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UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER I
SESSION 2021/2022**

COURSE NAME : OPERATING SYSTEM
COURSE CODE : BIC 20803
PROGRAMME CODE : BIS / BIP/ BIW/ BIM
EXAMINATION DATE : JANUARY / FEBRUARY 2022
DURATION : 3 HOURS
INSTRUCTION : 1. ANSWER ALL QUESTIONS
**2. THIS FINAL EXAMINATION IS
CONDUCTED ONLINE AND CLOSE
BOOK**

THIS QUESTION PAPER CONSISTS OF SIX (6) PAGES

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Q1 (a) Figure Q1(a) shows a program with several process creations.

```

#include <stdio.h>
#include <sys/types.h>
#include <unistd.h>
int main()
{
    fork();

    printf("Start..\n");

    fork();

    printf("Loading..\n");

    return 0;
}
    
```

Figure Q1(a)

Write the output of the program in Figure Q1(a).

(6 marks)

(b) Figure Q1(b) shows illustration of single thread process and multiple thread process.

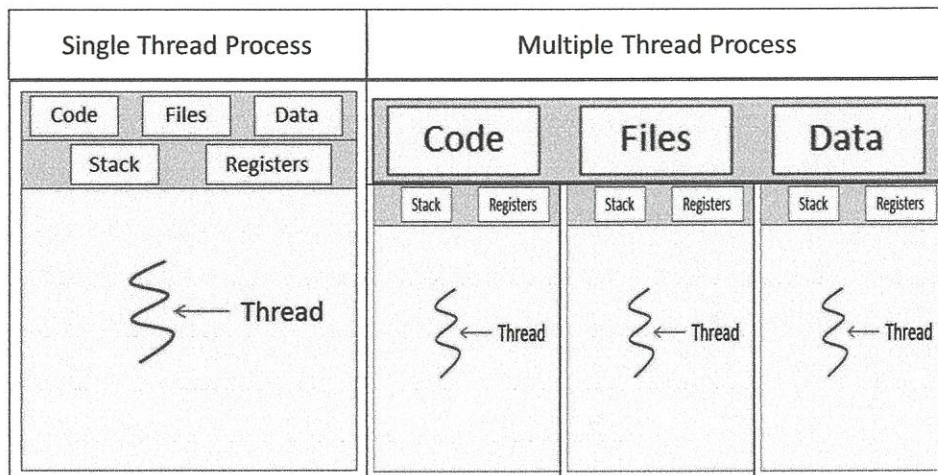


Figure Q1(b)

Based on the figure above, answer the following questions.

- (i) Analyse **THREE (3)** difference between processes and threads. (6 marks)
- (ii) List **THREE (3)** examples of multiple threads happen while working on a Microsoft Word document. (3 marks)



- (iii) If suddenly the process of the Microsoft Word requests a resource that currently held by another process, identify **TWO (2)** methods of recovery done by operating system. (4 marks)

Q2 Table Q2 shows list of processes (P1, P2, P3, P4, P5, P6 and P7) with their burst time. The time quantum is 8s (if required).

Table Q2

Process	Burst Time
P1	10
P2	6
P3	23
P4	9
P5	31
P6	3
P7	19

Referring to the **Table Q2** above, answer the following questions.

- (a) Calculate the average waiting time for each following algorithm: (Draw a Gantt Chart to support your answer)
 - (i) First Come First Serve (4 marks)
 - (ii) Round Robin (6 marks)
- (b) Based on your answers in **Q2(a)**, which algorithm performs best? Justify your answer. (3 marks)
- (c) Identify **ONE (1)** algorithm that executes the shorter time process as priority and cannot be pre-empted until the job completes. Using a Gantt Chart, calculate the average waiting time for the algorithm. (5 marks)



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Q3 Given five memory partitions of 10 MB, 5 MB, 2 MB, 3 MB, and 6 MB (in order) and list of active processes as illustrated in **Figure Q3**.

	Beginning Address (KB)	Memory Block Size (KB)	Status
	35 300	10 000	Free
	45 301	5 000	Free
	50 302	2 000	Free
	52 303	3 000	Free
	55 304	6 000	Free
	61 305	1 000	Busy
	62 306	2 500	Busy

Figure Q3

- (a) Identify which memory blocks are allocated to each of the processes using the following algorithm:
 - (i) Best-Fit (4 marks)
 - (ii) Worst-Fit (4 marks)

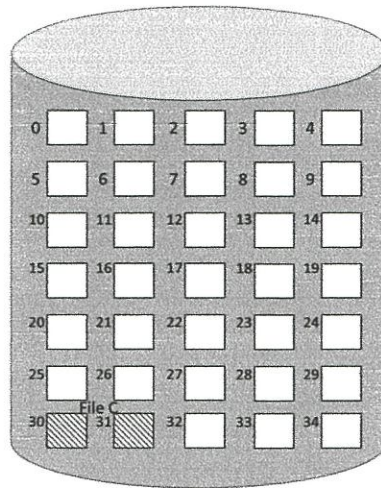
- (b) Based on your answers in **Q3(a)**, calculate the amount of internal fragmentations in each process memory block.
 - (i) Best-Fit (4 marks)
 - (ii) Worst-Fit (4 marks)

- (c) Illustrate the deallocation of the Realtek HD Audio Manager process with its adjacent free block if the process terminates sooner than the rest based on your answers in **Q3(a)(ii)**. (3 marks)

Q4 There are 9 workers for ASH Development Sdn. Bhd. as shown in Table Q4. Unfortunately, there are only 4 rooms available for these workers. Every week, a worker name is randomly selected to do odd jobs for the company. When a worker has been selected randomly, a room needs to be vacated if these rooms are full. Based on Figure Q4, worker's ID number 0 (Umar) is randomly selected for the first week, and the 4 boxes represent 4 rooms for workers.



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(8 marks)

(b) Based on your answers in Q5(a), list **TWO (2)** disadvantages of the types of allocation disk.

(4 marks)

(c) Identify **ONE (1)** type of security breach can be occurred if File C contains with personal bank information.

(2 marks)

-END OF QUESTIONS-

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