Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2016/2017

COURSE NAME	:	OPERATING SYSTEMS
COURSE CODE	:	BEC41303
PROGRAMME	:	BEJ
EXAMINATION DATE	:	JUNE 2017
DURATION	:	2 HOURS AND 30 MINUTES
INSTRUCTION	:	ANSWER **ALL** QUESTIONS

THIS QUESTION PAPER CONSISTS OF **FIVE (5)** PAGES

Q1 (a) Differentiate between Operating System (OS) for personal computers and real time systems.

(4 marks)

(b) Explain the roles of OS in terms of memory management.

(4 marks)

(c) Describe the concept of context switch in OS process management.

(3 marks)

Q2 (a) Compare between kernel threads and user threads.

(4 marks)

(b) State three multithreading models for the user and kernel threads.

(4 marks)

(c) Relate race condition with critical section.

(4 marks)

(d) Analyse the similarities and differences between "producer-consumer problem" and "readers-writers problem".

(4 marks)

(e) Discuss issues related to the thread queue implementations for multiprocessor computers.

(4 marks)

Q3 Consider the following set of processes in **Table Q3(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 Q3(a)

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

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

(10 marks)

(b) Write the correct waiting time for each process based on the scheduling algorithm in **Table Q3(b)**.

Table Q3(b)

	NP SJF	NP PRIORITY	RR (Q=1)	RR (Q=2)
P1	(a)	(f)	(k)	(p)
P2	(b)	(g)	(l)	(q)
P3	(c)	(h)	(m)	(r)
P4	(d)	(i)	(n)	(s)
P5	(e)	(j)	(o)	(t)

(10 marks)

(c) Calculate the average waiting time of each process for each of the scheduling algorithms in Q3(b).

(4 marks)

(d) Conclude the results in Q3(c).

(4 marks)

Q4 (a) State three conditions that must be fulfilled for a deadlock to occur.

(3 marks)

(b) Determine whether the following resource allocation graphs in **Figure Q4(a)** – **Q4(d)** is a deadlock condition or not:

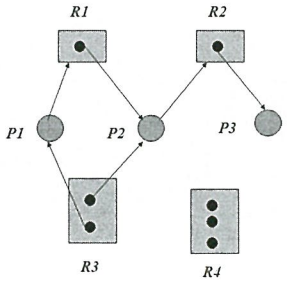

Figure Q4(a)

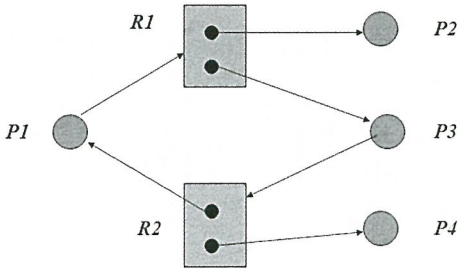

Figure Q4(b)

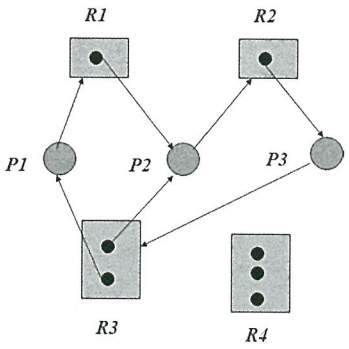

Figure Q4(c)

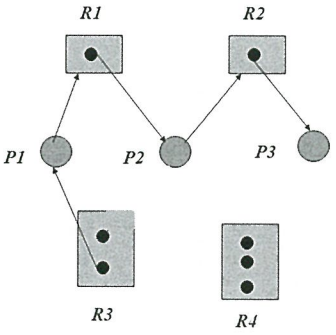

Figure Q4(d)

(8 marks)

(c) List four methods for deadlock management.

(4 marks)

Q5 (a) Discuss two general goals of computer security.

(4 marks)

(b) Categorize the following an attack based on computer security goals:

(i) Network snooping

(2 marks)

(ii) A distributed denial of service attack

(2 marks)

(iii) Modifying your marks in the student records database

(2 marks)

(c) Produce two 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)

Q6 (a) In Unix, Linux, and Windows file systems, there are multiple timestamps (usually 3) associated with each file. Explain the function of these timestamps.

(4 marks)

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

(4 marks)

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

(4 marks)

– END OF QUESTIONS –