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CBCS SCHEME

USN | | | | | | | | | | |

18CS43

Fourth Semester B.E. Degree Examination, July/August 2022
Operating Systems

Time: 3 hrs. Max. Marks: 100

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

Module-1

1 a. Distinguish between the following terms:
i) Multi programming and multitasking.
ii) Multi processor systems and clustered systems. **(10 Marks)**

b. Define Operating Systems. Explain dual mode of operating systems with a neat diagram. **(05 Marks)**

c. Explain about system calls with an example of handling a user application invoking the open( ) system call. **(05 Marks)**

OR

2 a. What is a process? Illustrate with a neat diagram the different states of a process and control block. **(05 Marks)**

b. Discuss the implementation of IPC using message passing systems in detail. **(10 Marks)**

c. List and explain the services provided by OS for the user and efficient operation of system. **(05 Marks)**

Module-2

3 a. Give a brief description about multithreading and explain the different multi threading models. **(05 Marks)**

b. Discuss the issues that come with multithreaded programming. **(10 Marks)**

c. Explain CPU scheduling criteria. **(05 Marks)**

OR

4 a. Calculate the average waiting time and the average turnaround time by drawing the Gantt chart using FCFS, SRTF, RR (q = 2ms) and priority algorithms. Lower priority number represents higher priority.

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

(12 Marks)

b. What is critical section problem? What are the requirements for the solution to critical section problem? Explain Peterson's solution. **(08 Marks)**

Module-3

5 a. What is a deadlock? What are the necessary conditions for the deadlock to occur? **(05 Marks)**

b. How to prevent the occurrence of deadlock, explain in detail. **(05 Marks)**

c. Consider the following snapshot of a system:

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

Answer the following using Banker's algorithm.

i) Is the system in safe state? If so, give the safe sequence.

ii) If process P_2 requests (0, 1, 1, 3) resources can it be granted immediately? **(10 Marks)**

OR

6 a. Explain paging hardware with TLB. **(05 Marks)**

b. Explain segmentation in detail. **(05 Marks)**

c. Discuss structure of page table with suitable diagrams. **(10 Marks)**

Module-4

7 a. Describe the steps in handling page faults. **(06 Marks)**

b. Consider the page reference string: 1, 0, 7, 1, 0, 2, 1, 2, 3, 0, 3, 2, 4, 0, 3, 6, 2, 1 for a memory with 3 frames. Determine the number of page faults using FIFO, optimal and LRU replacement algorithms. Which algorithm is most efficient? **(14 Marks)**

OR

8 a. Explain the different allocation methods. **(10 Marks)**

b. Discuss the various directory structures with required diagrams. **(10 Marks)**

Module-5

9 a. Explain access matrix method of system protection with domain as objects and its implementation. **(10 Marks)**

b. A drive has 5000 cylinders numbered 0 to 4999. The drive is currently serving a request at 143 and previously serviced a request at 125. The queue of pending requests in FIFO order is: 86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130. Starting from current head position, what is the total distance travelled (in cylinders) by disk arm to satisfy the requests using FCFS, SSTF, SCAN, LOOK and C-LOOK algorithms. **(10 Marks)**

OR

10 a. With a neat diagram, explain the components of a Linux system. **(08 Marks)**

b. Explain the different IPC mechanisms available in Linux. **(06 Marks)**

c. Discuss about scheduling in Linux. **(06 Marks)**

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18CS43

Fourth Semester B.E. Degree Examination, Feb./Mar. 2022
Operating Systems

Time: 3 hrs. Max. Marks: 100

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

Module-1

1 a. Explain the dual mode operation of operating system. **(07 Marks)**

b. Explain layered approach structure of operating system with diagram. **(07 Marks)**

c. Differentiate client server computing and peer-to-peer computing. **(06 Marks)**

OR

2 a. Explain operating system services with respect to user and system with figure. **(07 Marks)**

b. What is Process? Explain different states of a process with state diagram. **(07 Marks)**

c. With a neat diagram, explain the concept of virtual machines. **(06 Marks)**

Module-2

3 a. Draw the Gantt chart and calculate average waiting time and turn around time for the following snapshot of processes using i) FCFS ii) SRTF iii) RR (2ms). **(07 Marks)**

Process id	Burst time	Arrival time
P_1	6	0
P_2	3	1
P_3	1	2
P_4	4	3

b. Explain different types of multithreading models. **(07 Marks)**

c. Explain Dining philosopher's problem using monitors. **(06 Marks)**

OR

4 a. Calculate the average waiting time and turn around time for the following snapshol of process using:

i) Non-preemptive SJF

ii) Non-preemptive priority

iii) Round Robin (TQ = 1ms).

