



DUBLIN INSTITUTE OF TECHNOLOGY

DT228 BSc. (Honours) Degree in Computer Science

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

Year 2

WINTER EXAMINATIONS 2016/2017

SOFTWARE ENGINEERING 1 [CMPU2019]

INTERNAL EXAMINER
MR RICHARD LAWLOR

MONDAY 16TH JANUARY

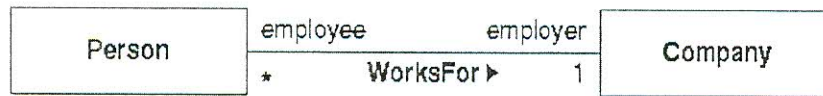
9.30 A.M. – 11.30 A.M.

TWO HOURS

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

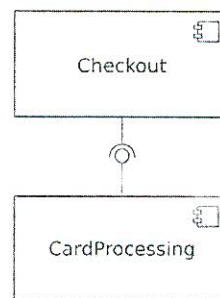
1. (a) Show how the following class diagram could be reified by introducing a linking class so that a person can work more than 1 job at a company or work for different companies.

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



(7 marks)

- (b) Provide a USE specification for the class diagram in part (a) including any operations and attributes you deem appropriate. In your USE code, include SOIL implementation of the operations.
- (c) Explain what an interface is and provide two ways of showing one in UML. Then comment on the meaning of the following UML diagram.



(8 marks)

2. (a) Provide a use case description for the following 2 related library 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)

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

(5 marks)

- (c) Create a USE model which can be used to do a use-case realisation for the “borrow book” use-case from part (a) and describe briefly how “borrow book” might be simulated. Also draw a sequence diagram as part of your answer.

(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.

(10 marks)

- (b) How are coupling and cohesion affected by inheritance in object-oriented design and/or programming?

(8 marks)

- (c) Describe three types of coupling.

(7 marks)

5. (a) Explain what design patterns are and comment on how they may help software design.

(8 marks)

- (b) Draw an object diagram which illustrates what is meant by 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)

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

(7 marks)