Question Paper

Exam Date & Time: 02-May-2019 (02:00 PM - 05:00 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

INTERNATIONAL CENTRE FOR APPLIED SCIECES
IV SEMESTER B.Sc. (APPLIED SCIENCES) IN ENGINEERING
END SEMESTER THEORY EXAMINATION-APRIL/MAY 2019
OPERATING SYSTEMS [ICS 243]

Marks: 100 **Duration: 180 mins.**

Answer 5 out of 8 questions.

1) Explain Dual Mode operation with neat diagram (6)

A)

B) Give the queueing diagram representation of process scheduling and explain the role of different process schedulers. (6)

C) What is the role of Operating system with respect to process management, memory management and storage management? (8)

2) What is system call? List different types of system calls (6)

A)

B) What are the different states of a process? Explain with neat diagram. (6)

C) Explain different threading issues in multi-threaded programming (8)

3) Explain FCFS CPU scheduling algorithm for the following set of processes. (10)

A) Draw Gantt Chart and calculate average turnaround time and average waiting time.

Job (Processes)	Arrival Time	CPU Time (Burst Time)
P1	0	6
P2	1	2
P3	2	5
P4	3	7
P5	7	1

B) Define the following (5)
i. CPU utilization
ii. Throughput
iii. Turnaround Time
iv. Waiting Time
v. Response Time

C) What are the three multithreaded models ? Explain various benefits of threads (5)

4) (5)

A) Explain direct and indirect communication of message passing systems

B) Explain Peterson's solution to the critical section problem. Justify how mutual exclusion, progress and bounded-waiting requirement is met? (7)

C) What is monitor? Along with its the syntax and semantics , describe the monitor solution to the Dining Philosopher's solution (8)

5) Explain bounded buffer problem and Reader-writers problem (6)

A)

B) What are the various methods of handling the deadlocks (6)

C) What are the different data structures used in Banker's algorithm? Give algorithm with all the steps used in safety algorithm. (8)

6) What is swapping? Differentiate between internal and external fragmentation. (5)

A)

B) Explain any two structure of page table (6)

C) For the following page reference string, apply LRU, OPTIMAL and FIFO page replacement algorithm and hence find out the number of page faults. Consider all frames are initially empty and use 3 frames. (9)

Page reference : 7 0 1 2 0 3 0 4 2 3 0 3 2 1 2 0 1 7 0 1

7) Explain sequential access method and direct access method used in file systems (8)

A)

B) A variable-partition multiprogramming system uses a free memory list to track available memory. The current list contains entries of 150KB, 360KB, 400KB, 625KB, and 200KB as free five memory blocks. The system receives requests for Job1=215KB, Job2=171KB, Job3= 86KB and Job4= 481KB, in that order. Describe the final contents of the free memory list if the system used each of the following memory placement strategies. (6)

i. Best-fit
ii. Worst-fit
iii. First Fit

C) List all different types of file extensions and their functions (6)

8) Write a note on following (5x4) (20)

i. Access matrix with owner rights
ii. Components of Linux system
iii. Semaphore and critical section
iv. Directory structure.

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