



University College Dublin
An Coláiste Ollscoile, Baile Átha Cliath

SEMESTER 1 EXAMINATION – 2008/2009

COMP 30160

Object-Oriented Design

Dr. P. McCullagh

Dr. J. Carthy

Dr. Mel Ó Cinnéide*

Time Allowed: 2 hours

Instructions for candidates

Answer Question 1 and any *two* other questions.

Question 1 carries 30 marks. Other questions carry 20 marks.

1 (compulsory).

Answer each of the following short questions. In each case, only a brief answer is required.

- (i) Distinguish between *Iterative* Development and *Incremental* Development.
- (ii) Explain the title of Eric S. Raymond's seminal paper, *The Cathedral and the Bazaar*.
- (iii) Explain the term *Analysis Paralysis* in the context of the Waterfall process.
- (iv) What happens in the Elaboration phase of the Unified Process?
- (v) Explain why a stand-alone function is a poorer candidate for reuse than a class.
- (vi) Explain the slogan *You Ain't Gonna Need It* in the context of Agile Processes.
- (vii) Explain the slogan *Embrace Change* in the context of Agile Processes.
- (viii) Are you *Test Infected*? Explain your answer briefly.
- (ix) How are testing and refactoring related in the context of Extreme Programming?
- (x) What Extreme Programming practice is key to improving a project's *truck number* (risk due to loss of key personnel)? Describe this practice briefly.
- (xi) Explain the *includes* and *extends* relationships in Use Case modelling.
- (xii) Why is decomposing a Use Case model extensively using *includes* and *extends* relationships frowned upon?
- (xiii) What is *Responsibility-Driven Design*?
- (xiv) Explain briefly the *Layered Architecture* pattern.
- (xv) Distinguish between *boundary*, *control* and *entity* objects in the context of the Unified Process.

(30 marks, 2 marks per part)

2.

Write an essay entitled *Software Methodology* under the following headings (you may add more if you wish):

Software Failure,
The Waterfall Process,
Problems with Waterfalling,
Iterative and Incremental Development,
The Unified Process,
Agile Processes,
Conclusion.

(20 marks)

3.

- (a) For each of the following design patterns, describe its *intent* and *applicability*, and provide a brief description of an example where the pattern could be used. There is no need to go into the detail of the pattern structure or possible implementations, and the examples you use should **not** be one covered in the module.

Observer,
Abstract Factory,
Singleton,
Visitor.

(12 marks)

- (b) Describe the structure of any two of the Gamma *et al* design patterns with which you are familiar. Describe also the consequences and implementation issues related to the pattern that you find interesting.

(8 marks)

4.

- (a) Describe briefly each of the principal UML models, viz:

Use Case model
Class model
Interaction model

Explain the purpose of each of these models when analysing using UML, and explain how these models relate to each other. What aspects of a system *cannot* be described using these models?

(12 marks)

- (b) Describe and discuss each of the following principles:

- (i) Open-Closed Principle
- (ii) Law of Demeter
- (iii) Liskov Substitution Principle

(8 marks)