CS264 - Software Design

Assignment 05

Assignment Release Date:	05-12-2022
Submission Due Date:	16-12-2022
Feedback Due Date (estimated):	14-01-2023 (for assignments that make Due Date)
Support Laboratories	Labs 10-11 (Two Weeks)
Total Mark:	10%

This Assignment is worth 10% of the Software Design CA Component.

This is an open-book, graded assignment. You may use online resources for reference purposes only to help with the assignment. Please cite all references as comments in your submissions. You cannot directly reuse C# **solution code** from online sources. **You must not engage with another student, in person or electronically (phone, social media, etc.) to secure assistance with this assignment. If you do so you will receive an automatic fail (0%).** We will perform similarity checks on submitted assignments to check for collaborative efforts. A reasonable attempt at this assignment will gain you 10% of your continual assignment marks.

Assignment 05 - Software Design and Design Pattern Implementation with C#

You are required to re-design and re-develop the console application that you developed in Assignment 02, 03 and 04. The existing user interface should be retained, i.e. providing simple keyboard functionality to (i) generate different random shapes that are added to the canvas, (ii) display the current canvas to the console, (iii) save the canvas to a file, (iv) and implement Undo-Redo functionality in your interactive session (when re-developing Assignment 03 and 04).

Note that you do not need to implement a graphical user interface for this assignment, i.e. you are not building a graphics app. This assignment is about designing and developing the classes and methods associated with a typical drawing app data model and implementing a Software Design Pattern.

Assignment 05 - Requirements

You are required to implement the following core functionality for this assignment:

1. You must re-design your application code so that it now uses one of the (Creational) Factory Software Design Patterns (*Factory Method* or *Abstract Factory*) to create the shapes used in the application. You should clearly state, using comments in the code, which software design pattern is being used.
2. You must re-design your application code so that it now uses a software design pattern, of your choosing, to create style objects that are used by the shapes created by your application. When

the shapes on the canvas are drawn, ie. outputted as SVGs, then output methods must utilise the style object. You should clearly state, using comments in the code, which software design pattern is being used.

3. You must include a relevant class diagram (PDF format) for your parts 1 and 2 above. This should be derived from the codebase using, for example, the automated PUML extensions for VS Code. We will use these diagrams to compare the class structure to the software design pattern chosen to implement your chosen Factory solutions.
4. Finally, you must include a detailed description (500-1000 words) explaining why you have chosen your specific software design patterns, how you implemented the patterns and their impact on your re-designed application, and how they are appropriate for use in this particular application.

Assignment 05 - Extra CA Credit

There is no extra credit option available for this assignment.

IMPORTANT SUBMISSION DETAILS

Please indicate the Operating System (Linux/Windows/MacOS/Online) and IDE (e.g. VS Code) version used for testing (as a comment in your submitted code).

All work must be submitted via Moodle (see "Assignments" section for submission). Work submitted via other means will not be accepted unless you have prior arrangements with the Head Demonstrator (Mark McCormack). All work MUST be submitted by the due-date deadline. Late submissions will not be accepted.

*The assignment submission is a zip file named "**assignment-05-xxxxxxxxx.zip**" (where "xxxxxxxxx" is your student id) containing solution files, e.g. named "**shapefactories.cs**", "**Program.cs**", etc. together with any other resources used in the assignment solution. Please ensure that all external files use relative directory referencing, rather than hard-coding the files' location.*