CS 441 Software Engineering

Assignment 3

Due on Sunday, October 13, 11:59PM.

Individual Portion

1. A company consists of departments that are located in one or more offices. One office serves as the headquarter of the company. Each department has a manager who is recruited from the set of employees. Your task is to model the system for the company. Draw a class diagram that consists of all the classes in your system, their attributes and operations, relationships between the classes, multiplicity specifications, and other model elements that you find appropriate. (15 Points)

2. Which architecture pattern or style do you think should be used to design each of the following systems? Draw your architectural diagram and justify your answer. (25 Points)

    a. An ticket vending machine used at a railway station.
    b. A 2D lunar lander video game. If you are not familiar with this game, search Lunar Lander Game online.
    c. A robot floor-cleaner that automatically cleans the floor of a room. The cleaner must be able to detect walls and other obstructions.

Group Portion

Create an architectural document for the class project application that your group is working on. The document should include both the high-level architecture and low-level component (module) design of the application. (60 Points)

The deliverable should adhere to the following structure. There is also an example document named "*Examples of architecture descriptions.doc*" for your reference in Cougar Course.

Cover page, which includes the title, authors, and date.

Table of contents.

Introduction, which provides a brief overview of the system from the point of view of the system architect.

Architecture. Create a high-level architectural diagram for your system. (a) Explain the main architectural style used by the system and why this style was chosen, and (b) discuss the rationale for the architecture.

Component design, which precisely describes each component in your design. As needed, each component should be further broken down into sub-components (modules). Each module, at whatever level, must be described in this section. Four aspects of each module must be described:
- **The purpose of the module**: State the generic purpose of the module. Specify which part of the requirements document it addresses, if this is appropriate. (Appropriate items to address here

include such topics as: What secret does this module hide? Does the module represent an abstract data type?)

- **The provided interface**: Define the provided interface by listing all its methods with descriptive names. The definition includes the names of the methods, their parameters, and their return types. Provide a short commentary describing each of the methods (i.e. what it does).
- **The required interface**: Define the required interface by listing all its modules/methods. Note that every one of the modules/methods listed should be described elsewhere in this document, either as part of the design which you are creating or else as an externally provided service.
- **Constraints on the module**: E.g., performance constraints, platform requirements, and so on. Only include this part if necessary.

Every student must submit a pdf document for the individual portion.

Only one student from each group needs to submit a separate pdf document for the group portion.