The University of Saskatchewan

Saskatoon, Canada

Department of Computer Science

CMPT 270– Developing Object-Oriented Systems

Assignment 1

Date Due: September 20, 2024, 6:00pm

Total Marks: 32

General Instructions

- Assignments must be submitted using Canvas.
- Programs must be written in Java.
- VERY IMPORTANT: Canvas is very fragile when it comes to submitting multiple files. We insist that you package all of the files for all questions for the entire assignment into a ZIP archive file. This can be done with a feature built into the Windows explorer (Windows), or with the zip terminal command (LINUX and Mac). We cannot accept any other archive formats. This means no tar, no gzip, no 7zip, no RAR. Non-zip archives will not be graded. We will not grade assignments if these submission instructions are not followed.

Question 1 (32 points):

The objective of this question is to become familiar with objects, and modelling with object types (classes). You will not write any code for this questions, rather you will analyze several hypothetical applications to determine which object types and containers are needed, which attributes/fields are needed for each object, and the methods are needed to interact with each object's data.

Your Tasks

For each of the following hypotheticals software systems, you are to provide:

- The object types/classes involved, with the main fields/attributes for each class.
- The containers needed, with the type of the items stored in the container, and how the items are accessed from the container, e.g., in order first to last, by index, by field value, etc. You do not need to include how the items are stored (array, linked list, stack, etc).
- Any important methods, including accessors and mutators when needed. Make sure method names are descriptive
- For each field/attribute and method, indicate the visibility (i.e., public, private, or protected)

For this question, since you are not writing any code, submitted files describing the classes must be in **plain text .txt** files. **If other file types are used, you will receive a grade of zero for this question.** You should submit one file for each of the three scenarios (see submission criteria below).

An acceptable format could look like this:

```
Application: Hotel Management system

Class Hotel
- - - - - - - - - - -

   Attributes:
   - name: String
   - address: String
   - phone number: String
   - Container of Guests
      accessed by roomNumber
- - - - - - - - - - -
   Methods:
   + getGuest() : Guest
   + addGuest(g : Guest) : void
   + removeGuest(roomNum : int) : void
end of class Hotel

...etc...
```

System 1: Hospital Application

Consider a Hospital with a fixed number of rooms for patients. The application needs to keep track of patients, their emergency contact person, and rooms. Patients need to be admitted when brought to the clinic for care and discharged afterwards. Each room can be empty, or there can be a patient assigned to it. New patients can only be admitted if there is an available room, and can only be

assigned to an empty room. Each patient can have zero or more doctors (when first admitted, there may not be a doctor assigned to them); we need to be able to assign doctors to admitted patients, be able to find out which doctors have been assigned to each patient, and lookup the emergency contact for a specific patient. Each doctor can have zero or more patients assigned, we need a way to assign doctors to patients, and find out which patients are assigned to each doctor. Doctors will start their shift, care for some number of admitted patients while on duty, and end their shift after some number of hours.

Evaluation

3 marks : Identification of classes
3 marks : Identification of key attributes
3 marks : Identification of key methods
1 mark : Identification of containers

The full grading rubric can be found on Canvas.

System 2: A Project Management System for a Video Game Studio

Consider a project management system for a video game studio. A project management system helps manage the material and tasks associated with projects. In a video game studio there are team leaders, team members, and third-party contractors. A studio may be working on multiple different games at the same time, with each game having team leaders, team members, and contractors. Team leaders may be assigned to multiple games at a time. Team members are normally assigned to work on a single game. Contractors are specialists that contribute a special set of skills to a game, and as such they may be assigned to work on multiple different games at the same time. Each game has files that can be uploaded by the users. These files can be visible to everyone, or only visible to leaders and team members. Every game has a series of tasks associated with it. Every task has team members and contractors associated with it, as well as a completion percentage used to track its progress.

Evaluation

3 marks : Identification of classes
3 marks : Identification of key attributes
3 marks : Identification of key methods
1 mark : Identification of containers

The full grading rubric can be found on Canvas.

System 3: Student's Choice

Choose a computer system, video game, or application that you use or interact with frequently. Provide a brief requirements description of the primary functionality of the system, and perform a requirements decomposition similar to the previous 2 systems. Your system should include at least 3 classes, but no more than 5. If the system feels too complicated, choose a single feature within the system and decompose that. The goal of this exercise is to practice thinking in an object-oriented way, not necessarily to understand how the system actually works.

This is to be completed individually. Since there is a wide variety of software systems available to choose from, it is unlikely multiple students will choose the same system and decompose it in the same way. Keep this in mind when completing the assignment.

subsubsection*Evaluation

3 marks : Requirements description of chosen system
3 marks : Identification of classes
3 marks : Identification of attributes
3 marks : Identification of methods

The full grading rubric can be found on Canvas.

Files Provided

There are no files provided for this assignment.

What to Hand In

You must submit the following files:

hospital.txt
projectManagement.txt
studentsChoice.txt

Grading Rubric

The grading rubric can be found on Canvas.