Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER I
SESSION 2013/2014

COURSE NAME	:	OPERATING SYSTEM
COURSE CODE	:	BEC 41303
PROGRAMME	:	BEJ
EXAMINATION DATE	:	JANUARY 2014
DURATION	:	3 HOURS
INSTRUCTION	:	ANSWER **ALL** QUESTIONS IN **SECTION A** AND **ONE (1)** QUESTION IN **SECTION B**

THIS QUESTION PAPER CONSISTS OF **FOUR (4)** PAGES

SECTION A

Q1 (a) For each of the following pairs of terms, identify the context(s) in which they occur.Then define each term and clarify the key difference(s) between the two terms.

(i) "host OS" and "guest OS"

(2 marks)

(ii) "page" and "frame"

(2 marks)

(iii) "reference bit" and "dirty bit"

(2 marks)

(iv) "file" and "directory"

(2 marks)

(v) "disk partition" and "file system volume"

(2 marks)

Q2 (a) (i) Give four (4) conditions must be fulfilled for a deadlock to occur.

(4 marks)

(ii) Describe three (3) disk arm scheduling algorithms indicating their advantages and disadvantages.

(6 marks)

(b) UNIX users make frequent use of *pipes*.

(i) What are *pipes* used for and why would the *shell* need to create it instead of the processes actually using the *pipe*. Justify your answer

(3 marks)

(ii) Why is it important that the *shell* close the *pipe* and what will happen otherwise. Justify your answer.

(6 marks)

Q3 The following questions are about operating system security.

(a) Flaws in the operating systems of computers are discovered almost daily. The majority of viruses take advantage of these flaws to infect your computer. Interpret the three (3) goals of operating system security.

(5 marks)

(b) Categorize and justify the three goals of operating system security answered in Q3 (a) with following an attack on:

(i) Network snooping
(ii) A distributed denial of service attack
(iii) Modifying your marks in the student records database

(6 marks)

(c) Produce two (2) examples of why it is important to consider the skill and resources available to likely intruders when designing computer security mechanisms and policies to defend against those intruders.

(4 marks)

SECTION B

Q4

(a) How can it be that file reads are more frequent than file writes but that disk writes are more frequent than disk reads? Defend the statement.

(5 marks)

(b) Point out how are modern file systems designed to exploit this fact in order to improve the disk write performance? Give at least one example of such a file system.

(5 marks)

(c) Two ways to reduce the number of system calls for accessing a file are to

- memory map the file using **mmap**, or
- use the C library call **setvbuf**

For which file access patterns is each most suitable and why? That is, which file access patterns are suitable for "**mmap**" and which are suitable for "**setvbuf**" .Defferenciate it.

(5 marks)

Q5 Answer the following questions about file systems in general.

(a) In Unix, Linux, and Windows file systems, there are multiple timestamps (usually 3) associated with each file. Differentiate what do each of these timestamps represent.

(3 marks)

(b) In class, we discussed three (3) different techniques for organizing the data blocks for each file in a file system, namely contiguous allocation, linked allocation, and indexed allocation. Briefly describe each approach, critic the strengths and weaknesses of each.

(6 marks)

(c) In a storage system with conventional magnetic-media disks, several different delays occur when servicing a request. Identify at least three of these delays, and comment on their relative contribution to the total delay for servicing a request.

(6 marks)

- END OF QUESTIONS -