

Assignment #4

1

DDR, Spring 2024 – Architecture, design and implementation using design patterns

Design Problem –

Document a detailed problem description / scenario for software implementation using java language. You need to utilize 4 design patterns or this problem that you need to create yourself from the list of following: Factory, Adapter, Façade, Decorator, Iterator, Observer, Proxy, Command, Composite, State, Chain of Responsibility and Template Method patterns. You need to (1) implement solution for this scenario using at least 4 different design patterns in java language (2) create a UML class diagram and interaction diagrams to explain your solution (3) document your solution and give a detailed textual descriptions to explain the usage of patterns and reasons that you have used these patterns (4) show outputs of java implementation (5) compare advantages and disadvantages of each pattern that you have used. (6) A detailed critical analysis on how this solution can be implemented using other patterns (apart the four that you have used) and its consequences and further improvements that can be achieved in architecture. Please also use diagrams to explain your point here.

Note:

1. Assignment must be submitted on Google forms (MS word Assignment report).
2. Last date of submission is **22-04-2024 11:00 AM (sharp)**
3. Assignments will not be accepted after due date.
4. Only 1 submission is allowed, if you once submit it then you are allowed to update your submission.
5. You need to submit in your section only. If you submit in wrong section or both sections or if you violate any assignment instructions then expect negative marking.
6. Email submission not allowed. Emails queries asking hints for solution will result in negative marking.
7. If you upload empty or corrupted archive, you will get zero marks. Hence double check before uploading.
8. Plagiarism, if detected, will result in zero marks.
9. Do not use the sample shown in the reading assignment / text books /internet or any public domain.
10. Upload a Zip archive (name is as Ass04_name_roll_number_section.ZIP) having following contents:
11. **Following folders must be present in the Zip archive:**
 - a. Java **SourceCode** folder: containing all java source code files and project file using **eclipse**.
 - b. **UML** folder: containing UML class diagrams in PNG or any image format in subfolders and also papyrus project file. You can use Eclipse Papyrus or any other tool to draw the UML class diagram. Remember that you also need to submit the UML project files in any case (even if you have used online tools to validate that you have created the UML diagrams yourself.)
 - c. **Report** folder: containing MS word report of your assignment. Report should have your name, roll number, and answers of all the questions, code for all design improvements, screenshots of the working / execution and also the UML diagrams.
12. Contents of the MS Word report:
 - a. Cover Page of Assignment must contain: Student name, Roll no, Date of submission.
 - b. Attach screenshot of the question paper after cover page.
 - c. Solutions to all the questions, figures, source code, output screenshots and textual descriptions.