



Final Exam

Operating System (1)

Computer and Syst. Dept.
Time Allowed: 3 hrs.
1st Year Students.
Total Marks: 100
Code: CSE 3124



Solve the following:

- يسمح باستخدام القلم الرصاص (شرط وضوح الخط).
- الرجاء وضوح الرسم قدر المستطاع (ليس شرطاً استخدام المسطرة)
- الامتحان في ورقتين.

Question 1: True or False (and why?)

- (a) The number of the cylinders is greater than the number of tracks in any surface ()
- (b) All programs can be programmed in a multi-threaded manner. ()
- (c) Each process must have a process control block (PCB) in memory. ()
- (d) Data reliability is to keep data safe from human attacks. ()
- (e) Contiguous file allocation method suffers from external fragmentations. ()
- (f) Long term scheduler increases the degree of multiprogramming. ()
- (g) In RR If the quantum time decreases, this will slow down the execution of the processes. ()
- (h) OS can access the text files in indexed manner. ()
- (i) Aging is a solution of the convoy effect. ()

18 marks

Question 2: Explain why? (Use the minimum words)

- (a) SJF CPU scheduling may suffer from starvation.
- (a) It is recommended to use as few threads as possible in your applications.
- (b) Some programmers prefer to build their applications in multi-threading manner.
- (c) It is important to include inter-Track and inter-Sector gaps on the disk surface.
- (d) Memory is a preemptive resource, while CD driver is not.

10 Marks

Question 3: Explain what is meant by **process states**, then:

- (a) Draw the process state diagram.
- (b) What is meant by process control block?
- (c) What is meant by context switch?

8 Marks

Question 4: Use figures only to:

- (a) Explain the linked disk allocation method.
- (b) Ready queue and input queue.
- (c) Computer internal structure.
- (d) Explain how a file stored in blocks (141,452,378, 675) using FAT.

8 Marks

Question 5: Discuss what is meant by the following parameters:

CPU utilization, System throughput, Turnaround time, Waiting time, Response time.

Then, Consider the following set of processes, with the length of the CPU burst time given in milliseconds, Using SRTF:

- (a) Draw the Gant chart illustrates the execution of these processes.
- (b) Calculate TAT and WT for each process, then calculate AWT for all processes.
- (c) Calculate the number of context switches.

Process	Burst Time	Arrival time
P ₁	7	0
P ₂	4	2
P ₃	1	4
P ₄	4	5

12 Marks

Question 6: Explain when?

- (a) A program becomes a process.
- (b) The TAT of a process equals process execution time.

4 Marks

Question 7: Compare between:

- (a) RAM, ROM, Cache memory.
- (b) Multi-Tasking and Multi-Processor systems.

4 Marks

Question 8:

i. Define (in few words) the following Terms:

Sector, Cylinder, Disk access time, Disk bandwidth

Then use the SSTF scheduling technique to calculate the total head movement for the following:

- Queue: 98, 183, 37, 122, 14, 124, 65, 67, 25, 78, 107, 15
- Head starts at: 53.

ii. A hard disk has 4096 tracks on each surface. It has 4 plates. There are 1024 sectors per track and each sector stores 512 bytes, calculate:

- Number of tracks per cylinder.
- Number of cylinders in the disk.
- Number of tracks in the disk.
- Cylinder size.
- Total Disk size.
- Size of the data that can be read by the head at a time?

14 Marks

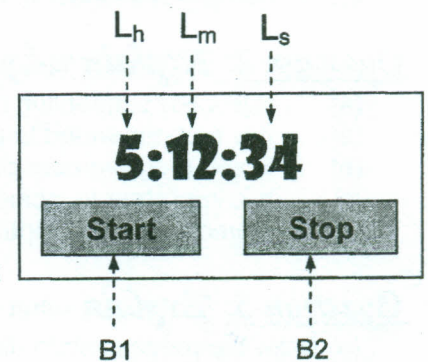


Figure 1

Sub-task	Time
S1	26 ms
S2	5 ms
S3	2 ms

Question 9: Explain the main difference between multi-threading and multi-programming, then:

(a) Explain how multi-threading adds flexibility when executing a process with long sub-tasks assuming a process P with three sub-tasks as shown in the table. The processor gives 6 ms to P in each cycle. Show how to execute P as a single thread, then as three threads.

(b) Write the code for the clock thread shown in figure 1. **14 Marks**

Question 10: In multi-level queuing scheduling with feedback using the shown 3 queues (Note: Q3 uses SJF as a scheduling algorithm). Show how to schedule the shown processes in figure 2. Then calculate the average waiting time.

8 Marks

Process	Burst Time	Arrival Time
P ₁	0	10
P ₂	5	26
P ₃	12	7

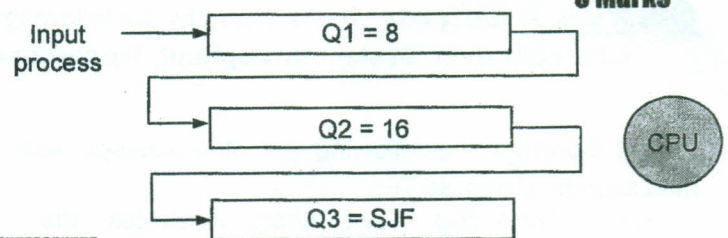


Figure 2

----- End of Questions -----

With Best Wishes

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Plz, send feedback about the exam to:

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