School of Information and Physical Sciences
SENG2130/6350-Systems Analysis and Design

Assignment 1 Part B: System Design
Due: 5:00pm Friday 28th May (Week 12)
Implementation and Evaluation Worksheet
Triple S Emergency Management System

Introduction

Following the success of the initial system, Triple S have decided to integrate the city's school safety training program into the existing system. This consists of scheduling and management for all training courses run by Triple S in any given school in the city.

Specifically, managers will use the system to keep track of all schools in the city where the programs are delivered. There are a number of different courses that are available for delivery, with more courses to be made available in future. The system should allow managers to track these courses, and add new ones as necessary.

When a school requests Triple S deliver a course, the manager will access the system, create a new offering of the course, and assign an operator to deliver the course at the school. This needs to be at a time the operator is not working at Triple S, or on shift for NSW Police. Once the course has been scheduled, and an operator has been assigned, the school will be notified by email of the time and date the course has been scheduled for.

A separate software development organisation, The Code Monkeys, was contracted to develop the new functionality required. Your job is to review their work, evaluate the design, and suggest improvements. Unfortunately, the package did not come with any documentation, so you will need to reverse engineer the design model to evaluate the new subsystem.

The following worksheet refers to the code package – SchoolTraining_CodeMonkeys_Java.zip available on Canvas. This package is written in Java, and omits several imported libraries (such as GUI frameworks and references to other parts of the system). As a result, the package will NOT compile (this is intentional, any missing libraries should not be considered software bugs). A version of the package written in Python is available on request (let your academic know if you would like to use this).

Tasks

1. With reference to the code package provided, reverse-engineer the source code to produce a full class diagram of the subsystem. This should include data types, methods, return types, visibility, attributes, and relationships with multiplicity. (10 marks)
2. Consider the class diagram produced in task 1. Answer the following questions: (10 marks)
    a. Does each use case map to some set of subsystems? Identify the mapping, including any missing use cases.
    b. Does each use case have a specific control object that holds the required application logic? Identify the mapping, including any use cases that do not have control objects.
    c. What system architecture, if any, has been used in the design of this subsystem? What design goals should have been considered in the selection of a suitable system architecture?

   d. Have cohesion and coupling been considered in the design of this subsystem? Explain how, and describe how the design could be improved.
   e. How readable is the design model? Have subsystems been given names that are logical and consistent? Have entities with similar names been used to describe similar concepts? Do any subsystems or classes have conflicting names?
   f. Does the subsystem handle all of the boundary conditions? If not, which ones are missing from the design?
   g. Does the design conflict with any non-functional requirements? If so, identify which ones, and explain how the design could be modified to address this.
   h. Have any object design patterns been used in the implementation of this subsystem? If so, identify which patterns were used, and explain what purpose they achieve.

3. In addition to email notifications, some schools have requested that notifications be sent via fax. To save money on development, Triple S would like this to be implemented with a pre-compiled component that provides access to a class ‘FaxService’ containing a method ‘sendFax(String faxNumber, String message)’. Modify the code to implement the Adaptor pattern, such that the system can use this library while minimising the coupling between classes. (10 marks)
4. The code package contains numerous faults. Rather than trying to identify every single one, you are instead requested to propose a testing strategy for the package, as well as any future versions of the package. Your strategy should include different levels of tests, such as Unit tests, Integration tests, System tests, and User Acceptance tests. For each level, include a test plan with test cases, sample inputs, and expected outputs. Provide examples of defects in the code to illustrate how your proposed testing strategy could identify a variety of faults. (10 marks)

The main deliverable of this worksheet is the completed worksheet, and the updated code package, which should be provided as *one compressed (zip) file.*

Total marks – Out of 40 (Scaled to /10 marks for section 7 of assignment 2).