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*) : 2×7=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

(2)

(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

(i) segmentation

(ii) swapping

(iii) pure demand paging

(iv) multiple continuous fixed partition

(h) The piece of code that only one thread should execute at a time is called

(i) mutual exclusion

(ii) critical section

(iii) synchronization

(iv) None of the above

(i) Which memory allocation policy allocates the largest hole to the process?

(i) Best fit

(ii) Worst fit

(iii) First fit

(iv) 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?

(i) Internal fragmentation

(ii) Virtual fragmentation

(iii) External fragmentation

(iv) 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

(i) SJF

(ii) 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, 2, 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

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

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