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Question Paper Code : 40393

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2021.

Fourth/Fifth Semester

Computer Science and Engineering

CS 8493 — OPERATING SYSTEMS

(Common to : Electronics and Communication Engineering/Information Technology)

(Regulations 2017)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Distinguish between Multicore and Multiprocessor.

2. What is system boot in operating system?

3. Define MUTEX.

4. How deadlocks can be avoided?

5. When trashing is used?

6. What is demand paging?

7. Enlist different types of file directory structure.

8. Is FAT file system advantageous? Justify.

9. What are the Components of a Linux System?

10. Which layer of iOS contains fundamental system services for apps?

PART B — (5 × 13 = 65 marks)

11. (a) (i) Explain importance and Need of cache with its working principle. (7)

(ii) What is function of DMA operation? Explain with neat diagram. (6)

Or

(b) (i) Discuss in detail about the various memory hierarchies with neat block diagram. (7)

(ii) Discuss about the functionality of system boot with respect to operating system. (6)

12. (a) (i) Explain Banker algorithm for deadlock avoidance with suitable example. (7)

(ii) A system has four processes and five resources. The current allocation and maximum needs are as follows: (6)

	Allocated	Maximum	Available
Process A	1 0 2 1 1	1 1 2 1 3	0 0 × 1 1
Process B	2 0 1 1 0	2 2 2 10	
Process C	1 1 0 1 0	2 1 3 1 0	
Process D	1 1 1 1 0	1 1 2 2 1	

Consider value of x as 1, 2 and 3.

What is the smallest value of x in which the above system become a safe state?

Or

(b) (i) What is critical section? Discuss in detail reader's writer's problem. (7)

(ii) Define Deadlock. State the conditions for deadlock. Explain the steps involved in deadlock recovery. (6)

13. (a) (i) Compare paging with segmentation in terms of memory requirement by the address translation structure in order to convert virtual addresses to physical memory.

(ii) Explain in detail about page replacement algorithms with suitable example

Or

(b) With a neat diagram Discuss about a mechanism of paging scheme. (13)

14. (a) (i) What do you mean by directory structure? Also discuss *Tree-Structured Directories and Acyclic-Graph Directories.* (7)

(ii) Describe in detail about File System Implementation and file allocation method. (6)

Or

(b) Suppose that a disk drive has 200 cylinders, numbered 0 to 199. The work queue is: 23, 89, 132, 42, 187. Determine the total distance for the following disk scheduling algorithms (13)

(i) SCAN (ii) LOOK

(iii) C-SCAN (iv) C-LOOK

Work Queue: 23, 89, 132, 42, 187

- there are 200 cylinders numbered from 0 - 199
- the diskhead stars at number 100.

15. (a) (i) Explain in detail about how process is managed and scheduled in Linux. (7)

(ii) Discuss about Inter Process Communication (IPC) in linux. (6)

Or

(b) With frame work explain the working function of Android operating system architecture. Compare the features of IoS and Android. (13)

PART C — (1 × 15 = 15 marks)

16. (a) A computer uses 46—bit virtual address, 32—bit physical address, and a three-level paged page table organization. The page table base register stores the base address of the first-level table (T1), which occupies exactly one page. Each entry of T1 stores the base address of a page of the second-level table (T2). Each entry of T2 stores the base address of a page of the third-level table (T3). Each entry of T3 stores a page table entry (PTE). The PTE is 32 bits in size. The processor used in the computer has a 1 MB 16 way set associative virtually indexed physically tagged cache. The cache block size is 64 bytes. What is the size of a page in KB in this computer?

Or

(b) Discuss about following page replacement policy with neat sketch.

(i) FIFO (ii) LIFO (iii) LRU (iv) Optimal Consider a virtual page reference string 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1 Suppose a demand paged virtual memory system running on a computer system such that the main memory has 3 page frames. To compare above page replacement algorithms and Justify which one has minimum number of page faults.

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