



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
(ONLINE)
SEMESTER I
SESSION 2020/2021**

COURSE NAME : OPERATING SYSTEM
COURSE CODE : BIT 20403
PROGRAMME CODE : BIT
EXAMINATION DATE : JANUARY / FEBRUARY 2021
DURATION : 3 HOURS
INSTRUCTION : 1. ANSWER ALL QUESTIONS
2. STUDENT'S SHOULD UPLOAD ANSWER BOOKLET (PDF FORMAT) WITHIN 30 MINUTES AFTER EXAMINATION PERIOD.

THIS QUESTION PAPER CONSISTS OF FIVE (5) PAGES

TERBUKA

CONFIDENTIAL

- Q1** (a) Draw a tree diagram to illustrate the process creation in Figure Q1. (4 marks)

```

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

FIGURE Q1

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

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, answer the following questions.

- (a) State **ONE (1)** scheduling algorithm that involved context switching to execute the processes in Table Q2. (2 marks)
- (b) Based on your answer in Q2(a),
- (i) calculate the average waiting time.
 - (ii) calculate average turnaround time for all processes.
 - (iii) draw a Gantt Chart to illustrate the execution process. Show your work. (12 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 P4, another held by P4
 - One instance of R4 held by P3
 - One instance of R5 held by P3, another held by P4
 - Two instance of R6 held by P5
- Some processes have requested additional resources, as follow:
 - 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.

(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.

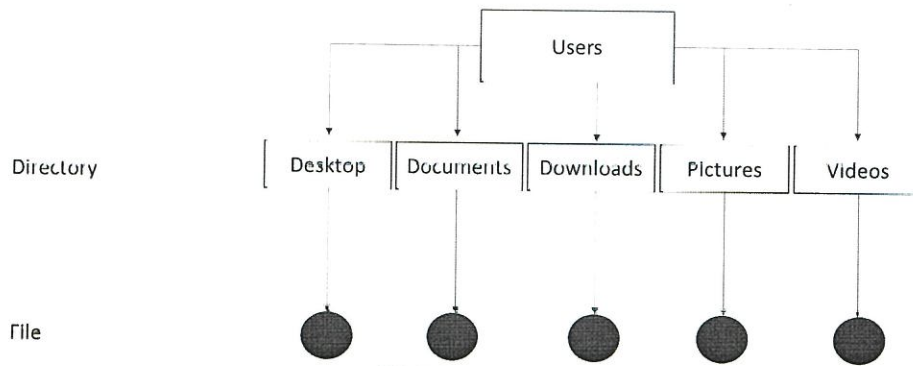


FIGURE Q4

- (a) List **TWO (2)** disadvantages of having type of level directory. (4 marks)

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

Q5 (a) Machine X has used a logical address space of 64 pages of 1024 words each, mapped onto a physical memory of 32 frames.

Based on the scenario:

- (i) Calculate number of bits used in the logical address. (3 marks)

- (ii) Calculate number of bits used in the physical address. (3 marks)

(b) Machine Y has used a 1-KB page size and 16 bit of address size.

Calculate the page numbers and offsets for the following address references (provided as decimal numbers) :

- (i) 2375
- (ii) 19366
- (iii) 30000
- (iv) 256
- (v) 16385

(10 marks)

- (c) Machine Z wants to execute a process, but when it attempts to access data or code that is in its address space, the data or code is not currently available in the system RAM.

Determine the solution of the scenario.

(4 marks)

-END OF QUESTIONS-