

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:	05 th Apr 2013 (Fri)
Assignment Deadline:	07 th 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.

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)

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

Last updated: 05 April 2013

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)

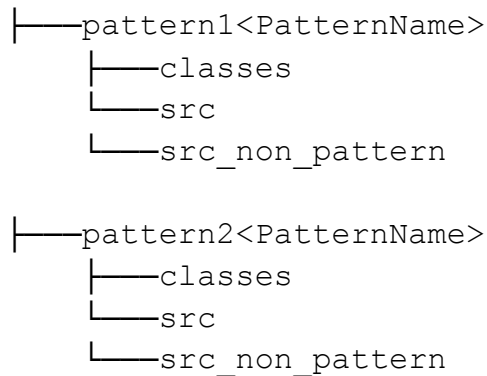
[20 marks * 2 or...] (40 marks)

Total Marks (100 marks)

Submission Instructions

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

1234567



...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 Packages: 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.