University College Dublin
An Coláiste Ollscoile, Baile Átha Cliath

SEMESTER 2 EXAMINATION – 2015/2016

COMP 30160

Object-Oriented Design

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Time Allowed: 2 hours

Instructions for candidates

Question 1 carries 20 marks. Questions 2-6 carry 10 marks each.

Answer either Question 1 plus any three other questions OR Questions 2 to 6.

Maximum marks available is 50.

Question 1
Compare and contrast the software development practices of the companies who delivered seminars during the module. Include in your answer an account of how these practices relate to the Unified Process and Agile Processes.

(20 marks)

Question 2
(a) In the context of the UML Class Model, use examples to explain the following terms: association, aggregation, composition, multiplicity.

(7 marks)

(b) What is an *association class*? Explain under what circumstances an association class should be replaced with a regular class.

(3 marks)

Question 3
(a) Describe Test-Driven Development (TDD) from a software developer's perspective.

(7 marks)

(b) In the following decision statement, what set of assignments for `a`, `b` and `c` will provide modified condition/decision test coverage?

```
if (a || (b && c)) ...
```

(3 marks)

Question 4
Write a note on any three of the SOLID principles of object-oriented design. In each case describe the benefits of the principle and the consequences of not observing the principle.

(10 marks)

Question 5
In relation to any design pattern with which you are familiar, answer the following:
(i) What is the intent of the pattern?
(ii) Using the appropriate UML diagrams, describe the typical structure and interactions of the pattern.
(iii) Describe three issues related to the applicability or implementation of this pattern.

(10 marks)

Question 6
For each of these refactorings, explain what the refactoring does, what its preconditions are and in what context you would apply it: (i) Extract Method, (ii) Convert Local Variable to Field, (iii) Extract Class.

(10 marks)