Reg. No. : | | | | | | | | | | |

Question Paper Code: 52133

M.E. DEGREE EXAMINATION, DECEMBER 2015

First Semester

Computer Science and Engineering

15PCS103 - ADVANCED OPERATING SYSTEMS

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. Operating system is a program that manages the _____

   (a) software (b) hardware

   (c) people (d) programmers

2. A system has 3 processes sharing 4 resources. If each process needs a maximum of 2 units then, deadlock _____

   (a) never occur (b) may occur (c) has to occur (d) none of these

3. In distributed file system, a file is uniquely identified by _____

   (a) host name (b) local name

   (c) both a and b (d) neither a nor b

4. Real time systems must have _____

   (a) preemptive kernels (b) non preemptive kernels

   (c) a or b (d) neither a nor b

5. _____ is responsible for maintaining the abstractions of the operation system in Linux.

   (a) System libraries (b) System utilities

   (c) Kernel (d) Compiler

PART - B (5 x 3 = 15 Marks)

6. Distinguish between preemptive and non-preemptive scheduling.

7. How does Lamport's algorithm guarantee mutual exclusion?

8. Mention the issues in load distributing.

9. List out the characteristics of real time systems.

10. The LINUX kernel does not allow paging out of kernel memory. What effect does this restriction have on the kernel's design?

PART - C (5 x 16 = 80 Marks)

11. (a) Consider the following snapshot of a system:

	Allocation				Max.				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P_0	0	0	1	2	0	0	1	2	1	5	2	0
P_1	1	0	0	0	1	7	5	0				
P_2	1	3	5	4	2	3	5	6				
P_3	0	6	3	2	0	6	5	2				
P_4	0	0	1	4	0	6	5	6				

Answer the following questions using the Banker's algorithm:

(i) What is the content of the matrix need?

(ii) Is the system in a safe state?

(iii) If a request from process P_1 arrives for (0, 4, 2, 0) can the request be granted immediately. (16)

Or

(b) Consider a system with a set of processes P1, P2, P3 and their CPU burst time, priorities and arrival times being mentioned below:

Process	Burst time	Arrival time	Priority
P1	05	0	2
P2	15	1	3
P3	10	2	1

Assuming 1 to be the highest priority, calculate the following:

(i) Average waiting time using FCFS, SJF (preemptive and non-preemptive) and priority (preemptive and non-preemptive) scheduling mechanism.

(ii) Average turnaround time using FCFS, SJF (preemptive and non-preemptive) and priority (preemptive and non-preemptive) scheduling mechanism.

(iii) Assuming time quantum to be 2 units of time, calculate average waiting time and average turnaround time using RR scheduling. (16)

12. (a) Consider the following scheme to reduce message traffic in distributed deadlock detection. Transactions are assigned unique priorities, and an antagonistic conflict occurs when a transaction waits for a data object that is locked by a lower priority transaction. Deadlock detection is initiated only when an antagonistic conflict occurs. When a waiting transaction receives a probe that is initiated by a lower priority transaction, the probe is discarded.

(i) Determine the number of messages exchanged to detect a deadlock in the 'best'case.

(ii) Determine the number of messages exchanged to detect a deadlock in the 'average'case.

(iii) Determine the number of messages exchanged to detect a deadlock in the 'worst'case.

(iv) Determine the saving (in percentage) in the average number of messages exchanged under this message traffic reduction scheme as compared to when no such is used. (16)

Or

(b) (i) Explain the Lamport's logical clock and vector clocks with a neat diagram. (10)

(ii) Write the Chandy - Lamport's global state recording algorithm. (6)

13. (a) Describe the distributed shared memory. Explain the algorithms that are developed for implementing the DSM. (16)

Or

(b) Design a decentralized two-phase commit protocol,

(i) Where no site is designated to be a coordinator. (8)

(ii) Which uses only O(N) messages where N is the number of sites in the system. (8)

14. (a) Explain the real time task scheduling and methods of handling resources in real time systems. (16)

Or

(b) Discuss in detail about the mobile operating systems. (16)

15. (a) Explain the process and memory management policy of Linux system. (16)

Or

(b) Explain in detail about the system components of Windows 2000. (16)