UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINTATION
SEMESTER II
SESSION 2011/2012

COURSE NAME	:	OPERATING SYSTEMS
COURSE CODE	:	BIT 2043 / BIT 20403
PROGRAMME	:	BACHELOR OF INFORMATION TECHNOLOGY
EXAMINATION DATE	:	JUNE 2012
DURATION	:	2 HOURS 30 MINUTES
INSTRUCTION	:	ANSWER **ALL** QUESTIONS.

THIS QUESTION PAPER CONSISTS OF SEVEN (7) PAGES

PART A

Instruction: Answer **ALL** questions.

Q1 In which of the following scheduling algorithms, starvation is possible?

A. Round robin
B. First come first serve
C. Multi-level queue scheduling
D. All of the above

Q2 Which hardware device is used to map logical addresses into physical addresses?

A. Overlays
B. Memory management unit
C. Address translator
D. Page table

Q3 Assume that there are **4 (FOUR)** processes in the system (running or ready to run). If round robin scheduling algorithm with a time quantum of 15 ms is used, then a waiting process will not wait more than _____.

A. 15 ms
B. 34 ms
C. 45 ms
D. 60 ms

Q4 Assume that process P1 wants to transfer 256 KB of data from the disk to the memory. If the system provides a buffer of 64 KB then how many interrupts will be received by the CPU from the DMA to complete the transfer?

A. 4
B. 5
C. 6
D. 7

Q5 A process that has many short CPU bursts is called a _____.

A. CPU bound process
B. I/O bound process
C. I/O and CPU burst cycle
D. None of the above

PART B

Instruction: Answer **ALL** questions.

Q6 (a) Identify condition which may cause deadlock if printer is one of the resources that can be used by a single process at a time.

(1 mark)

(b) State criteria to be maximized and minimized in order to optimize scheduling.

(5 marks)

(c) If the starting address of frame 1, the 5KB page in primary memory is 1024, then at which address will be the frame 2?

(2 marks)

Q7 (a) Identify **TWO (2)** information contain in a logical address.

(2 marks)

(b) State the location of the virtual memory.

(1 mark)

(c) Propose the best solution when a user gets an error message that warns of low virtual memory.

(2 marks)

(d) Justify why increasing size of virtual memory is not recommended based on situation in **Q7(c)**.

(2 marks)

Q8

Table Q8

Process	Arrival Time	Processing Time
P_1	0.00	5
P_2	2.01	4
P_3	2.01	2
P_4	4.01	4
P_5	5.01	3

(a) Outline a chart illustrating their execution for the processes arrived in sequence by referring to **Table Q8** using:

(i) First-Come First-Served
(ii) Shortest Job First (Non-Preemptive)

(iii) Shortest Remaining Time (Preemptive)
(iv) Round Robin (time quantum = 2)

(12 marks)

(b) Calculate the average turnaround time for all processes in scheduling algorithms listed in **Q8(a)**.

(8 marks)

(c) Calculate the average waiting time for all processes in scheduling algorithm listed in **Q8(a)**.

(8 marks)

Q9

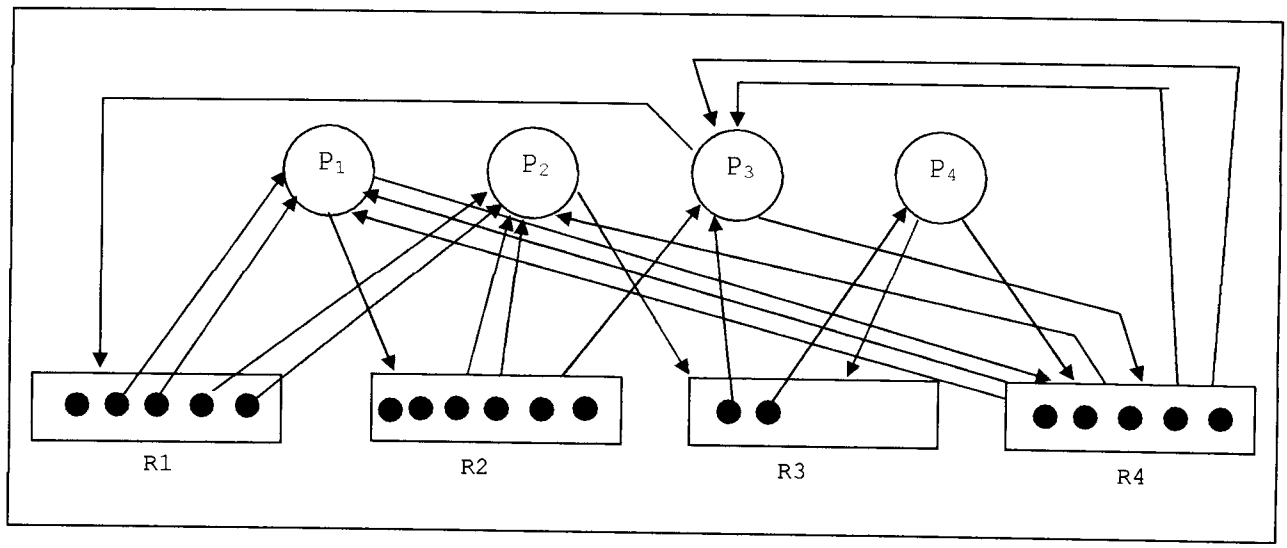

Figure Q9: Resource Allocation Graph

Table Q9(a): Resource Allocation and Request

Process	Current Allocation				Outstanding Requests				Maximum Allocation				Resources Available			
	R_1	R_2	R_3	R_4	R_1	R_2	R_3	R_4	R_1	R_2	R_3	R_4	R_1	R_2	R_3	R_4
P_1																
P_2																
P_3																
P_4																

(a) Analyze the given resource allocation graph by referring to the **Figure Q9** and then fill up the **Table Q9(a)**.

