Programme Code: TU082 Module Code: CMPU 1017 CRN: 22035

TECHNOLOGICAL UNIVERSITY DUBLIN CITY CAMPUS - GRANGEGORMAN

TU082 – BSc. (Honours) in Information Systems and Information Technology

Year 2

SAMPLE EXAM PAPER

CMPU1017 - Programming and Algorithms 2

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Exam Duration: 2 Hours

Instructions: Answer 3 out of 4 Questions. All questions carry equal marks. One additional mark for free.

(a)	Explain what is meant by <i>Variable Scope</i> , highlighting the difference between <i>Global Variables</i> and <i>Local Variables</i> .	(6 marks)
(b)	List the seven (7) principles of <i>Universal Design</i> , and suggest two (2) new principles that might replace Principles 6 and 7. Create 3-5 guidelines for the two (2) new principles (for either developers or users).	(12 marks)
(c)	Explain what is meant by Black Box, Grey Box and White Box Testing.	(15 marks)

- 2. (a) When a stack is implemented as an array it needs two (2) variables, which are (6 marks) *MaxSize* and *StackTop*, and an array called *Stack*, explain the purpose of these three features.
 - (b) Describe using either PseudoCode or Python how you would implement (12 marks) the following modules for a *stack implemented as an array*:
 - CreateStack()
 - IsEmpty()
 - IsFull
 - Push(N)
 - Pop()
 - Top()
 - (c) Develop a *Menu-Driven* Python program to implement the modules from Question 2(b) ensuring that all modules that have *parameters* are supplied with those values, and all *return values* from the modules are captured, and an appropriate message is passed to the user.

1.

- 3. (a) When a queue is implemented as an array it needs three (3) variables, which are (6 marks) *MaxSize, QHead* and *QTail*, explain the purpose of these variables.
 - (b) Describe using either PseudoCode or Python how you would implement (12 marks) the following modules for a *queue implemented as an array*:
 - CreateQ()
 - IsEmpty()
 - IsFull
 - AddToQ(N)
 - DeleteFromQ()
 - ClearQ()
 - (c) Explain how you would change the answer to Question 3(b) if you were (15 marks) implementing a *circular queue* instead of a *linear one*.

4.

(a)	i.	Explain what is meant by <i>Recursion</i> in programming.	(5 marks)
	ii.	Provide an English language description of a program to demonstrate the use of recursion to implement the <i>Factorial</i> function	(6 marks)
	iii.	Develop a program in Python to implement the <i>Factorial</i> function using recursion.	(10 marks)
(b)	i.	Write a program in Python to open a text file and add the phrase " <i>This is the start of the file</i> " to the start of the file.	(6 marks)

ii. Write a program in Python to open a text file and add the phrase "*This* (6 marks) *is the end of the file*" to the end of the file.