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Question Paper Code: 41235

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2016

Third Semester

Computer Science and Engineering

14UCS305 - OPERATING SYSTEMS

(Regulation 2014)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. A parent process calling _____ system call will be suspended until children processes terminate.
(a) wait (b) fork (c) exit (d) exec
2. The state of a process is defined by
(a) the final activity of the process
(b) the activity just executed by the process
(c) the activity to next be executed by the process
(d) the current activity of the process
3. Which scheduling policy is most suitable for a time-shared operating system
(a) Shortest-job First. (b) Priority
(c) Round-Robin. (d) First-Come-First-Serve
4. An operating system contains 3 user processes each requiring 2 units of resource R. The minimum number of units of R such that no deadlocks will ever arise is
(a) 4 (b) 3 (c) 5 (d) 6
5. A set of techniques that allow to execute a program which is not entirely in memory is called
(a) demand paging (b) virtual memory
(c) auxiliary memory (d) secondary memory

6. 'LRU' page replacement policy is
- (a) Last Replaced Unit.
 - (b) Last Restored Unit
 - (c) Least Recently Used
 - (d) Least Required Unit
7. The "blocking factor" of a file is.
- (a) The number of blocks accessible to a file
 - (b) The number of blocks allocated to a file
 - (c) The number of logical records in one physical record
 - (d) None of these
8. The disadvantage of the two level directory structure is that
- (a) it does not solve the name collision problem
 - (b) it solves the name collision problem
 - (c) it does not isolate users from one another
 - (d) it isolates users from one another
9. A Linux device driver is
- (a) Structured into two halves called top half and bottom half
 - (b) Three equal partitions
 - (c) Unstructured
 - (d) None of these
10. Which of the following is FALSE?
- (a) Context switch time is longer for kernel level threads than for user level threads
 - (b) User level threads do not need any hardware support
 - (c) Related kernel level threads can be scheduled on different processors in a multiprocessor system
 - (d) Blocking one kernel level thread blocks all other related threads

PART - B (5 x 2 = 10 Marks)

11. Compare user threads and kernel threads.
12. What are the various scheduling criteria for CPU Scheduling?
13. What is a pure demand paging?
14. If the average page faults service time of 25 ms and a memory access time of 100ns. Calculate the effective access time.
15. List the various key features of VM ware server virtualization.

PART - C (5 x 16 = 80 Marks)

16. (a) (i) Demonstrate about the evolution of virtual machine. Also explain how virtualization could be implemented in Operating system. (8)
- (ii) Enumerate different operating system structures and explain with a neat sketch. (8)

Or

- (b) (i) Generalize five services provided by an operating system. Explain how each provides convenience to the users. (8)
- (ii) Describe the operation and states of a process in detail. (8)
17. (a) (i) Explain the FCFS, Preemptive and Non-Preemptive versions of Shortest Job First and Round Robin (time-slice2) scheduling algorithms with Grantt Chart for the four processes given. Compare their average turn around and wait time. (10)

Process	Arrival Time	Burst time
P1	0	10
P2	1	6
P3	2	12
P4	3	15

- (ii) Define semaphore. Explain the use of semaphore in synchronization problem with an example. (6)

Or

- (b) Evaluate the follow snapshot of the system

	Allocation	Max	Available
P ₀	0 0 1 2	0 0 1 2	1 5 2 0
P ₁	1 0 0 0	1 7 5 0	
P ₂	1 3 5 4	2 3 5 6	
P ₃	0 6 3 2	0 6 5 2	
P ₄	0 0 1 4	0 6 5 6	

Answer the follow based on banker's algorithm.

- (i) Define safety algorithm
- (ii) What is the content of need matrix?

- (iii) Is the system in a safe state?
- (iv) Is a request from process P_1 arrives for (0, 4, 2, 0) can the request be granted immediately? (16)

18. (a) (i) Consider the following page reference string:
2, 3, 4, 2, 1, 5, 6, 4, 1, 2, 3, 7, 6, 3, 2, 1. Calculate the number of page faults would occur for the FIFO and LRU, Optimal page replacement algorithms with frame size of 4 and 5. (12)
- (ii) Differentiate external fragmentation with internal fragmentation. (4)

Or

- (b) (i) Compare Which algorithms make the most efficient use of memory .Given memory partitions of 500 KB, 100 KB, 300 KB, 200 KB and 600 KB in order, how would each of the first-fit, best-fit, and worst-fit algorithms place processes of size 418 KB, 202 KB, 506 KB, 112 KB, and 95 KB (in order)? (10)
- (ii) Discuss briefly about the page fault handling routine with diagram. (6)
19. (a) Suppose that the disk drive has 5000 cylinders number 0 to 4999. The drive is currently serving a request at cylinder 143 and the previous request was at 125, the queue of the pending request in FIFO order is: 86, 1470, 913, 1174, 948, 1509, 1022, 1750, 130 starting from the current head position, what is the total distance (cylinders) that the disk arm moves to satisfy all the pending requests for each of the disk scheduling algorithms. (16)

Or

- (b) (i) Write a detailed note on various file access methods with neat sketch. (8)
- (ii) Describe the two levels and tree type directory structures in detail. (8)
20. (a) Explain in detail the design principles, kernel modules, process management, scheduling in LINUX system. (16)

Or

- (b) (i) Describe about the network structure of LINUX system. (8)
- (ii) Describe how file system is implemented in Windows. (8)