UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2015/2016

COURSE NAME   :   OPERATING SYSTEM

COURSE CODE   :   BEC 41303

PROGRAMME CODE   :   BEJ

EXAMINATION DATE   :   JUNE/JULY 2016

DURATION   :   2 HOURS AND 30 MINUTES

INSTRUCTION   :   ANSWER **ALL** QUESTIONS IN **SECTION A** AND CHOOSE **ONE** (1) QUESTION IN **SECTION B**

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

SECTION A

Q1 (a) Identify the context(s) for each of the following pairs of terms, in which they occur. Then define each term and clarify the key difference(s) between the two (2) 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 the use of *pipes* and why would the *shell* need to create it instead of the processes actually using the *pipe*? Justify your answer.

(4 marks)

(ii) Why the *shell* closing the pipe is important? What will happen otherwise? Justify your answer.

(6 marks)

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Q3   The following questions are about operating system security.

(a)   Flaws in the computer operating systems 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.

(6 marks)

(b)   Categorize the three (3) goals of operating system security in **Q3 (a)** with an attack on the following and justified your answers.

(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.

(3 marks)

SECTION B

Q4   Consider the following set of processes as shown in **Table Q4(a)**, with the estimated CPU burst given in milliseconds, and lower priority numbers corresponding to higher CPU priority (1 is the highest): The processes are assumed, to have arrived in the order P1, P2, P3, P4, P5, all at time 0.

Table Q4(a)

Process	Burst Time	Priority
P1	10	3
P2	1	1
P3	2	3
P4	1	4
P5	5	2

(a)   Produce four (4) Gantt charts that illustrate the execution of these processes using the following scheduling algorithms: non-preemptive SJF, non-preemptive priority (a smaller priority number implies a higher priority), RR(quantum=1), and RR(quantum=2).

(4 marks)

Table Q4(b)

	N-P SJF		N-P Priority		Turnaround time RR(q=1)		Turnaround time RR(q=2)	
	Turnaround	Waiting	Turnaround	Waiting	Turnaround	Waiting	Turnaround	Waiting
P1								
P2								
P3								
P4								
P5								

Answer the following **Q4(b)** and **Q4(c)** using **Table Q4(b)**.

(b)   Calculate the Turnaround time and waiting of each process for each of the scheduling algorithms in **Q4 (a)**.

(8 marks)

(c)   Deduce the average waiting time for all algorithms for each of these scheduling algorithms and conclude your finding.

(3 marks)

Q5   Answer the following questions about file systems in general.

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

(3 marks)

(b)   There are 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 (3) of these delays, and comment on their relative contribution to the total delay for servicing a request.

(6 marks)

- END OF QUESTIONS -