Object Orientation with Design Patterns – Assess02 (20% of Overall Award)

Last updated: 05 April 2013

Programming Problem

COLLEGE OF COMPUTER TRAINING, DUBLIN

ASSIGNMENT TITLE SHEET

Course:	BSc in Computer Science
Stage/Year:	3
Module:	Object Orientation with Design Patterns (BS3036)
Semester:	6
Assignment Number:	Assessment 02
Date of Title Issue:	05th Apr 2013 (Fri)
Assignment Deadline:	07th May 2013 (Tue)
Assignment Submission:	**see below**
Assignment Weighting:	**20% (of overall)**

Assignment Title: Case Study (Research) on two Design Patterns of your Choice

Learning Outcomes

ILO1: Assess application design requirements and improve existing application designs by applying a custom implementation of object orientated design patterns.

ILO3: Design applications that implement design patterns in the code, allowing the student to design structured applications using predefined solutions to recurring application design problems.

ILO4: Create modular, easy to maintain code by using design patterns during the design process of applications, allowing the student to create reusable modular code.

ILO5: Implement behavioural and structural design patterns, allowing the behavior of applications to be specifically defined, and the control in the application to be predictable and fault tolerant.

ILO6: Make efficient use of problem solving skills to assess the relevance of specific predefined design solutions to transfer conceptual ideas into well defined and designed solutions.

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What do I have to do?

The chapter titled "*Applying GoF Design Patterns*" – of Craig Larman's (2005)[1] book: "Applying UML and Patterns" provides a case-study in which six of the original Gang of Four (GoF)[2] design-patterns are applied to a case-study problem (i.e. developing a point-of-sale or "POS" software system):

- Adapter pattern
- Factory pattern
- Singleton pattern
- Strategy pattern (*only allowed if combined with another pattern which then counts as 1 pattern for this assignment*)
- Composite pattern
- Observer pattern

1. After studying the chapter - choose **any two** of the pattern implementations which are partially presented in the book, and fully implement them in code, to present a working solution to part of the point-of-sale (POS) case-study problem.

2. For each of the two patterns you choose – design and implement a complementary non-design-pattern solution which both:
   - highlights the benefits the design-pattern solution provides over the non-design pattern solution, and…
   - highlights the deficiencies of the non-design-pattern solution

3. For each of the two chosen patterns – provide a brief commentary (2 – 4 pages) which discusses the benefits and deficiencies, of the pattern as compared to the non-pattern implementation making reference to your code-solutions where necessary.

[1] Please see the "References" section at the end of this document for information on how to access the selected reading

[2] The "Gang of Four" is a term used to refer to Gamma, Helm, Johnson and Vlissides: the authors of the seminal design-patterns book: "Design Patterns: Elements of Reusable Object Oriented Software" (Gamma et. al, 1995)

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Assessment Criteria

Is the delivered-code exceptionally easy to understand, and exceptionally clean (i.e. neatly laid-out to a professional deliverable standard). In the case of the design-pattern solutions - can the code be considered "modular" and "easy to maintain". (ILO4)

(10 marks)

Has the code been delivered **exactly as requested** : i.e. code, packages, javadoc etc., (ILO4)

(10 marks)

For any TWO chosen design-patterns from the selected reading…

Has a complementary non-design-pattern solution been designed and implemented, for the case-study in the selected reading (ILO1, ILO3, ILO6)

[10 marks * 2 or…] (20 marks)

Has a design-pattern been correctly implemented for the case-study in the selected reading (ILO5)

[10 marks * 2 or…] (20 marks)

Has commentary been included, to

* highlight the benefits the design-pattern solution provides over the non-design pattern solution (ILO1)
* highlight the deficiencies of the non-design-pattern solution (ILO1)

[20 marks * 2 or…] (40 marks)

Total Marks (100 marks)

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Submission Instructions

1. Submit all code in the following folder structure, by using java packages (see below)

```
1234567
        ├──pattern1<PatternName>
        │   ├──classes
        │   └──src
        │   └──src_non_pattern
        │
        ├──pattern2<PatternName>
        │   ├──classes
        │   └──src
        │   └──src_non_pattern
```

   …but, put your own student ID number in place of `1234567` above.

2. Submit a readme.txt file which explains how to compile and run all code – `javac -d … -cp…` and – `java -cp.`

Java Pagkages: each source-code example should be in a java package called strategy1 (…strategy2/3):

```
//example 1 code in package named "strategy1"
package  pattern1Facade;
class Sale{
     //… code…
}
```

And then compiled using …

```
javac -d …
```

The source-code for your submission (`.java`) files should be stored in the respective `…\src` directory and the byte-code (`.class`) files should be stored in the respective `…\classes` folders.

Resources/Research:

For the Patterns

Larman, C., 2005. *Applying UML And Patterns: An Introduction To Object-Oriented Analysis And Design And Iterative Development* Third Edition., Prentice Hall PTR.
Available at: http://proquest.safaribooksonline (while inside the College LAN)

For Reference

Gamma, E. et al., 1995. *Design Patterns: Elements of Reusable Object-Oriented Software* 1st ed., Addison-Wesley Professional.