



Project Report
On
Airline Ticket Reservation System
(CSD 2206-5 DATABASE DESIGN AND SQL)

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CONTENTS

INTRODUCTION	3
REQUIREMENT ANALYSIS	4
Overview:	4
Entity, Attribute and Relationship Identification	5
Entities and Attributes:	5
Relationships:	5
CONCEPTUAL MODEL (E-R DIAGRAM)	6
LOGICAL DESIGN	8
Relational schemas:	8
Third Normalization Form:	8
Physical Table Representation	9

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

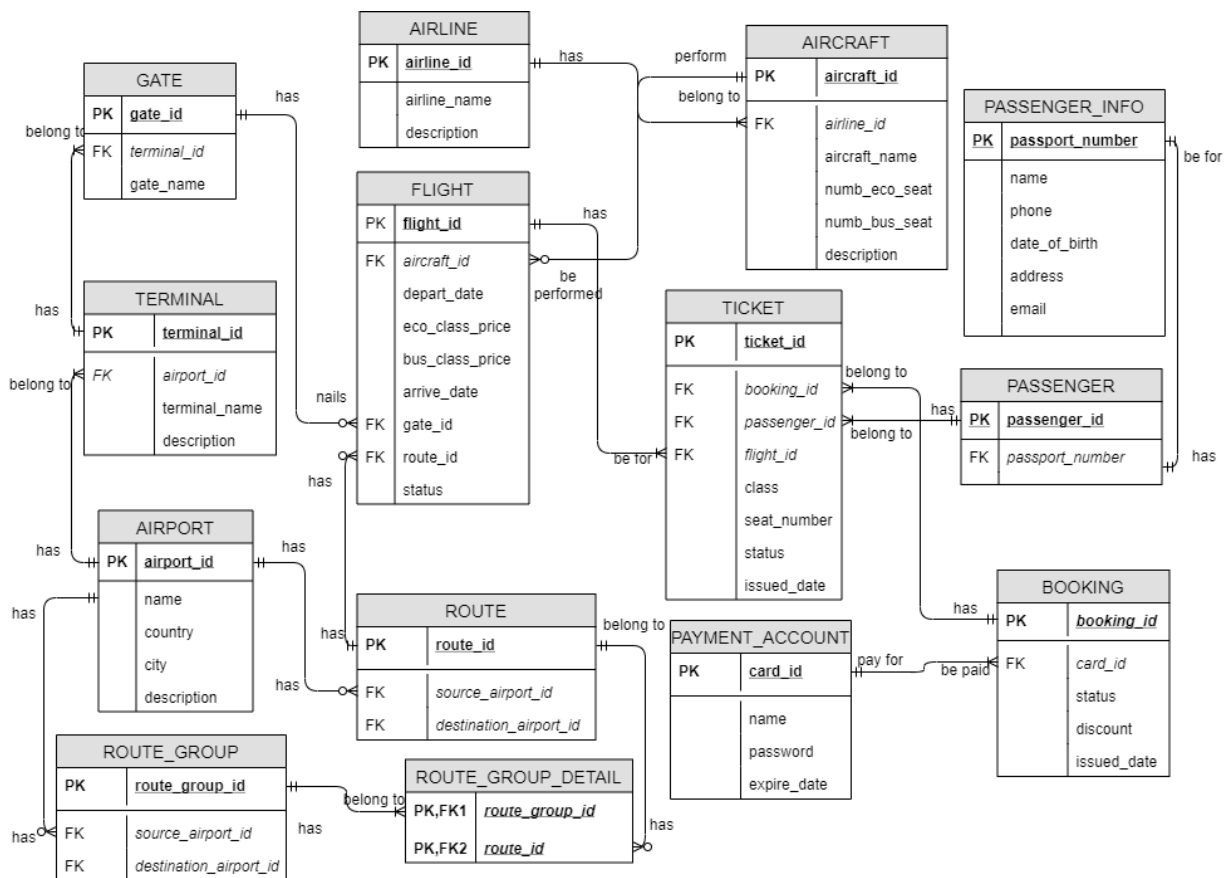
Entities and Attributes:

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)



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

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

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

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

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

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

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

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

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

PASSENGER				
Column Description	Optionality	Data Type	Size, Digits	SQL short name
Passenger ID (PK)	NOT NULL	VARCHAR	20	passenger_id
Passport number(FK)	NOT NULL	VARCHAR	20	passport_number

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

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

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