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Question Paper Code: 12042

M.E. DEGREE EXAMINATION, MAY 2014.

Second Semester

Computer Science and Engineering (with Specialization in Networks)

01PNE101 - OPERATING SYSTEM DESIGN

(Common to Computer Science and Engineering)

(Regulation 2013)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions.

PART A - (10 x 2 = 20 Marks)

1. What is the purpose of system call?
2. Define Cooperating processes.
3. Differentiate preemptive and non-preemptive scheduling.
4. What is the difference between deadlock prevention and avoidance?
5. Calculate the number of bits in the logical and physical address for a system with logical address space of eight pages of 1024 words each, mapped onto a physical memory of 32 frames.
6. Define thrashing.
7. What is the advantage and disadvantage of two-level directory structure?
8. Define seek time and rotational latency.
9. What do you mean by HAL?
10. Define inode.

PART - B (5 x 14 = 70 Marks)

11. (a) Explain the concept in Process and the possible operations on process. (14)

Or

(b) Discuss the operating system components and their functionalities. (14)

12. (a) (i) Assume you have the following jobs to execute with one processor, with the jobs arriving in the order :

Jobs	1	2	3	4	5
Burst time	80	20	10	20	50

Use FCFS, RR scheduling (quantum=30) and calculate the average waiting time for the processes. Also calculate the turnaround time for process P3 in each case. (10)

(ii) Give the usage of the TestAndSet instruction. (4)

Or

(b) Describe the Deadlock avoidance algorithm and use it to solve the following. Assume a system with 4 resource types (R1, R2, R3, R4) of 6,4,4,2 instances respectively. The maximum claim and the allocation status are as below. Find if the system is in safe state. Also find out if a resource request of P1 for <1, 1, 0, 1> be granted.

Maximum claim

	R1	R2	R3	R4
P1	3	2	1	1
P2	1	2	0	2
P3	1	1	2	0
P4	3	2	1	0
P5	2	1	0	1

Current Allocation

	R1	R2	R3	R4
P1	2	0	1	1
P2	1	1	0	0
P3	1	1	0	0
P4	1	0	1	0
P5	0	1	0	1

(14)

13. (a) (i) Consider a paging system with page table stored in memory. If a memory reference takes 100 ns, how long does a paged memory reference take? If we add TLBs, and 85 percent of all page-table references are found in TLBs, what is the effective memory access time? Assume the finding a page-table entry in TLB takes 15 ns. (6)

(ii) Explain the concepts in paging and mapping of logical to physical address with example. (8)

Or

(b) (i) Explain the LRU and FIFO page replacement algorithm with simple example. (7)

(ii) Explain the demand paging memory management schemes with necessary diagrams. (7)

14. (a) (i) Discuss the Acyclic Graph directory structures. (7)

(ii) Explain the features of indexed allocation methods for allocating space for files on disk. (7)

Or

(b) (i) Assume the present position of read/write head is at track 65, moving towards 199 (the highest numbered track) and the disk request queue contains read/write requests for sectors on tracks 82,159,113,90,187 respectively. What is the total number of head movements in FCFS, SCAN and LOOK strategies? (4)

(ii) Write a short note on swap space management. (10)

15. (a) Explain the memory management in Linux system. (14)

Or

(b) Discuss the design principles of Windows 2000 and detail on the file system management of it. (14)

PART - C (1 x 10 = 10 Marks)

16. (a) Design an algorithm which will overcome the drawbacks of traditional algorithms in solving critical section problem and that could be readily adopted in the Linux system. (10)

Or

(b) Scheduling is important for improving the performance of the system. Develope a scheduling algorithm which suits best for the Windows systems. Illustrate the strengths of the algorithm with simple example. (10)