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Question Paper Code: 1044229

B.E. / B.Tech. DEGREE EXAMINATIONS, NOV / DEC 2024

Fourth Semester

Computer Science and Engineering

U20CS403 / U20A1403 – OPERATING SYSTEMS

(Common to Artificial Intelligence and Data Science)

(Regulation 2020)

Time: Three Hours

Maximum: 100 Marks

Answer ALL questions

PART – A

(10 x 2 = 20 Marks)

1. Compare a multiprocessor system with a multicore system?
2. Provide an example of a system call and its purpose.
3. *Enumerate* the different process states in an operating system.
4. What is meant by semaphore?
5. Provide an example that illustrates the concept of internal fragmentation in memory management.
6. Describe what is meant by thrashing in an operating system and discuss its impact on system performance.
7. Define what is meant by SDD and USB drive, and highlight their primary uses.
8. Summarize the common file attributes maintained by an operating system.
9. Define scheduling in the context of operating systems and list its main types.
10. Define Inter-Process Communication (IPC) and explain its significance in operating systems.

PART – B

(5 x 16 = 80 Marks)

11. (a) (i) Explain the function of the CPU in a computer system and describe how it interacts with other components. (8)
- (ii) Compare and contrast Direct Memory Access (DMA) with interrupt-driven I/O, focusing on their mechanisms, advantages, and use cases. (8)

(OR)

- (b) Illustrate and explain the structure of an operating system using a suitable diagram, detailing the key components and their interactions. (16)

12. (a) Consider the following scenario.

Process	Burst time(ns)	Arrival time	priority
P1	5	0	2
P2	3	2	1
P3	2	1	4
P4	4	1	3
P5	2	0	1

Calculate Average Turn Around Time (ATAT) & Average Waiting Time(AWT) by using, (16)

1.FCFS

2.Shortest Job First

3.Round Robin scheduling(Time slice=2ns)

(OR)

- (b) Explain the concept of deadlock in an operating system and discuss the necessary conditions for a deadlock to occur. (16)

13. (a) Illustrate and explain how the memory management scheme of paging avoids external fragmentation using diagrams of paging hardware and memory models. (16)

(OR)

- (b) Explain when a page fault occurs and its consequences. With a neat sketch, describe the steps involved in handling a page fault. (16)

14. (a) Explain the concept of swap-space management in an operating system and describe its importance and functioning. (16)

(OR)

- (b) Discuss the different types of directory structures in an operating system using diagrams and examples to illustrate their organization and use cases. (16)

15. (a) Explain the input-output management system in Linux, including how it handles device drivers, buffering, and spooling. (16)

(OR)

- (b) Enumerate and explain the role of Android's architecture and SDK framework with the help of a suitable diagram to illustrate the different layers and components. (16)

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