CBCS SCHEME

USN | | | | | | | | | | 15CS64

Sixth Semester B.E. Degree Examination, June/July 2019
Operating Systems

Time: 3 hrs. Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Explain the role of operating system from different viewpoints. Explain the dual mode of operation of an operating system. **(07 Marks)**

b. Demonstrate the concept of virtual machine with an example. **(05 Marks)**

c. Explain the types of multiprocessing system and the types of clustering. **(04 Marks)**

OR

2 a. Describe the implementation of interprocess communication using shared memory and message passing. **(06 Marks)**

b. Demonstrate the operations of process creation and process termination in UNIX. **(06 Marks)**

c. Explain the different states of a process, with a neat diagram. **(04 Marks)**

Module-2

3 a. Discuss the threading issues that come with multithreaded program. **(08 Marks)**

b. Illustrate how Reader's-Writer's problem can be solved by using semaphores. **(08 Marks)**

OR

4 a. Calculate the average waiting time by drawing Gantt chart using FCFS (First Come First Serve), SRTF (Shortest Remaining Time First), RR (Round Robin) [q = 2 ms] algorithms.

Process	Arrival time	Burst time
P_1	0	9
P_2	1	4
P_3	2	9
P_4	3	5

(08 Marks)

b. Explain the Dining-Philosopher's problem using monitors. **(08 Marks)**

Module-3

5 a. Determine whether the following system is in safe state by using Banker's algorithm.

Process	Allocation			Maximum			Available		
	A	B	C	A	B	C	A	B	C
P_0	0	1	0	7	5	3	3	3	2
P_1	2	0	0	3	2	2			
P_2	3	0	2	9	0	2			
P_3	2	1	1	2	2	2			
P_4	0	0	0	4	3	3			

If a request for P_1 arrives for (1 0 2), can the request be granted immediately? **(09 Marks)**

b. Discuss the various approaches used for deadlock recovery. **(07 Marks)**

OR

6 a. Illustrate with example, the internal and external fragmentation problem encountered in continuous memory allocation. (07 Marks)
b. Explain the structure of page table. (09 Marks)

Module-4

7 a. Illustrate how demand paging affects systems performance. (08 Marks)
b. Describe the steps in handling a page fault. (08 Marks)

OR

8 a. Explain the various types of directory structures. (08 Marks)
b. Describe various file allocation methods. (08 Marks)

Module-5

9 a. Explain the access matrix model of implementing protection in operating system. (07 Marks)
b. Explain the following disk scheduling algorithm in brief with examples:
i) FCFS scheduling
ii) SSTF scheduling
iii) SCAN scheduling
iv) LOOK scheduling (09 Marks)

OR

10 a. Explain the components of LINUX system with a neat diagram. (08 Marks)
b. Explain the way process is managed in LINUX platform. (08 Marks)

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Sixth Semester B.E. Degree Examination, Dec.2019/Jan.2020
Operating Systems

Time: 3 hrs. Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. What is operating system? Explain multiprogramming and time sharing systems. **(06 Marks)**

b. Explain dual mode operating in operating system with a neat block diagram. **(05 Marks)**

c. What are system calls? Briefly point out its types. **(05 Marks)**

OR

2 a. Explain process states with state transition diagram. Also explain PCB with a neat diagram. **(06 Marks)**

b. What is interprocess communication? Explain its types. **(05 Marks)**

c. With a neat diagram, explain the concept of virtual machines. **(05 Marks)**

Module-2

3 a. For the process listed below, draw Gantt charts using pre-emptive and non-preemptive priority scheduling algorithm. A larger priority number has a higher priority. Calculate Average Weighing Time and Average turnaround time.

Jobs	Arrival Time	Burst Time	Priority
J_1	0	6	4
J_2	3	5	2
J_3	3	3	6
J_4	5	5	3

(06 Marks)

b. Is CPU scheduling necessary? Discuss the five different scheduling criterias used in the computing scheduling mechanism. **(05 Marks)**

c. Explain multithreading models. **(05 Marks)**

OR

4 a. Define semaphores. Explain its usage and implementation. **(06 Marks)**

b. Explain Reader-Write problem with semaphore in detail. **(05 Marks)**

c. What are monitors? Explain dining Philospher's solution using monitor. **(05 Marks)**

Module-3

5 a. System consists of five jobs (J_1, J_2, J_3, J_4, J_5) and three resources (R_1, R_2, R_3). Resource type R_1 has 10 instances, resource type R_2 has 5 instances and R_3 has 7 instances. The following snapshot of the system has been taken.

