

INFO 6210 Flights Online Booking System Database

Database Specification: Purpose, Business Problems Addressed and Business Rules

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Database Purpose:

The purpose of the database is to maintain the data used to generate and support customers' flight tickets booking and organize promotions for customers. The database will be used by administrative staff only.

Business Problems Addressed:

- Provide multiple choices on flight information for customers to buy their flight tickets to provide both small airlines and big airlines equal opportunities to sell their tickets. (e.g. customers are able to see all the flight information at the same time, to avoid monopoly.)
- Allow marketing staff to negotiate with airlines about more economical prices and cooperation.(e.g. exclusive cooperation with airlines to increase the number of customers and increase competitiveness among other similar platforms)
- Fully use resources to maximize profit for partnered airlines. (e.g. lowering the unoccupied rate of a flight.)
- Supply insight to give appropriated advertise for targeted marking. (e.g. giving different advertisements to customers who buys different class of tickets)
- Provide information for sales and marketing staff to analyze and design the promotion for customers based on the search history of customers.

Business Rules:

- Each customer may have zero or more orders.
- Each order must have one or more tickets.
- Each passenger must have one or more tickets.
- Each ticket can only have one passenger.
- Each employee can handle zero or more orders.
- Each manager may have one or more employees.
- Each customer has only one promotion level.
- Each customer may have zero or more credit cards.
- Each credit card must associate with one or more customer.
- Each ticket have only one airport.
- Each ticket have only one airline.
- Each ticket have only one flight.

Design Requirements (Credit to Professor Simon Wang):

- Use Crow's Foot Notation.
- Specify the primary key fields in each table by specifying PK beside the fields.
- Draw a line between the fields of each table to show the relationships between each table. This line should be pointed directly to the fields in each table that are used to form the relationship.
- Specify which table is on the one side of the relationship by placing a one next to the field where the line starts.
- Specify which table is on the many side of the relationship by placing a crow's feet symbol next to the field where the line ends.

Design Decision

Entity Name	Why Entity Included	How Entity is related to Other Entities
Tickets_INFO	One of the primary purposes of the database is to collect information about flight related to ticket booking. The important ticket data to collect include price information as well as the most economical flight available, and most time efficiency flight available, and necessary flight information for booking. With the information, we may help reduce inequity in different scale's airline.	As the core entity in the database, the Tickets_INFO's primary key, ticket_number, relates it to passenger, Order_Info, airline, airport, and airplane. So that insight may be gained about these factors in relationship to ticket information.
Order_INFO	Another key function of the database is to understand the total cost customer spend on each order. It's important to gain information about customer's average consumption, whether or not the customer is price sensitive or time sensitive. We are willing to know the priority of different customers.	The Order_Info entity is related to the ticket_Info, customer, and employee. One order must have one or more tickets. But one ticket can only belong in one order. One order must have one customer. But one customer can have zero or many orders. One order must have one employee. But one employee can have zero or many orders.
Customers	Customer information is the information of who do the action of purchase or the owner of membership. Customer does not have to be the passenger or the credit card holder to do the purchase. The customer is the membership in order to collect the orders and earn the promotion.	The Customer entity is related to Order_INFO due to one-to-many relationship. Each customer may have several orders, but one order must correspond to one customer. The Customer entity is related to Promotion due to one-to-many relationship. Each Customer is assigned to only one level of promotion, each level of promotion may have zero or many customers. The Customer entity is related to Credit_Card_INFO entity through an associative entity due to the many-to-many relationships. Customer may have zero or more credit cards, however each credit card can be in one or more customer information.

		The Customer entity is related to Search_History entity due to one-to-many relationship. Each customer may have zero or more search history through the search engine.
Passenger	Customers who buy flight tickets may not be the passengers. This passenger entity could help our team figure out who exactly the passengers are and save more information about the passengers to do some reports.	The Passenger entity is directly related to Tickets_INFO entity due to one-to-many relationship. Each passenger may have many different tickets, but one ticket must correspond to one passenger.
Employee	Each employee will confirm all the orders from customers that the tickets are valid and are able to purchase, and will solve all the possible problems that the customers have.	The Employee entity is directly related to Manager entity and Order_INFO entity due to the one-to-many relationships. Each employee has only one manager, and may correspond to zero or more orders. Each employee can have zero or many orders.
Manager	Managers are getting the reports from their related employees, and give support to employees when problems which employees can not solve by themselves.	The Manager entity is directly related to Employee entity due to the one-to-many relationship. Each manager may have one or more employees
Airport	The database team is interested in the detailed information of the airport of each ticket generated.	The Airport entity is directly related to Ticket_INFO entity and Flight entity due to the one- to-many relationship. Each airport may correspond to zero or more tickets.Each ticket should have only one airport information. Each airport may correspond to zero or many flights. Each fight should have only one arriving airport and departure airport at a time.
Airline	The database team is interested in the detailed information of the airline company of each ticket generated.	The Airline entity is directly related to Ticket_INFO and Flight entity due to the one-to-many relationship. Each airline company may correspond to zero or more tickets. Each ticket should have only one airline company information. Each airline may correspond to zero or many flights. Each fight should have only one airline.
Flight	The database team is interested in the detailed flight information of each ticket generated.	The Flight entity is directly related to Ticket_INFO, Airport, and Airline entity due to the one-to-many relationship. Each flight may correspond to zero or more tickets. Each ticket should have only one flight information.

Credit_Card_INFO	The team needs to hold the credit card information of each customer who buys tickets for business processing.	The Credit_Card_INFO entity is directly related to Customer entity through an associate entity, Customer_Cards due to the many-to-many relationships. Each credit card may be used by one or more customers. Each customers may have zero or many credit cards.
Promotion	The team needs to provide promotions for some specific customers, or some customers who buy specific flights. This could be used to keep our customers' loyalty and even gain more new customers in order to increase profits.	The Promotion entity is directly related to Customer and Flight entity due to the one-to-many relationships. Each type of promotion may be given to zero or many customers. Each type of promotion may be given to zero or many flights..
Search_History	The team needs to find the specific flights which customers are interested in, and send them relevant promotions or ads to increase benefits for airline companies, customers, and our company.	The Search_History entity is only used for future advertisement for sales and marketing staff, which only related to Cust_ID. The main purpose is to collect all interests from each customer.