Question Paper

Exam Date & Time: 11-Jun-2019 (09:30 AM - 12:30 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 - S2]

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

Answer 5 out of 8 questions.

1) Mention any four activities of operating system with respect to process management and file - system management (8)

A)

B) Mention any four types of system calls with their functions that is provided by OS (8)

C) Write any two differences between shared memory and message passing models for inter-process communication. (4)

2) Explain all multithreading models with neat diagram (6)

A)

B) With neat diagram, explain the queueing diagram and its significance in process scheduling. (4)

C) Explain Round Robin scheduling algorithm for following set of processes. Assume quantum=2ms. Assume P_i is in front of the ready queue if P_i and P_j processes arriving at the same time where $i < j$. (10)

Processes	Burst Time (in ms)	Arrival Time
P1	15	7
P2	6	0
P3	3	5
P4	1	0
P5	9	6
P6	4	5

Draw Gantt Chart and calculate average waiting time and average turn-around time.

3) Explain all the threading issues used in multithreaded programming (8)

A)

B) State first readers-writers problem. Write pseudo-code semaphore solution for the first readers-writers problem with the required data structures. (8)

C) Explain deadlock situation of incorrect use of wait() and signal() by 2 processes on 2 resources A and B. Show complete structure of processes P1 and P2 with appropriate wait() and signal() call sequences on resources A and B causing deadlock among P1 and P2. Justify your answer. (4)

4) What is demand paging? List the steps involved in handling a page fault with a (10)

4) What is demand paging? List the steps involved in handling a page fault with a neat diagram. (10)

A)

B) Consider the following snapshot of the following (10)

	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P0	0	0	1	2	0	0	1	2	1	5	2	0
P1	1	0	0	0	1	7	5	0				
P2	1	3	5	4	2	3	5	6				
P3	0	6	3	2	0	6	5	2				
P4	0	0	1	4	0	6	5	6				

Answer the following using Bankers algorithm

i) What is the content of the matrix Need?

ii) Is the system in a safe state?

iii) If a request from process P1 arrives(0,4,2,0) can the request be granted immediately?

5) Explain paging hardware with TLB with neat diagram (6)

A)

B) Write a pseudo-code for Dining-Philosophers problem using Monitors that provide deadlock free solution with appropriate data structure and condition variable. (6)

C) Consider the following page reference string: (8)
4, 3, 2, 1, 2, 1, 5, 4, 6,7,2,3,1,6,4,3,1,3,4,6
How many page faults would occur for the following replacement algorithms, with four page frames? Remember that all frames are initially empty.

i) LRU Replacement

ii) Optimal replacement

6) Give at least six file types along with their extension with respect to file system. (6)

A)

B) Explain any three components of kernel model which Linux supports (6)

C) What is Access Matrix? Illustrate its concepts with four domain and four objects. Explain Global Table implementation of Access matrix (8)

7) Explain mandatory locks and advisory locks? What are the advantages and disadvantages of providing mandatory locks instead of advisory locks whose usage is left to user's discretion? (6)

A)

B) Differentiate between single-level directory and two-level directory with neat diagram (6)

C) Explain the operation of inverted page table and hashed page table with a neat diagram (8)

8) Explain dual-mode operation with neat diagram (6)

A)

B) Explain with neat diagram the various states of the process (6)

C) Explain the below concepts in access matrix : (8)
i) Capability Lists
ii) Copy rights

II) Copy rights

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