

**FINAL
ALTERNATIVE ASSESSMENT**

(COVER PAGE)

Session : August 2020

Programme : Diploma in Computer Science (DCS)

Course : DCS1106: Operating Systems

Date of Examination : 16 December 2020 (Wednesday)

Time : 8.00am – 10.30am Reading Time : Nil

Duration : 2 Hours 30 Minutes

Special Instructions :

There are total of **FOUR (4)** questions. Answer all the questions. Each question carries 25 marks.

Material permitted : Non-Programmable Scientific Calculator

Materials provided : Nil

Examiner(s) : Usha Jayahkudy, Ryan Tee Ah Ann

Chief Moderator : Siti Hajar Khairuddin

This paper consists of 4 printed pages, including the cover page

DIPLOMA IN COMPUTER SCIENCE PROGRAMME (DCS)
DCS1106: OPERATING SYSTEMS
FINAL ALTERNATIVE ASSESSMENT: AUGUST 2020 SESSION

Instructions: There are total of **FOUR (4)** questions. Answer all the questions. Each question carries 25 marks.

Question 1

- a) Most operating systems are designed for general-purpose computation. For example, there is proposal for an OS that is optimized for running math based intensive programs. The operating system will be called as MathOS. The kernel includes system calls for many useful mathematical operations, such as matrix arithmetic, Euclidean distance, etc. These system calls are written in highly optimized assembly language in order to have maximum performance. Is this concept for MathOS a good idea, explain why or why not. (6 marks)
- b) Describe **ONE (1)** difference between a trap and interrupt. Given a scenario, explain the possibility of a trap being generated intentionally by user program. (4 marks)
- c) Classify the process below whether it should run under kernel mode or user mode
- i.) Sending the final printout to the scanner (1 mark)
 - ii.) Reading the system time (1 mark)
 - iii.) Remove a process from memory (1 mark)
 - iv.) Context switching (1 mark)
 - v.) System boot up (1 mark)
- d) The CPU utilization metric is based on average CPU usage over the time period selected for the view. Differentiate between batch operating system and time-sharing operating system based on the context of CPU utilization. (10 marks)

Question 2

Table 1 shows the list of processes and burst time for each processes

Table 1

Process	Burst Time
P1	13
P2	5
P3	23
P4	3
P5	31
P6	6
P7	14

The processes are assumed to have arrived in the order of P1, P2, P3, P4, P5, P6 and P7 all at time 0.

- a) Calculate the average waiting time when each of the below scheduling algorithm is used. Assume that a quantum 8 is being used:
 - i.) First Come, First Serve (6 marks)
 - ii.) Round Robin (6 marks)
 - iii.) Shortest Job First, non preemptive (6 marks)
- b) From operating system designer point of view, describe which algorithms is suitable to be implemented. (4 marks)
- c) State **THREE(3)** scenarios that could take place once the process is under running state. (3 marks)

Question 3

- a) Describe **FOUR** reason on combining segmentation and paging under one scheme. (8 marks)
- b) Explain **ONE(1)** advantage and **TWO** disadvantages of first-fit memory allocation algorithm. (6 marks)
- c) In certain systems, a subdirectory can be read and written by an authorized user, just an ordinary files can be.
 - i.) Explain the protection problems that could arise. (2 marks)
 - ii.) Suggest **ONE** scheme for dealing with each of these protection issues. (2 marks)

- d) Choose one Linux directory file system and explain the content of the directory. Describe **TWO** common ways on accessing to the directory. (7 marks)

Question 4

- a) A scenario arises when multiple interrupts from different devices appear at about the same time, where a priority scheme could be used to determine the order in which the interrupts would be serviced. Discuss **THREE (3)** issues need to taken into consideration in assigning priorities to handle different interrupts. (6 marks)
- b) Explain the **THREE(3)** sequences on how a process may utilize a resource in a normal mode of operation. (6 marks)
- c) By taking Windows 10 as an example, describe **FOUR** security measures/ schemes that are being implemented in Windows 10. (8 marks)
- d) Discuss **ONE (1)** strengths and **ONE (1)** weakness of implementing an access matrix using Access Control List that are associated with objects. (5 marks)

~THE END~

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