DUBLIN INSTITUTE OF TECHNOLOGY

BSc. (Honours) Degree in Computer Science

Year 3

WINTER EXAMINATIONS 2017/2018

SOFTWARE ENGINEERING III [CMPU3038]

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WEDNESDAY 17TH JANUARY
9:30am - 11:30am

2 HOURS

ANSWER **THREE** QUESTIONS OUT OF **FOUR**.

ALL QUESTIONS CARRY 33 MARKS EACH.

ONE COMPLIMENTARY MARK SHALL BE AWARDED.

Note: *If asked in any question to provide an example of code, you may use any appropriate language of your choice or pseudo code in your answer.*

Q.1 The *Data Access Object (DAO)* is a well-known and popular design pattern. Answer each of the following questions in relation to the DAO:

(i) Describe its intent.

[6 Marks]

(ii) Draw a UML structural diagram that would illustrate the organisation and associations of classes collaborating in the DAO pattern.

[9 Marks]

(iii) In terms of *abstraction*, discuss the benefits it provides.

[9 Marks]

(iv) Provide a code example illustrating its implementation.

[9 Marks]

Q.2

"Objects should only talk to their immediate friends and never talk to strangers".

The quote above is often given as a high level summary of the *Principle of Least Knowledge*. Answer the following questions in relation to it.

(i) Briefly discuss the meaning of the quote in terms of object communication.

[4 Marks]

(ii) Consider the context where an object O receives a message M. List four guidelines from Demeter that outlines how O should respond to the message M.

[8 Marks]

(iii) Choose one of the guidelines you have listed in your answer to part **(ii)** of this question and provide a code example that illustrates its behaviour.

[8 Marks]

(iv) When developing a behavioural model, it is possible to create a sequence diagram which fully and correctly realises a specific use case but is inconsistent with its corresponding class diagram. Explain how this might happen using an example to illustrate your answer.

[13 Marks]

Q.3 **(a)** Explain the term *Design Pattern* within the context of software engineering.

[6 Marks]

(b) *Creational, Structural and Behavioural* patterns are three design pattern categories. For each category, answer the following questions:

(i) Describe the context for which each category of patterns applies.

[3x3 Marks]

(ii) Discuss an example pattern in each category - in your answer give the intent and an example context where the pattern could be used.

[3x6 Marks]

Q.4 **(a)** Object oriented analysis and design models iteratively evolve from representations of system requirements. Technical reviews of these models are considered as important as final testing. Briefly discuss ***three*** aspects of these models that are of particular interest when undertaking reviews.

[12 Marks]

(b) Outline what is meant by *Test Driven Development* and provide ***three*** benefits of this development approach.

[12 Marks]

(c) Explain what a *Mocking Framework* is and how it could be utilised in a *Test Driven Development* approach.

[9 Marks]