



Beijing-Dublin International College



SEMESTER I FINAL EXAMINATION - 2016/2017

School of Computer Science

COMP30013J Object Oriented Design

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Time Allowed: 120 minutes

Instructions for Candidates

Question 1 carries 40 marks and all other questions carry 20. Answer Question 1 and any other 3 questions.

BJUT Student ID: _____ **UCD Student ID:** _____

I have read and clearly understand the Examination Rules of both Beijing University of Technology and University College Dublin. I am aware of the Punishment for Violating the Rules of Beijing University of Technology and/or University College Dublin. I hereby promise to abide by the relevant rules and regulations by not giving or receiving any help during the exam. If caught violating the rules, I accept the punishment thereof.

Honesty Pledge: _____ **(Signature)**

Instructions for Invigilators

Non-programmable calculators are permitted.
No rough-work paper is to be provided for candidates.

Question 1: Short Questions**(5% each question)**

- a) Explain what is meant by object identity. Describe how can this identity be realised in persistent storage.
- b) Classes A and B both implement the interface Inf. A new method must be that makes sense for A but not for B. Explain briefly the possible solutions and the advantages and disadvantages of each solution.
- c) What is cohesion? Why is it important that a class be cohesive?
- d) Explain what is meant by object identity. Describe how object identity is implemented in most object-oriented programming languages. Describe how can this identity be realised in persistent storage. Explain the difference between the two implementations.
- e) Explain the 'no concrete superclass' principle.
- f) Explain the includes and extends relationships in use case modelling.
- g) Distinguish between Iterative development and Incremental development
- h) In modelling with UML, what is the key goal in building interaction diagrams? What models may change as a result of this process?

Question 2: Methodology**(20%)**

Write an essay titled Software Methodology. The essay must discuss the following headings (You can add more if you wish):

- The waterfall process
- Problems with the waterfall model
- Iterative and incremental development
- The unified process
- Extreme programming
- Conclusion

Question 3: Patterns**(20%)**

Explain the Observer pattern. Your explanation should include a UML class diagram showing the structure and a sequence diagram showing the interactions that happen after the subject has been updated.

Question 4: Code Metrics**(20%)**

Explain each of the following metrics:

- Weighted Methods Per Class (WMC)
- Response For a Class (RFC)

For each of the metrics, you should explain the metric in your own words as well as highlighting the consequences for the developers if the calculated metric is a high value.

Question 5: Implementation**(20%)**

- a) Dependencies impose constraints on the order in which components can be created and tested. Describe the two basic approaches to this. What are the advantages and disadvantages of each approach. (10%)
- b) Describe an alternative approach to choosing the order in which components are created and constructed (10%)