

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

Stage 2

SAMPLE PAPER

PROG1017 Programming and Algorithms 2

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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) Explain the purpose of a *Circular Queue* and in what circumstances you would use it. (6 marks)
 - (b)
 - i. Write a Python program to print out all of the prime numbers between 1 and 1000. (6 marks)
 - ii. Write a Python program to print out the first 1000 prime numbers. (6 marks)
 - (c) List five (5) types of *Testing Tools*, and describe their function in at least one sentence. (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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