Programme Code: TU856, TU858

Module Code: CMPU 1022

TECHNOLOGICAL UNIVERSITY DUBLIN

Grangegorman

TU856 - BSc. (Honours) in Computer Science
TU858 - BSc. (Honours) in Computer Science (International)

Year 1

SEMESTER 2 EXAMINATIONS 2022/23

CMPU 1022 Operating Systems 1

Internal Examiner(s):

Paul Kelly

Dr Paul Doyle

External Examiner(s):

N/A

Instructions To Candidates: Answer ALL Questions

All questions carry equal marks

Exam Duration: 2 hours

1. **(a)** In Linux, explain the following terms as they relate to file management:

(i) root

(ii) path

(iii) suffix

(2 marks for each answer)

(b) Explain what the following Linux/Bash commands do:

(i) cat

(ii) clear

(iii) pwd

(iv) ls

(v) echo

(2 marks for each answer)

(c) Write a Bash/Linux script to automatically backup files and sub-directories from a specified directory /usr/paul/files to a newly created directory called /usr/paul/backup. Finally, list all the files and subdirectories in the new directory backup.

(7 marks)

What would you type into the command prompt to execute it?

(2 marks)

2. **(a)** Explain the following data structures, including in each explanation a diagram:

(i) A Queue

(ii) A Stack

(iii) A Heap

(2 marks for each answer)

(b) Explain the purpose of the *Job Scheduler*. What optimisations does it perform while scheduling?

(9 marks)

(c) What are the fields of the *Process Control Block (PCB)*? Provide an explanation for each field.

(10 marks)

3. **(a)** Explain the concept of *Deadlock* in your own words. Provide an example of how deadlock can occur.

(6 marks)

(b) What does the *File Manager* do? Please list at least 5 points.

(10 marks)

(c) Discuss (including a diagram for each of) the following physical file storage allocation schemas:

(i) Contiguous Storage

(ii) Non-contiguous Storage

(iii) Indexed Storage

(3 marks for each answer)

4. **(a)** Explain 5 different common password hacking attacks.

(10 marks)

(b) Explain what is meant by the term *Distributed Denial-Of-Service* attack. Provide an example.

(5 marks)

(c) Explain 4 different common methods to protect an operating system.

(10 marks)