

16.01.20

09.30 - 11.30am

CMPU 3038 Software Engineering 3

Basement 3, Kevin Street

Programme Code: DT228

Module Code: CMPU 3038

CRN: 22401

TECHNOLOGICAL UNIVERSITY DUBLIN
KEVIN STREET CAMPUS

BSc. (Honours) Degree in Computer Science

Year 3

SEMESTER 1 EXAMINATIONS 2019/20

Software Engineering 3

Mr. Ciaran Cawley

Dr. Deirdre Lillis

Mr. Patrick Clarke

Two Hours

Instructions to candidates

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 (a) When modelling the problem domain as part of an analysis and design process, designers will prefer *unidirectional associations* over *bidirectional associations* unless there is an evident need for bidirectional navigation between objects. Explain, in terms of the implementation of the model, why designers might have this preference. In your answer, provide an example class diagram and code that illustrates your explanation.

[15 Marks]

(b) (i) The *Law of Demeter* is also known as the *Principle of Least Knowledge*. Give a brief summary of this principle.

[3 Marks]

(ii) Give a brief description of *three* of the four guides within the *Law of Demeter* and provide both a class diagram and a sequence diagram that illustrates the structure and behaviour of each one.

[15 Marks]

Q.2 (a) (i) Briefly describe what is meant by a *structural* software design pattern.

[4 marks]

(ii) There are a number of similar *structural design patterns* that are often grouped together under the name *wrapper* patterns. Identify *three* of these patterns giving their *intent* and provide a UML diagram that describes their structure. In your answer, ensure you identify why they are considered as *wrapper* patterns.

[3 x 6 Marks]

(b) The *intent* of the *Model View Controller* design pattern is to "*separate the application logic from the user interface logic*". In the context of a web application where the presentation is generated on the server side and passed to the client, explain, with the aid of a clearly labelled diagram, how this design pattern could be realised.

[11 Marks]

- Q.3 (a)** The *intent* of the *Context Object* design pattern is to avoid using protocol specific system information outside of its relevant context. Describe an example of your choice that illustrates the use of this pattern and discuss the benefits that you believe are gained when it is used. [10 Marks]
- (b) (i)** In the context of the development of web services, briefly explain what is meant by the acronym *REST*. [5 Marks]
- (ii)** Explain what is meant by a resource in the context of *REST* and identify four *HTTP methods* that are used in relation to resources. [11 Marks]
- (iii)** Explain how *media types* are used for both *REST* client requests and *REST* server responses. [7 Marks]
- Q.4 (a) (i)** Outline what is meant by *White Box* testing and *Black Box* testing. In your answer, ensure you clearly identify how they differ. [5 Marks]
- (ii)** In the context of developing Object Oriented systems, briefly describe what is meant by *scenario based* test design. [5 Marks]
- (b) (i)** Describe what is meant by *Unit Testing*. In your answer ensure you provide the goal and benefits of this testing approach. [6 Marks]
- (ii)** Explain what is meant by *Test Driven Development* and show how it differs from a "traditional" approach to *Unit Testing*. [9 marks]
- (iii)** Discuss the role of *Mock Objects* when implementing unit tests. [8 marks]