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Question Paper Code : 91346

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2014.

Fourth Semester

Computer Science and Engineering

CS 2254/ CS 45/ CS 1253/ 080250012/ 10144 CS 405 — OPERATING SYSTEMS

(Common to Information Technology)

(Regulation 2008 / 2010)

(Common to PTCS 2254/ 10144 CS 405 — Operating Systems for B.E. (Part-Time)
Fourth Semester – CSE – Regulation 2009 / 2010)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is the resident set and working set of a process?
2. What resources are used when a thread created?
3. Differentiate between pre-emptive and non-pre-emptive scheduling.
4. What can the operating system do to recover from deadlock?
5. What is the maximum file size supported by a file system with 16 direct blocks, single, double, and triple indirection? The block size is 512 bytes. Disk block numbers can be stored in 4 bytes.
6. List the steps needed to perform page replacement.
7. What file access pattern is particularly suited to chained file allocation on disk?
8. What file allocation strategy is most appropriate for random access files?
9. Compare bitmap-based allocation of blocks on disk with a free block list.
10. What is an I/O buffer?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Draw the state diagram of a process from its creation to termination, including All transitions, and briefly elaborate every state and every transition. (8)
(ii) What are threads? Why are they required? Discuss the differentiate between Kernel level and user level threads. (8)

Or

- (b) (i) What are interacting processes? Explain any two methods of implementing interacting processes. (8)
- (ii) Explain in detail about the different Multi threading models with neat diagram. (8)
12. (a) (i) Consider the situation in which the disk read/write head is currently located at Track 45 (of tracks 0-255) and moving in the positive direction. Assume that the Following track requests have been made in this order: 40,67,11,240,87. What is the order in which optimized C-SCAN would service these requests and what is the total seek distance? (8)
- (ii) Explain any three policies for process scheduling that uses resource consumption information. What is response ratio? (8)

Or

- (b) (i) What are semaphores? How do they implement mutual exclusion? (8)
- (ii) Give a solution for readers-writers problem using conditional critical regions. (8)
13. (a) Consider the following segmented paging memory system. There are 4 segments for the given process and a total of 5 page tables in the entire system. Each page table has a total of 8 entries. The physical memory requires 12 bits to address it; there are a total of 128 frames.

Segment Table

		0	0x73	0x25	0x85	0x0F	0x17
		1	0x2C	0x2D	0x31	0x3D	0x00
0	0x3	2	0x05	0x1E	0x01	0x5D	0x0D
1	0x1	3	0x17	0x5A	0x1F	0x1E	0x66
2	0x0	4	0x57	0x0F	0x09	0x6C	0x62
3	0x4	5	0x1A	0x7A	0x0A	0x2F	0x50
		6	0x4B	0x2B	0x1A	0x78	0x32
		7	0x11	0x6C	0x32	0x7B	0x11
		0		1	2	3	4

Page Tables



Physical memory; address = 12 bits

- (i) How many bytes are contained within the physical memory?
- (ii) How large is the virtual address?

- (iii) What is the physical address that corresponds to virtual address 0×312 ?
- (iv) What is the physical address that corresponds to virtual address $0 \times 1E9$? (16)

Or

- (b) Explain with the help of examples FIFO and LRU page replacement algorithms. (16)
14. (a) (i) Explain in detail about File system Implementation. (6)
- (ii) A file system on a disk has both logical and physical block sizes of 512 bytes. Assume that the information about each file is already in memory using contiguous, linked, and indexed allocation strategies answer the following questions : (10)
 - (1) How is the logical-to-physical address mapping accomplished in this system? (For the indexed allocation, assume that a file is always less than 512 blocks long).
 - (2) If we are currently at logical block 10 (the last block accessed was block and want to access logical block 4, how many physical blocks must be read from the disk?

Or

- (b) (i) Discuss the different techniques with which a file can be shared among different users. (8)
 - (ii) What is File protection and security? Compare both and also Explain the techniques to protect user files. (8)
15. (a) (i) Describe three circumstances under which blocking I/O should be used. Describe three circumstances under which nonblocking I/O should be used. Why not just implement nonblocking I/O and have processes busy-wait until their device is ready? (8)
- (ii) What is disk management? Explain in detail how to improve the disk Performance. (8)

Or

- (b) Explain the following :
 - (i) What is RAID? Describe its types with proper example. (8)
 - (ii) Compare synchronous and asynchronous input / output with the help of an example. (8)