**Overview**

This is an individual piece of work. To accomplish this CW, you are requested to produce a report that contains analysis and implementation of different design patterns based on scenarios. The last digit of your student ID determines which organization domain you are assigned for. For example, if your ID is 2345, the last digit of your ID is 5 thus you are required to address the task #5 from the list below. Students with IDs ending with 0 should attempt task #10.

1. E-banking application
2. Hospital Management System
3. E-government application
4. Online Mobile Phones shop
5. Online Education
6. Hotel Management System
7. University Intranet System
8. Online Flower Shop
9. Online Flight Booking application
10. Online Library System for University

For this task, you will play the role of a software architect consultant for the organization you are responsible for.

**Task**

**Introduction- background information (15 marks)**

Clearly and briefly state your business domain. Describe the business rules, involved users,

procedures and services of the organization.

*For example: If you were to choose an e-banking domain, you would have given short*

*information about it. Also, provide information about its services and different account types.*

*Maybe, mentioned that the bank makes a distinction between different client types:*

*corporate, personal, citizen, non-citizen, etc. All these business rules will serve you as a basis*

*for choosing a specific design pattern in later tasks.*

**Main section (75 marks)**

Next, you are required to choose or make up (imagine) 3 possible use cases (related to the

chosen application functionality) that would require the use of a design pattern. Then, provide

all of the following for each specific scenario *(25 marks for each scenario):*

1. Clearly describe the scenario. Clearly describe the business rules that serve as the basis

for using a specific design pattern. Provide all related requirements, workflows, actors, etc.

that would clearly show that the chosen design pattern is the best solution for this

specific case. Make sure it would justify the use of the design pattern. *(4 Marks)*

2. Write code using standard/“naïve” approach to the problem. Explain and discuss what is wrong with this approach and what possible problems it may cause. Also, explain what may cause problems (change in requirement, refactor code, new feature addition, etc.). Discuss all drawbacks of the approach. *(4 Marks)*

2. Apply a design pattern(s) that solves the problem. Discuss the advantages of using the

chosen design pattern. Define the possible disadvantages if the design pattern is not

applied in the very case. Compare it to the “naive” solution and explain how this solution is better. Make sure you consider your solution’s reusability, scalability and maintainability aspects. *(4 Marks)*

3. Provide the UML Class Diagram of your solution. Make sure you are using the real class

names and attributes in your diagrams and not a screenshot of some general diagram

from the Internet. If your UML Class Diagram does not match your code, you will not get

any marks for this task. *(5 Marks)*

4. Provide code in one of the indicated programming languages (Javascript, C#) of your

choice for your solution. The code can be typed in any editor desired and submitted together with the report *(8 Marks)*

Different types of patterns (structural, behavioral, creational) must be used in each of the 3

use cases.

**Conclusion (10 marks)**

Discuss the general advantages and disadvantages of using design patterns, their role in

software development and architecture. Also, you should state the lessons learned, personal experience of using

design patterns.

**General guidelines**

● The electronic copy of the coursework (with the solution source code) must be

submitted via the intranet coursework submission system before the specified deadline.

The only electronic version will be evaluated.

● Word limit: 2000 words.

● The coursework deadline is not negotiable.

● Cheating and plagiarism carry severe penalties.

● It is your responsibility to check the file’s integrity and make sure online-submitted files

can be read/opened.

● Your work must be properly referenced using the Harvard referencing style. All sources -

including material from the web – must be acknowledged.

This is your responsibility to put coursework through the Turn-it-in anti-plagiarism software

before submission.

**Feedback**

Feedback will be provided in 3 weeks after the coursework submission deadline.

**Marking Guidelines**

This coursework is a 50% portion of the final module mark. Reports will be evaluated according

to the quality of the answer (i.e. justifying reusability, scalability, and maintainability of the

design solution using design patterns and OOP principles). The use of each design pattern will be

assessed in terms of how it fits the context, what problems it solves and what benefits it brings.

You must demonstrate their knowledge and understanding of given context, ability to

identify design problems and solve them using appropriate design patterns.

**Assessment criteria**

|  |  |
| --- | --- |
| **Component** | **Mark %** |
| **Introduction** to the chosen domain, its major  entities, their attributes, and responsibilities.   * state the domain * main users * functions of the system. | 15 |
| ***Scenario 1/ Scenario 2/ Scenario 3:*** | ***25 each scenario*** |
| Detailed statement/description of the  problem/scenario that clearly justifies the use of design patterns. | 4 |
| Application of Design Pattern:  Evaluation of reusability, scalability, and  maintainability of the proposed design.  Possible wrong ways of solving the  problem and their consequences. | 8 |
| Corresponding UML Diagram. | 5 |
| Implementation for the solution  (source code). | 8 |
| **Conclusion** describing the student’s experience in studying design patterns and the advantages of using them in various scenarios. Future prospects on applying them in other different cases. | 10 |