P	Burst Time	Priority
P_1	10	3
P_2	1	1
P_3	2	3
P_4	1	4
P_5	5	2

(07 Marks)

b. Show how semaphores provides solution to reader writers problem. **(07 Marks)**

c. Explain critical section problem. What are the requirements that critical section problem must satisfy. **(06 Marks)**

Module-3

5 a. Describe the resource allocation graph i) With deadlock ii) With a cycle but no deadlock **(06 Marks)**

b. Using Bankers algorithm determine whether the following system is in a safe state.

Process	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P_0	0	0	2	0	0	4	1	0	2
P_1	1	0	0	2	0	1			
P_2	1	3	5	1	3	7			
P_3	6	3	2	8	4	2			
P_4	1	4	3	1	5	7			

If a request from process P_2 arrives for (0, 0, 2) can the request be granted immediately? **(07 Marks)**

c. Illustrate with example the internal and external fragmentation problem. **(06 Marks)**

OR

6 a. What are Translation Loadaside Buffer (TLB)? Explain TLB in detail with a simple paging system with a neat diagram. **(07 Marks)**

b. What is deadlock? What are necessary conditions for deadlock? **(07 Marks)**

c. With the help of a neat diagram, explain the various steps of address binding. **(06 Marks)**

Module-4

7 a. Consider the following page reference string
7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1
Assuming there are 3 memory frames, how many page faults would occur in case of i) LRU ii) Optimal algorithm note that initially all frames are empty. **(07 Marks)**

b. Explain the various operations performed on files. **(07 Marks)**

c. With suitable example, explain any two methods of implementation of free space list. **(06 Marks)**

OR

8 a. Illustrate how demand paging affects system performance. **(07 Marks)**

b. Explain the various access methods of files. **(07 Marks)**

c. What is thrashing? How it can be controlled? **(06Marks)**

Module-5

9 a. Describe the different Linux Kernel modules. **(07 Marks)**

b. Explain different IPC mechanisms available in Linux. **(07 Marks)**

c. Explain process scheduling in a Linux system. **(06 Marks)**

OR

10 a. With a neat diagram, explain in detail the component of a Linux operating system. **(07 Marks)**

b. Explain the various disk scheduling algorithm with example. **(07 Marks)**

c. Explain the file system implementation in Linux. **(06 Marks)**

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18CS43

Fourth Semester B.E. Degree Examination, Jan./Feb. 2021
Operating Systems

Time: 3 hrs. Max. Marks: 100

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

Module-1

1 a. Explain in detail about abstract view of the components of a computer system with a neat diagram. **(10 Marks)**

b. Explain about computer system organization with a neat diagram. **(10 Marks)**

OR

2 a. Discuss briefly about operating system operations with diagram. **(10 Marks)**

b. Discuss briefly about types of system calls with illustration. **(10 Marks)**

Module-2

3 a. Discuss in detail about multithreading models with suitable illustration. **(10 Marks)**

b. Explain about the different scheduling criteria in process scheduling concept. **(10 Marks)**

OR

4 a. Explain in detail about multiple – processor scheduling with example. **(10 Marks)**

b. Discuss briefly about the critical – section problem with example. **(10 Marks)**

Module-3

5 a. Discuss briefly about semaphores in sychronization. **(10 Marks)**

b. Discuss in detail about deadlock characteristics with example. **(10 Marks)**

OR

6 a. Discuss in detail about contiguous memory allocation with illustration. **(10 Marks)**

b. Explain in detail about paging in a memory management scheme. **(10 Marks)**

Module-4

7 a. Discuss briefly about demand – paging in memory management scheme. **(10 Marks)**

b. Discuss briefly about file attributes in a file system. **(10 Marks)**

OR

8 a. Explain in detail about various file operations in a file system. **(10 Marks)**

b. Explain in detail about various file types in a file system. **(10 Marks)**

Module-5

9 a. Explain in detail about over view of mass storage structure. **(10 Marks)**

b. Discuss about design principles of LINUX system. **(10 Marks)**

OR

10 a. Discuss about process management in a LINUX system. **(10 Marks)**

b. Explain about inter process communication in the LINUX system. **(10 Marks)**

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