INTI International University & Colleges

FINAL
ALTERNATIVE ASSESSMENT

(COVER PAGE)

Session	:	**April 2021**
Programme	:	Diploma in Computer Science (DCS)
Course	:	**DCS1106: Operating Systems**
Date of Examination	:	27 July 2021 (Tuesday)
Time	:	4.00pm – 6.30pm 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: APRIL 2021 SESSION

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

Question 1

a) With help of a diagram, explain how a modern general-purpose computer which consists of a CPU and number of device controllers communicate between each other. You are also required to provide an example for the each of the component involved.

(12 marks)

b) Operating system should include applications such as Mail Programs and Web Browsers. In your point of view, discuss by providing **THREE (3)** supporting argument on whether it should be or should not.

(6 marks)

c) The operating system design for handheld device cater for convenience and resource utilization. Describe **TWO (2)** reasons by providing example of each.

(4 marks)

d) Explain the reason behind having kernel mode and user mode serve as protection to the operating system.

(3 marks)

Question 2

Given the following processes, burst times and arrival time in Table1:

Table 1: List of Process with Burst Time and Arrival Time

Process	**Burst Time**	**Arrival Time**
P1	4	3
P2	3	5
P3	2	0
P4	1	5
P5	3	4

The processes are assumed to have arrived based on the arrival time

a) Calculate the average waiting time when each of the below scheduling algorithm is used.

i.) First Come, First Serve

(7 marks)

ii.) Round Robin (quantum 2)

(7 marks)

iii.) Shortest Job First, (preemptive)

(7 marks)

b) State which scheduler is responsible in swapping the process between the memory and CPU and explain the necessity of having swapping under this context.

(2 marks)

c) State **TWO (2)** possibilities on how a process could get terminated

(2 marks)

Question 3

a) Describe how the **THREE (3)** different stages of address binding of instructions and date to memory address take place.

(6 marks)

b) Given memory partitions of 200 kB, 600kB, 300kB, 400kB, and 700 kB (in order), how would each of the first-fit, best-fit and worst-fit algorithms place processes of 312kB, 517kB, 212kB, and 526kB (in order).

(9 marks)

c) Explain **TWO (2)** ways on how compaction can reduce external fragmentation issue.

(5 marks)

d) In Linux, all drives are mapped under a single "root" directory represented by a /. In your opinion, describe **ONE (1)** advantages and **ONE (1)** disadvantages of having such file system.

(5 marks)

Question 4

a) Describe the **TWO (2)** processes involved when servicing an interrupt and explain the performance overhead that could occur.

(6 marks)

b) Explain **THREE (3)** security measures/ schemes that are being implemented under Ubuntu operating system.

(6 marks)

c) State which three goals of security is the following attack based on:

- Man-in-the-middle attacks

(1 mark)

- Denial of Service attacks

(1 mark)

- Password attacks

(1 mark)

d) Write a Linux command to modify the permission access for the Backup directory so that it has the following access as in Table 2. The command should also include creating three user called alex, muthu, and chong. Assign alex and muthu under a group called student. Assume the Backup directory and LabTest.txt file has been created. Figure 1 shows the existing permission of the Backup directory and Figure 2 shows the existing permission of the files.

```
usha@usha-VirtualBox:~/Documents$ ls -lS
total 4
drwxrwxr-x 2 usha usha 4096 Mei   7 10:57 Backup
```

Figure 1: Existing permission of the Backup directory

```
usha@usha-VirtualBox:~/Documents/Backup$ ls -lS
total 0
-rw-rw-r-- 1 usha usha 0 Mei   7 10:59 EvenOddNumber.cpp
-rw-rw-r-- 1 usha usha 0 Mei   7 10:59 LabTest.txt
```

Figure 2: Existing permission of the files

Table 2: Permission Access to the LabTest.txt file

Name	**Permission**	**Description**
chong	read, write, execute	Owner of the LabTest.txt file
Student	read	Read access to LabTest.txt file

(10 marks)

~THE END~