Jobs	Allocation			Maximum			Available		
	R_1	R_2	R_3	R_1	R_2	R_3	R_1	R_2	R_3
J_1	0	1	0	7	5	3	3	3	2
J_2	2	0	0	3	2	2			
J_3	3	0	2	9	0	2			
J_4	2	1	1	2	2	2			
J_5	0	0	2	4	3	3			

Find need matrix and calculate the safe sequence by using Banker's algorithm. Mention the above system is safe or not safe. **(06 Marks)**

b. What is dead lock? What are necessary conditions an operating system must satisfy for a dead lock to occur? **(05 Marks)**
c. What is a Resource Allocation Graph (RAG)? Explain how RAG is very useful is describing deadly embrace by considering own example. **(05 Marks)**

OR

6 a. What are Translation Load aside Buffer (TLB)? Explain TLB in detail with a simple paging system with a neat diagram. **(06 Marks)**
b. Given the memory partitions of 100 K, 500 K, 200 K, 300 K and 600 K apply first fit, best fit and worst fit algorithms to place 212K, 417K, 112K and 426K. **(05 Marks)**
c. Describe both internal and external fragmentation problems encountered in a contiguous memory allocation scheme. **(05 Marks)**

Module-4

7 a. Consider the following page reference stream: 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1. How many page faults would occur for LRU and FIFO replacement algorithms assuming 3 frames? Which one of the above is most efficient? **(06 Marks)**
b. Explain demand paging system. **(05 Marks)**
c. What is thrashing? How can it be controlled? **(05 Marks)**

OR

8 a. Explain briefly the various operations performed on files. **(06 Marks)**
b. Explain the various access methods of files. **(05 Marks)**
c. Explain various allocation methods in implementing file systems. **(05 Marks)**

Module-5

9 a. Explain the various Disk Scheduling algorithms with example. **(08 Marks)**
b. Explain access matrix method of system protection. **(08 Marks)**

OR

10 a. With a neat diagram explain in detail components of a Linux system. **(06 Marks)**
b. Explain the different IPC mechanisms available in Linux. **(05 Marks)**
c. Explain process scheduling in a Linux system. **(05 Marks)**

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Sixth Semester B.E. Degree Examination, Dec.2018/Jan.2019
Operating Systems

Time: 3 hrs. Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Distinguish between the following terms :
i) Multiprogramming and multitasking
ii) Multiprocessor systems and clustered systems. **(04 Marks)**

b. Analyze modular kernel approach with layered approach with a neat sketch. **(06 Marks)**

c. List and explain the services provided by OS for the user and efficient operation of system. **(06 Marks)**

OR

2 a. Illustrate with a neat sketch, the process states and process control block. **(08 Marks)**

b. Discuss the methods to implement message passing IPC in detail. **(08 Marks)**

Module-2

3 a. Discuss the benefits of multithreaded programming. **(04 Marks)**

b. Consider the following set of processes with CPU burst time (in ms).

Process	Arrival time	Bunt time
P1	0	6
P2	1	3
P3	2	1
P4	3	4

Compute the waiting time and average turnaround time for the above process using FCFS, SRT and RR (time quantum = 2ms) scheduling algorithm. **(12 Marks)**

OR

4 a. Illustrate with examples the Peterson's solution for critical section problem and prove that the mutual exclusion property is preserved. **(08 Marks)**

b. Show how semaphore provides solution to reader writers problem. **(08 Marks)**

Module-3

5 a. Define deadlock. Write short notes on 4 necessary conditions that arise deadlocks. **(06 Marks)**

b. Assume that there are 5 processes PO through P4 and 4 types of resources. At time T_0 we have the following state :

Process	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				

Apply Banker's algorithm to answer the following :

i) What is the content of need matrix?

ii) Is the system in a safe state?

iii) If a request from a process P1(0, 4, 2, 0) arrives, can it be granted? **(10 Marks)**

OR

6 a. Write short notes on :

i) External and internal fragmentation

ii) Dynamic loading and linking. **(04 Marks)**

b. Analyze the problem in simple paging technique and show how TLB is used to solve the problem. **(08 Marks)**

c. Given the memory partitions of 200k, 700k 500k, 300k, 100k, 400k. Apply first fit and best fit to place 315k, 427k, 250k, 550k. **(04 Marks)**

Module-4

7 a. For the following page reference string 1, 2, 3, 4, 1, 2, 5, 1, 2, 3, 4, 5. Calculate the page faults using FIFO and LRU for memory with 3 and 4 frames. **(08 Marks)**

b. Explain demand paging in detail. **(08 Marks)**

OR

8 a. What do you mean by free space list? With suitable example, explain any 3 methods of free space list implementation. **(08 Marks)**

b. Write short notes on linked and indexed allocation method with a neat diagram. **(08 Marks)**

Module-5

9 a. Given the following sequences 95, 180, 34, 119, 11, 123, 62, 64 with the head initially at track 50 and ending at track 199. What is the total disk traveled by the disk arm to satisfy the request using FCFS, SSTF, LOOK and CLOOK algorithm. **(12 Marks)**

b. Write short notes on access matrix and its implementations. **(04 Marks)**

OR

10 a. Explain the components of Linux system with a neat diagram. **(08 Marks)**

b. Describe briefly on Linux Kernel modules. **(08 Marks)**

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