W228/203C, W282/203C

DUBLIN INSTITUTE OF TECHNOLOGY

DT228 BSc. (Honours) Degree in Computer Science

Year 2

DT282 BSc. (Honours) Degree in Computer Science (International)

Year 2

WINTER EXAMINATIONS 2015/2016

SOFTWARE ENGINEERING 1 [CMPU2019]

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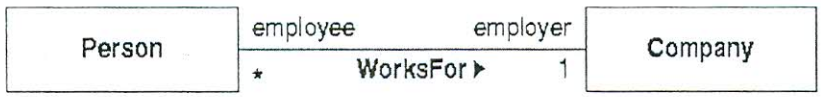
THURSDAY 14TH JANUARY 9.30 A.M. – 11.30 A.M.

TWO HOURS

INSTRUCTIONS TO CANDIDATES
ANSWER **FOUR** QUESTIONS OUT OF **FIVE**.
ALL QUESTIONS CARRY EQUAL MARKS.

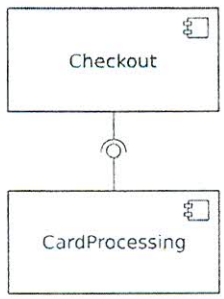
1. (a) Show how the following class diagram could be reified by introducing a linking class so that a person can work more than 1 job at a company or work for different companies.

Then provide an object diagram to show an snapshot of this design.



(8 marks)

(b) Explain what an interface is and provide two ways of showing one in UML. Then comment on the meaning of the following UML diagram.



(9 marks)

(c) Provide a simple state chart for a copy of a book in a library system, then refine it so that reservations can be taken into account. Make sure to include any appropriate guard conditions.

(8 marks)

2. (a) What is a use-case?
List three significant advantages and a potential disadvantage in using use-cases.

(10 marks)

(b) Explain what is meant by use-case realisation.

(5 marks)

(c) Provide an use case description for the following 2 related use cases:

- borrow book
- borrow book and pay fine

and draw a corresponding use case diagram.
When is it appropriate to split a use-case using extends?

(10 marks)

3. **(a)** Outline the stages of the *waterfall* process model and then discuss the major problems associated with it.

Is the waterfall process model suitable for any type of software development?

(15 marks)

(b) Comment on four aspects in which *Iterative and Incremental* processes can help overcome some of the issues connected with the waterfall process.

(10 marks)

4. **(a)** Briefly explain what is meant by the terms *modularity, cohesion* and *coupling* within the context of software design and programming and then discuss their relevance. How do they relate to object-oriented concepts like: classes/object, data hiding and encapsulation?

(16 marks)

(b) Describe three types of coupling.

(9 marks)

5. **(a)** Draw an object diagram which illustrates what is meant be a part-whole hierarchy.

With the aid of a class diagram and comments, describe an appropriate design for interacting with part-whole hierarchies in a uniform way.

(10 marks)

(b) Provide some skeleton code in Java or any OOP for 3 significant classes in your design from part (a).

(10 marks)

(c) How can a one-to-many class association be implemented in Java?

(5 marks)