



UTHM

Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION (ONLINE) SEMESTER I SESSION 2020/2021

COURSE NAME : OPERATING SYSTEM
COURSE CODE : BIC 20803
PROGRAMME CODE : BIS / BIP / BIW / BIM
EXAMINATION DATE : JANUARY / FEBRUARY 2021
DURATION : 3 HOURS
INSTRUCTION : 1. ANSWER ALL QUESTIONS
2. STUDENTS SHOULD UPLOAD
ANSWER BOOKLET (PDF FORMAT)
WITHIN 30 MINUTES AFTER
EXAMINATION PERIOD.

TERBUKA

THIS QUESTION PAPER CONSISTS OF FIVE (5) PAGES

Q1 (a) Draw a tree diagram to illustrate the process creation in Figure **Q1(a)**.

```

int main()
{
    fork();
    fork();
    fork();
    printf ("Hello UTHM! \n");
}
    
```

FIGURE Q1(a)

(4 marks)

(b) Based on your answer in **Q1(a)**, write the output of the program.

(2 marks)

(c) Discuss **TWO (2)** effects if the parent process aborts the children processes.

(4 marks)

Q2 Table **Q2** shows list of processes (P1, P2, P3, P4 and P5) with their arrival and execution time. The time quantum is 6s (if required).

Process	Arrival Time (mm:ss)	Execution Time (s)
P1	00:00	18
P2	00:02	2
P3	00:08	5
P4	00:10	8
P5	00:11	28

TABLE Q2

Based on Table **Q2** above, answer the following questions.

(a) State **ONE (1)** name of scheduling algorithm that involved context switching to execute the processes in Table **Q2**.

(2 marks)

- (b) Based on your answer in Q2(a),
- (i) Draw a Gantt Chart to illustrate the execution process for all processes in Table Q2. (4 marks)
 - (ii) Calculate the average waiting time and show your calculations. (4 marks)
 - (iii) Calculate the average turnaround time and show your calculations. (4 marks)
- (c) Explain **TWO (2)** reasons that your scheduling answer in Q2(a) perform poorly compared to First Come, First Served (FCFS) scheduling. Draw a Gantt chart to support your answer. (6 marks)

Q3 Figure Q3 shows information about resources in a system.

- There are six classes of allocatable resource labelled R1 through R6
- There are five processes labelled P1 through P5
- There are two instances of each resource
- There are some resource instances already allocated to processes, as follows:
 - One instance of R1 held by P1, another held by P2
 - One instance of R2 held by P3
 - One instance of R3 held by P3, another held by P4
 - One instance of R4 held by P3
 - One instance of R5 held by P3, another held by P4
 - Two instances of R6 held by P5
- Some processes have requested additional resources, as follows:
 - P1 wants one instance of R4
 - P2 wants one instance of R1 and one instance of R2
 - P3 wants one instance of R1
 - P4 wants one instance of R6
 - P5 wants one instance of R3

FIGURE Q3

- (a) Draw a resource allocation graph to illustrate the information in Figure Q3. (10 marks)

(b) Based on your answer in Q3(a), analyze state for each process. (5 marks)

(c) List FIVE (5) possible sequences to avoid deadlock. (5 marks)

Q4 Figure Q4 shows one type of level directory.

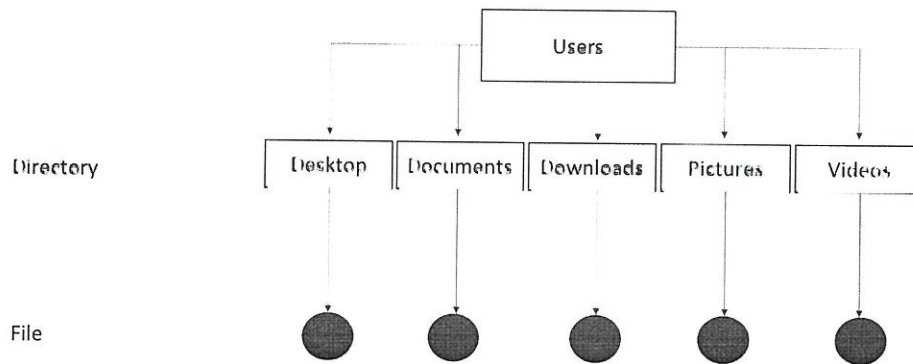


Figure Q4

(a) List TWO (2) disadvantages of having type of level directory in the figure. (4 marks)

(b) Illustrate a two-level directory diagram if your laptop has two users with same directories and files. (6 marks)

Q5 (a) Figure Q5 shows jobs allocation in a main memory by using Best-Fit Allocation Scheme.

Job No.	Memory Requested	Status	Memory Block No.	Memory Block Size	Job No.	Job Size	Status	Total Waste
Job 1	15K	Allocated at Block 4	Block 1	300K	Job 4	200K	Busy	100
Job 2	50K	Allocated at Block 3	Block 2	250K			Free	
Job 3	750K	wait	Block 3	50K	Job 2	90K	Busy	0
Job 4	200K	Allocated at Block 1	Block 4	20K	Job 1	15K	Busy	5
Job 5	110K	Allocated at Block 5	Block 5	115K	Job 5	110K	Busy	5

FIGURE Q5

Draw and label the positions of external and internal fragmentations.

(4 marks)

(b) Assume a main memory is composed of two-page frames for public use and that a program requests pages in the following order:

A, B, D, D, D, B, A, A, B, C, C, B

Using the First-In-First Out (FIFO) page removal algorithm, perform a page trace analysis indicating page faults with asterisks (*).

(6 marks)

-END OF QUESTIONS-

