MSc Software Engineering

Cohort: MSE/11A/PT

Examinations for 2010 – 2011 / Semester 1

MODULE: DESIGN PATTERNS

MODULE CODE: SDT5101

Duration: 2 Hours

Reading time: 15 Minutes

Instructions to Candidates:

1. Answer **all** questions.
2. Questions may be answered in any order but your answers must show the question number clearly.
3. Always start a new question on a fresh page.
4. All questions **do not** carry equal marks.
5. Total marks **100**.

This question paper contains 3 questions and 3 pages.

QUESTION 1: (40 MARKS)

Consider a University system which has several sub systems:

- Student Registration
- Module Registration
- Time Tabling
- Library System
- Human Resource Management
- Payroll
- Accounting

(a) The library (dll) in the Payroll sub-system must make use of the library (dll) utilised by the Accounting system. However, the interface of the library used by both systems differs and they cannot be amended. You have been assigned the task of developing a small tool to allow the interaction of both libraries.

Identify and elaborate on an appropriate design pattern that is suited for this need. Give justification for your choice. ***(10 marks)***

(b) Identify 2 other design patterns that can be used in the University system.

Your answer should explain the use of the pattern in the context of the University system, its justification and structure or sample code for the implementation. ***(20 marks)***

(c) (i) What is the intent of the singleton pattern? ***(2 marks)***

(ii) Identify and illustrate how the singleton pattern can be applied in the University system. ***(8 marks)***

QUESTION 2: (40 MARKS)

Developers spend much more time extending and changing code than they did originally while developing it.

(a) As a team leader, illustrate how you will introduce to your team the concept of design patterns as well as the benefits. ***(10 marks)***

(b) With reference to 2 patterns, illustrate how design patterns help to cope with change easily. ***(10 marks)***

(c) (i) What are anti-patterns? ***(3 marks)***

(ii) Explain 4 root causes of anti-patterns. ***(8 marks)***

(iii) Give 3 examples of anti-patterns in software development and provide their solutions.

(9 marks)

QUESTION 3: (20 MARKS)

(a) Compare the adapter pattern with the façade and decorator patterns.

(***6 marks)***

(b) Illustrate a two-way adapter pattern. ***(4 marks)***

(c) Describe 3 components of a pattern. ***(3 marks)***

(d) Illustrate the difference between the factory and abstract factory pattern.

(7 marks)

******END OF QUESTION PAPER******