(8 marks)

Table Q9(b): Resources Allocation and Request

Process	Current Allocation			Outstanding Request			Resources Available		
	R_1	R_2	R_3	R_1	R_2	R_3	R_1	R_2	R_3
P_1	1	0	1	0	0	0	0	0	1
P_2	2	0	1	0	1	0			
P_3	1	2	2	0	0	0			
P_4	0	1	0	0	1	0			

(b) Illustrate the resource allocation graph by referring to the **Table Q9(b)**.

(6 marks)

Q10

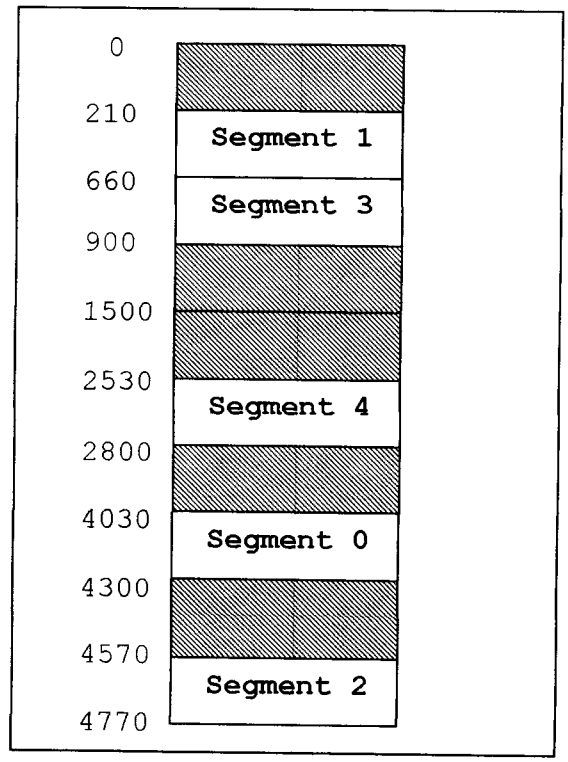

Figure Q10 (a)

(a) Based on the **Figure Q10(a)**, Segment 5 sized 270K and Segment 6 sized 400K will be loaded into physical memory by using first come first serve and best fit concept. Draw the new physical memory after Segment 5 and Segment 6 are loaded into the memory.

(4 marks)

(b) Draw an appropriate segment table referring to your answer in **Q10(a)**.

(6 marks)

(c) Compute the physical address for each of the logical address based on the segment table of **Q10(b)**.

(i) 0 178
(ii) 2 200
(iii) 1 370
(iv) 3 240
(v) 4 270

(5 marks)

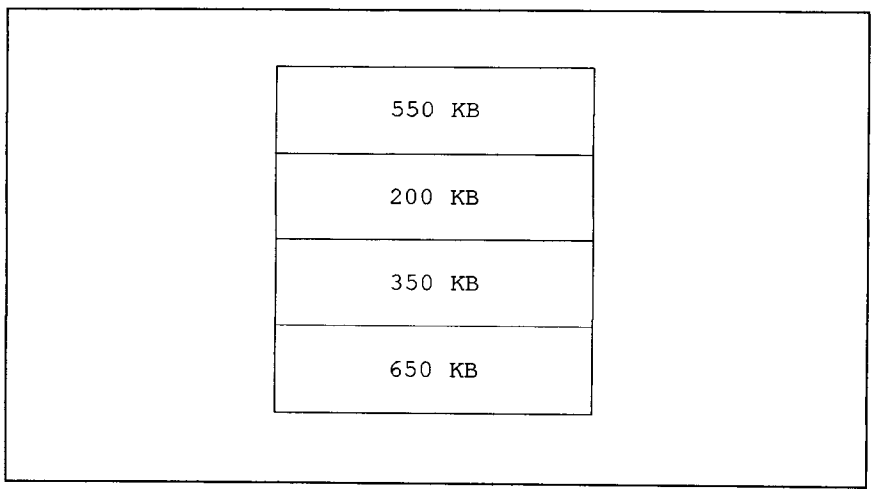

Figure Q10(b)

(d) **Figure Q10(b)** above illustrates a memory partition. Several processes in sequence and sized 250 KB, 150 KB, 300 KB and 500 KB will be loaded into the memory. Illustrate the new memory partition after inserting the processes using the following methods:

(i) Best fit

(4 marks)

(ii) Worst fit

(7 marks)

Q11 Based on the given information, answer all of following questions.

```
Process size      =    670 K
Frame size        =    50 K
Memory size       =    150 K
Address Reference =    13, 23, 45, 133, 221, 56, 78, 168, 90, 120,
                       234, 133, 212, 311
```

(a) Calculate the reference string.

(2 marks)

(b) Compute the number of pages required by this process.

(2 marks)

(c) Calculate the number of frames required by this process.

(2 marks)

(d) Illustrate the number of page faults produced by the following algorithms towards the reference string you got in **Q11(a)**.

(i) First In First Out (FIFO)
(ii) Optimal

(6 marks)