4.2 Algorithms

**Ticket-Related Algorithms**

Every customer interacting with the application has to buy a ticket in order to have a trip. In our system, the ticket information is kept under Ticket table and this entity has an important role while maintaining the system. Since buying a ticket will affect Customer’s attributes directly, mile\_sum and memberships, it is very crucial to hold Ticket’s price.

Prices of the tickets will be set according to their flight locations by default. However as the time passes, their prices will change regarding the days left until the flight.

Flights’ prices, which was set by default in the beginning, will stay in their first amounts until there are two weeks until the flight. At this time, the price will be increased by 25%. After a week, the price will be once again increased by 25%. For instance if a flight between Ankara and Istanbul is set to be 100TL at the beginning, its price will be 125TL when there are two weeks until the flight time. A week later, when there is a week left until the flight time, its price will be 156.25TL and the price will change no more.

Ticket’s other attributes will affect the price as well. Ticket class, extra\_luggage and meal will be considered when setting a default price for a ticket.

**Promotion-Related Algorithms**

The system will have promotions to encourage customers to tickets more frequent or to offer them ticket prices in a reasonable amount. Since the promotions are distinguished with a primary key of promotion\_id, no other customer than the owner of the promotion will be able to use it.

Promotions are divided into two other entities which are defined by disjoint specialization. First one, Campaign, rewards the customer with a free ticket depending on the mile\_sum the customer has. For customers who have a total of 10,000 miles, a free one-way ticket will be given to be used only inside Europe. For a total of 25,000 miles, the customer will be given a one-way overseas flight.

Other type of Promotion, Sale, provides the customer with a percentage of discount under a specific time period. The discount of 15% will be given on customer’s birthday within a time period of one week. Moreover for each customer, for every 5,000 miles they gain, they will be given a discount of 20% in a time period of two weeks.

Beside these base promotions, Managers can set a promotion to a customer with customer’s user\_name so that the customer who has lots of cancelled reservations can be given less amount of promotions.

**Reservation-Related Algorithms**

Customers can reserve their tickets with a unique reservation\_no. They are able to choose the class of their ticket as well. However, if they cancel their flights, then there is no returning back. They will no longer be able to have their reservation turned into a ticket.

In order to prevent customers making more reservations then they need, they will be given 2 days to buy their tickets or else, the price of their tickets will be increased by 10%. In this way, they will be deterred from occupying tickets.

**Algorithms Preventing Logical Errors**

In order to prevent logical errors, there are variety of points that are important:

* Dates and departure times of flights cannot conflict any other flights around that time.
* Planes cannot have more passengers than their capacities.
* Pilots are not able to be on duty more than their max\_flight\_distances.
* Business class tickets cannot be anywhere else front rows.
* Customers with insufficient mile\_sum cannot be given promotions.
* sale\_period in Sale table must be in the length of specified time. The period cannot be zero or over the time.

7. Implementation Plan

To manage the data flow in our project, we would like to use MySQL Server and we will be maintaining it with Java. For our application functionalities and user interface in our management system’s website, we will be using PHP, Bootstrap, HTML, CSS and Javascript.