

Code : 061503

B.Tech 5th Semester Exam., 2018

OPERATING SYSTEMS

Time : 3 hours

Full Marks : 70

Instructions :

- i. The marks are indicated in the right-hand margin.
- ii. There are **NINE** questions in this paper.
- iii. Attempt **FIVE** questions in all.
- iv. Question No. 1 is compulsory.

1. Choose the correct option (any seven) : $2 \times 7 = 14$

(a) In which type of operating system, the response time is very crucial?

- (i) Unix operating system
- (ii) Real-time operating system
- (iii) Network operating system
- (iv) Batch operating system

(b) A process is

- (i) a program in high-level language kept on disk
- (ii) a contents of main memory
- (iii) a program in execution
- (iv) a job in secondary memory

(c) The strategy of temporarily suspending a process that is logically runnable is called

- (i) preemptive scheduling
- (ii) non-preemptive scheduling
- (iii) shortest job first
- (iv) first come, first serve

(d) To avoid the race condition, the number of processes that may be simultaneously inside their critical section is

- (i) 8
- (ii) 1
- (iii) 2
- (iv) 4

(e) Fork is used to

- (i) dispatch a task
- (ii) create a new job
- (iii) create a new process
- (iv) increase the priority of a task

(f) The principle of locality of reference justifies the use of

- (i) secondary memory
- (ii) critical section
- (iii) virtual memory
- (iv) cache memory

- (g) The memory allocation scheme subject to "external" fragmentation is
- segmentation
 - swapping
 - pure demand paging
 - multiple continuous fixed partitions
- (h) The piece of code that only one thread should execute at a time is called
- mutual exclusion
 - critical section
 - synchronization
 - None of the above
- (i) Which memory allocation policy allocates the largest hole to the process?
- Best fit
 - Worst fit
 - First fit
 - None of the above
- (j) When there is enough memory to fit a process in memory, but the space is not continuous, then which of the following is required?
- Internal fragmentation
 - Virtual fragmentation
 - External fragmentation
 - None of the above

2. (a) What is an operating system? Enumerate the basic functions of the operating system and explain each in brief.
- (b) What is meant by process control block? Explain the different fields of PCB with the help of a diagram. Discuss the concept Context Switch by giving an example.
- 6+8=14
3. (a) Explain the following scheduling algorithms with the help of an example
- SJF
 - Round robin
- (b) Differentiate between preemptive scheduling and non-preemptive scheduling.
- 8+6=14
4. (a) What is meant by deadlock? Explain with example. Elaborate upon the conditions necessary for a deadlock situation to arise.
- (b) Discuss the various mechanisms for deadlock recovery.
- 8+6=14
5. (a) Illustrate the concept of demand paging with the help of a diagram.
- (b) What are the various memory allocation schemes?
- 7+7=14



6. (a) Consider the following reference string :

7, 0, 1, 3, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1,
2, 0, 1, 7, 0, 1

Calculate the number of page faults that would occur for the following page replacement algorithms with frame size of 4 :

(i) FIFO

(ii) LRU

- (b) Explain the concept of semaphores with the help of an example. $8+6=14$

7. (a) Discuss the performance criteria of CPU scheduling.

- (b) Compare and contrast between linked and indexed disk allocation strategies.

$6+8=14$

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8. (a) Illustrate with examples the following disk scheduling algorithms :

(i) SSTF

(ii) C-Look

- (b) Explain the memory hierarchy of the operating system. $8+6=14$

9. Write short notes on the following : 14

(a) Segmentation

(b) Real-time systems

(c) Critical section
