Assignment 2 – Design Model and Implementation

Due Date: (See Slate\ Assignments)
Date: Fall, 2018
Type: **Group Assignment**
Weight: **10%**

Summary

Using Visual Paradigm, continue the software modeling of Coffee Maker simulator system and iteratively implement a prototype of the system. Create a software design model using class diagram. Model the behaviour of the system using sequence and communication diagrams. Ensure you develop the code and the model details iteratively moving from the model to code and back to the model as you progress. The implementation is only a simple prototype using any technology, language or application type.

Submission checklist

- ✓ Software UML Model created using Visual Paradigm containing the following models and diagrams
    a. Design Model
        i. Main class diagram showing the main classes of the system
        ii. Detailed class diagrams corresponding to the diagrams in the domain model.
        iii. Detailed sequence diagrams that model the behaviour of the application.

- ✓ Assignment report using Word and PDF that will contain screenshots of your implemented system, a reflection on the design process and description of two design patterns . Ensure your work is presented professionally

- ✓ Code submitted as a ZIP-ed file. You can use any type of application, IDE and framework you would like. The code submitted will be compared with the diagrams in the model for consistency.

- ✓ **Details.** Please note that the parts of the assignment are not meant to be completed sequentially but in parallel including the reflection. Note what you are being asked to reflect on and complete the reflection outline as you complete the assignment. Write down in bullet point format your reflection points. At the end of the assignment transform the reflection outline in a report format.

Part I (50%): Design Modeling. Continue the software model you have created in Assignment 1 with the complete structural and behavioural modeling of the Coffee Maker System. You are required to design either a web application, mobile app or universal app that will simulate the operation of a coffee maker using Object-Oriented Design that follows OO Design Principles and Design Patterns. (Console applications do not meet the requirements; Simple procedural implementation does not meet the requirements of the assignment)

1. Model the structure of the system using UML class diagram. Create a high-level structure diagram showing the classes, interfaces and their relationships. Create detailed structural class diagrams that focus on different areas of the system. In the detailed structural class diagrams, show field variables and methods with full signatures.
2. Model the behaviour of the system using interaction diagrams. Ensure different types of diagrams are used appropriately: sequence diagrams and communication diagrams. Use sequence diagrams to *discover* necessary methods.
3. Design the system in such a way that it can easily support different coffee makers of different complexity

Part II (30%) Coffee Maker Simulator Implementation. Implement a simple Coffee Maker Simulator application that reflects the model completed in Part I. Decide on some simple features that you are going to implement.

1. Reflect on the modeling details that are missing as you attempt to start the implementation.
2. Refine the model as needed every time a concept required in the implementation requires more design details.
3. Go back and forth between the model and its implementation as you progress.
4. At a minimum, the Coffee Maker Simulator system shall implement the following features:
    a. Have an Interactive graphical user interface (native device, universal or web)
    b. Imagine a gamified training manual that teaches the users how to make coffee using your coffee machine system.
    c. The system shall allow the user to make a coffee by supplying all the necessary ingredients and executing the operations in the sequence required.
    d. The system shall implement all error handling required to notify the user of steps done in incorrect order, incorrect or insufficient ingredients (i.e. coffee, water, milk, sugar etc)
    e. Iterate through the implementation to increase the complexity of the coffee maker supported.

Part III (20%) Design Pattern. Describe Any TWO design patterns and report if they can be used in your DESIGN that have been used in your Answer.

BONUS: Part IV (10%) Reflection. Using an assignment report reflect on the design and development process and describe the resulting application using screenshots. Alternatively, you can produce a short demo video uploaded online. If you choose to produce a video the report shall contain a screenshot of start and the link to video. The following details shall be covered in the reflection

1. What modeling details, needed for implementation, were missing in the initial model developed in Assignment 1?
2. Describe refinements of the model that were done while the application was being implemented. Describe what was missing and needed to be added and how it was used in the implementation.
3. Present screenshots of the application that was implemented that show the functionality of the application. If you choose to provide a video, specify that and provide a link to the video.

BONUS: **Part V (20%)** Design and implement a **data-driven system** that allow you to save and load a different coffee maker models with different features and different coffee recipes that the system shall train the user in making them. Imagine a training system used in a coffee shop like Starbucks that has complex machines and complex recipes with many variations.

Notes:

1. The **professionalism of your submission**, clarity of written communication is extremely important. The ability to communicate your knowledge is as important as the knowledge itself. Up to 40% of the mark for any written work can be deducted due to poor presentation / communication: document organization (10%), layout (10%) spelling (10%), title page (10%)

2. **All assignment shall be submitted by the deadline.** Late submissions will be penalized with 10% per day for up to 3 calendar days after which the assignment cannot be submitted anymore. **An email must be sent** should you choose to submit a late assignment. If no such emails are received the solution will be posted. **Assignments are not accepted after the solutions have been posted.**

3. Remember that completing the assignment by yourself will ensure your success on the midterm and final exam. See the Academic Honesty at Sheridan.

4. Submission is done in electronic format **using SLATE DropBox. DO NOT email your submission.**