

Question Paper Code : 10815

M.C.A. DEGREE EXAMINATIONS, APRIL/MAY 2023.

Elective

MC 4004 – ADVANCES IN OPERATING SYSTEMS

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. Define race condition.
2. Draw the life cycle of thread.
3. List out any four issues in Distributed operation system design.
4. Differentiate one phase with two phase deadlock detection algorithm.
5. State the issues in load distribution in resource management.
6. Differentiate preemptive with non preemptive transfers.
7. Define synchronous and asynchronous IO in linux system.
8. What is the difference between periodic and aperiodic tasks?
9. Mention the file accesses mechanisms in Mobile OS.
10. Draw the Mac OS X architecture.

PART B — ($5 \times 13 = 65$ marks)

11. (a) (i) Explain in detail about various synchronization mechanisms. (7)
(ii) Briefly explain how scheduling algorithm is evaluated. (6)

Or

- (b) (i) Discuss in detail about deadlock prevention and recovery techniques. (6)
(ii) Explain in detail about FCFS and SJF scheduling algorithm with suitable examples. (7)

12. (a) (i) Discuss the architecture of distributed operating system. How resource availability and fault tolerance is ensured in distributed operating systems? (6)

(ii) Explain in detail about Distributed mutual exclusion algorithm with suitable example. (7)

Or

(b) (i) Explain in detail about centralized and distributed deadlock detection Algorithm. (6)

(ii) How real time and embedded systems are different from standard distributed operating systems? Discuss the basic structure and components of real time system. (7)

13. (a) With neat sketch explain in detail about the algorithm used for implementing distributed shared memory. What are the design and implementation issues of distributed shared memory? (13)

Or

(b) How many types of load distributing algorithms are there in a distributed system based on their usage of current systems state? Explain. (13)

14. (a) Discuss the design principles and structure of mobile operating systems. Also explain the features of Android operating system. (13)

Or

(b) (i) How would you measure the performance of the processes with respect to the real time task scheduling? Explain. (7)

(ii) Discuss in detail about how resource sharing is handled effectively in real time operating system with suitable example. (6)

15. (a) (i) Discuss the case study of any grid computing system in terms of features, scheduling and implementation details. (7)

(ii) Discuss the difference between IOS, Android and Windows Mobile operating systems. (6)

Or

(b) Discuss the Micro, Nano and Monolithic kernel models of real time and embedded systems. Discuss the various applications or real life areas where real time and embedded operating systems are used. (13)

PART C — (1 × 15 = 15 marks)

- (a) Consider a three process system in which process may request any of 12 drives. Suppose the allocation state is as given in Table 2. Show that the allocation state is unsafe. Will this system deadlock?

	Allocation	Max	Need	Available
P_0	5	10		12
P_1	2	4		
P_2	3	9		

Or

- (b) Consider the set of 4 processes whose arrival time and burst time are given in Table 1.

		Table 1		
Process No.	Arrival Time	Burst Time		
		CPU Burst	I/O Burst	CPU Burst
P1	0	3	2	2
P2	0	2	4	1
P3	2	1	3	2
P4	5	2	2	1

If the CPU scheduling policy is Shortest Remaining Time First, calculate the average waiting time and average turnaround time.