

Programme Code(s): TU082
Module Code: PROG 1017
CRN(s): 22035

TECHNOLOGICAL UNIVERSITY DUBLIN
CITY CAMPUS

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

Year 2

SAMPLE PAPER

Programming and Algorithms 2

Internal Examiner(s)
Damian Gordon
Dr. Mariana Rocha
Dr. Paul Doyle

Duration
2 hours

Instructions to candidates
Answer **THREE** questions out of **FOUR**
All questions carry equal marks.

- 1.
- (a) Explain what is meant by *Variable Scope*, highlighting the difference between *Global Variables* and *Local Variables*. (6 marks)
- (b) (i) List the seven (7) principles of *Universal Design* (7 marks)
- (ii) Suggest two (2) new principles that might replace Principles 6 and 7, and create 3-5 guidelines for the two (2) new principles (for either developers or users). (5 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 *MaxSize* and *StackTop*, explain the purpose of these variables. (6 marks)
- (b) Describe using either PseudoCode or Python how you would implement the following modules for a *stack implemented as an array*: (12 marks)
- `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. (15 marks)
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3. (a) When a queue is implemented as an array it needs three (3) variables, which are *MaxSize*, *QHead* and *QTail*, explain the purpose of these variables. (6 marks)
- (b) Describe using either PseudoCode or Python how you would implement the following modules for a queue implemented as an array: (12 marks)
- CreateQ()
 - IsEmpty()
 - IsFull
 - AddToQ(N)
 - DeleteFromQ()
 - ClearQ()
- (c) Develop a *Menu-Driven* Python program to implement the modules from Question 3(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. (15 marks)
4. (a) i. Explain what is meant by *Recursion* in programming. (5 marks)
- ii. Provide an English language description of a program to demonstrate the use of recursion to implement the *Factorial* function (6 marks)
- iii. Develop a program in Python to implement the *Factorial* function using recursion. (10 marks)
- (b) i. Write a program in Python to open a text file and add the phrase “*This is the start of the file*” to the start of the file. (6 marks)
- ii. Write a program in Python to open a text file and add the phrase “*This is the end of the file*” to the end of the file. (6 marks)
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