and time | NOT NULL | DATETIME |  | arrive\_date |
| Price for economic class | NOT NULL | FLOAT | 15 | eco\_class\_price |
| Price for business class | NOT NULL | FLOAT | 15 | bus\_class\_price |
| Status of the flight | NOT NULL | VARCHAR | 10 | status |

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| --- | --- | --- | --- | --- |
| **ROUTE** | | | | |
| **Column Description** | **Optionality** | **Data Type** | **Size, Digits** | **SQL short name** |
| Route ID (PK) | NOT NULL | VARCHAR | 10 | route\_id |
| IATA source Airport ID (FK) | NOT NULL | CHAR | 3 | source\_airport\_id |
| IATA destination Airport ID (FK) | NOT NULL | CHAR | 3 | destination\_airport\_id |

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| --- | --- | --- | --- | --- |
| **ROUTE\_GROUP\_DETAIL** | | | | |
| **Column Description** | **Optionality** | **Data Type** | **Size, Digits** | **SQL short name** |
| Route ID (PK,FK) | NOT NULL | VARCHAR | 10 | route\_id |
| Route group ID (PK,FK) | NOT NULL | VARCHAR | 10 | route\_group\_id |

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| **ROUTE\_GROUP** | | | | |
| **Column Description** | **Optionality** | **Data Type** | **Size, Digits** | **SQL short name** |
| Route group ID (PK) | NOT NULL | VARCHAR | 10 | route\_group\_id |
| IATA source Airport ID (FK) | NOT NULL | CHAR | 3 | source\_airport\_id |
| IATA destination Airport ID (FK) | NOT NULL | CHAR | 3 | destination\_airport\_id |

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| **TICKET** | | | | |
| **Column Description** | **Optionality** | **Data Type** | **Size, Digits** | **SQL short name** |
| Ticket ID (PK) | NOT NULL | VARCHAR | 20 | ticket\_id |
| Booking ID (FK) | NOT NULL | VARCHAR | 20 | booking\_id |
| Passenger ID (FK) | NOT NULL | VARCHAR | 20 | passenger\_id |
| Flight ID (FK) | NOT NULL | VARCHAR | 10 | flight\_id |
| Class of the ticket | NOT NULL | VARCHAR | 5 | class |
| The seat number | NULL | VARCHAR | 3 | seat\_number |
| Status of the ticket | NOT NULL | VARCHAR | 10 | status |
| Issued date and time | NOT NULL | DATETIME |  | issued\_date |

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| **PASSENGER** | | | | |
| **Column Description** | **Optionality** | **Data Type** | **Size, Digits** | **SQL short name** |
| Passenger ID (PK) | NOT NULL | VARCHAR | 20 | passenger\_id |
| Passort number(FK) | NOT NULL | VARCHAR | 20 | passport\_number |

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| **PASSENGER\_INFO** | | | | |
| **Column Description** | **Optionality** | **Data Type** | **Size, Digits** | **SQL short name** |
| Passort number (PK) | NOT NULL | VARCHAR | 20 | passport\_number |
| Passenger name | NOT NULL | VARCHAR | 30 | name |
| Contact phone number | NOT NULL | CHAR | 10 | phone |
| Date of birth | NOT NULL | DATE |  | date\_of\_birth |
| Address | NOT NULL | VARCHAR | 50 | address |
| Contact email | NOT NULL | VARCHAR | 30 | email |

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| --- | --- | --- | --- | --- |
| **BOOKING** | | | | |
| **Column Description** | **Optionality** | **Data Type** | **Size, Digits** | **SQL short name** |
| Booking ID (PK) | NOT NULL | VARCHAR | 20 | booking\_id |
| Card ID (FK) | NOT NULL | VARCHAR | 20 | card\_id |
| Status of booking | NULL | VARCHAR | 10 | status |
| Discount | NOT NULL | FLOAT | 4 | discount |
| Booking issued date and time | NOT NULL | DATETIME |  | issued\_date |

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| --- | --- | --- | --- | --- |
| **PAYMENT\_ACCOUNT** | | | | |
| **Column Description** | **Optionality** | **Data Type** | **Size, Digits** | **SQL short name** |
| Card ID (PK) | NOT NULL | VARCHAR | 20 | card\_id |
| Name on the card | NOT NULL | VARCHAR | 30 | name |
| Password | NOT NULL | SMALLINT | 3 | password |
| Card expire date | NOT NULL | DATE |  | expire\_date |