

Exercise Set: Iteration Abstraction

In this exercise set, we have marked questions we think are harder than others with a [#]. To check solutions for questions, ask one of the instructors or TAs or post a question to the google group!

For each of the two following systems, do the following:

- a) Identify and record classes for a design after applying the identifying classes part of the responsibility-driven design method.
- b) Identify and assign responsibilities according to the responsibility-driven design method.
- c) Find and record collaborations needed between the classes to support the stated responsibilities.

1. Social Network Application (Requirements)

The Social Network Application Foomix allows people to connect with each other online and share information such as their status, pictures or movies. Foomix allows a user to register and fill in her profile information. In particular, it lets the user specify her name, her birth date and place, her current address and a profile picture.

Once registered, a user can create photo albums that each has a name and a list of pictures that the user has uploaded to Foomix. The user can also update his current status and he can upload movies to his profile.

Each user has a list of friends and can add other users as friends. For this, a user can list all or search for registered users. Each friend in the friends list of a user can be connected to the user as a general friend, a friend from school/university or a friend from work.

Foomix also provides a marketplace, where companies or people can offer games for users to play. The marketplace lists all applications a user of Foomix can play. Once a user plays one of the offered games, the game remembers the user and its highest score in a ranking.

2. Flight/Customer Management System (Requirements)

An air carrier wants a flight reservation system that manages their flights and planes and allows customers to manage their flight reservations and account information as well as their award mile status with the air carrier.

An air carrier offers flights from airports all over the world. A flight is defined by the departure airport, the arrival airport, the date and the flight number.

The air carrier has a number of planes and pilots; it assigns a plane and a pilot to each flight it operates. Each plane contains a set of numbered seats.

For each customer of the air carrier, there is an account that stores information on the customer's billing and home address, the bank details and the customer's flight reservations. For each flight reservation, the air carrier keeps track of the particular flight, the seat the customer is assigned to on the plane and other customer preferences such as the meal plan and special requirements for boarding.

The air carrier also has an award mile program. Therefore, each flight has a number of award miles assigned to it. For each customer, the air carrier system has information on the customer's award mile status. Therefore, the air carrier system keeps track of all past flight reservations the customer has made in a flight booking history and also if the customer actually went onto the plane. The award mile status of a customer is then defined by the number of award miles the customer collected from all flights in his booking history that he actually boarded. There might be flights that the customer has in his flight reservation history that he did not actually board, in which case the award miles for the flights are not counted towards the customer's award mile status.

Additional Requirements: [±]

Furthermore, an air carrier is organized in a global network with other air carriers to provide better services to their customers. A customer that purchases a flight from one air carrier of the global network can transfer all of his award miles for that flight to his award mile account with another air carrier of the same global network. Once transferred, the flight will be stored in the history of the customer's flight reservations. However, for each flight in a customer's booking history, the air carrier has to keep track of whether or not the award miles should be counted towards the customer's award mile account for the air carrier or another one in the global network.