Q. Code:791798

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

B.E. / B.TECH. DEGREE EXAMINATIONS, MAY 2024

Fourth Semester

CS22401 – OPERATING SYSTEMS

(Computer Science and Engineering & Artificial Intelligence and Data Science)

(Regulation 2022)

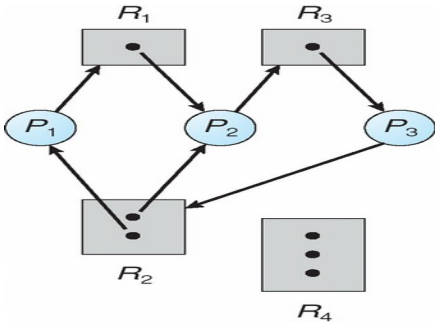
TIME: 3 HOURS **MAX. MARKS: 100**

COURSE OUTCOMES	STATEMENT	RBT LEVEL
CO 1	Infer the OS features and operations while working in operating system	**2**
CO 2	Analyze various scheduling algorithms and process synchronization	**4**
CO 3	Evaluate the performance of various memory management techniques	**5**
CO 4	Design a simple file system and analyze the performance	**4**
CO 5	Work with some popular operating systems like Linux, Windows	**5**

PART- A (20 x 2 = 40 Marks)

(Answer all Questions)

		CO	RBT LEVEL
1.	List the importance of operating system from System perspective.	**1**	**2**
2.	Discuss on privileged instructions.	**1**	**2**
3.	Identify the changes in instruction cycle when an interrupt is involved.	**1**	**2**
4.	Discuss the use of fork() and exec() system calls?	**1**	**2**
5.	List the attributes in the Process Control Block.	**2**	**4**
6.	Analyze the scheduling criteria of process scheduling.	**2**	**4**
7.	Identify how a user program disturbs the normal operation of the system?	**2**	**3**
8.	Give an example for cooperating processes and discuss the reason.	**2**	**3**
9.	Compare safe state and unsafe state. Whether all unsafe state ends in deadlock?	**3**	**4**
10.	Inspect and check whether the given resource allocation graph ends in deadlock:	**3**	**4**



11.	Analyze the cause of thrashing and how does the system detect thrashing?		**3**	**4**
12.	Consider the following segment table:		**3**	**5**

Segment	Base	Length
0	319	600
1	2400	20
2	100	110
3	1327	580
4	1952	96

criticize the physical addresses for the following logical addresses?

a. 0,450

b. 1,10

c. 2,500

d. 3,500

e. 4,180

13.	List the various file attributes.		**4**	**4**
14.	Illustrate the access list privilege for chmod 711.		**4**	**4**
15.	List the various file allocation methods.		**4**	**4**
16.	Compare sequential access and random access.		**4**	**4**
17.	List the components of a Linux System.		**5**	**4**
18.	Interpret how the virtual address is composed in MULTICS.		**5**	**5**

			Marks	CO	RBT LEVEL
19.		List the message queue associated in each process in RC4000.	**5**	**4**	
20.		Criticize spooling.	**5**	**5**	

PART- B (5 x 10 = 50 Marks)

			Marks	CO	RBT LEVEL
21.(a)	**(i)**	With suitable diagram explain the concept of memory hierarchy.	**(4)**	**1**	**2**
	(ii)	Discuss in detail about the System Calls in operating system.	**(6)**	**1**	**2**
		(OR)			
(b)		With suitable diagram discuss about the structure of the operating system.	**(10)**	**1**	**2**
22.(a)		Consider the following set of processes, with the length of the CPU burst given in milliseconds:	**(10)**	**2**	**4**

Process	Burst Time	Arrival Time
P0	8	0
P1	4	3
P2	5	4
P3	9	2
P4	2	5

a. Illustrate the execution of these processes using the following scheduling algorithms in both preemptive and Non-preemptive mode: FCFS, SJF, and RR (quantum =2).

b. What is the turnaround time of each process for each of the scheduling algorithms?

c. Calculate the waiting time of each process and analyze the scheduling algorithms.

(OR)

(b)		With suitable working principle and diagram explain about Interprocess communication.	**(10)**	**2**	**4**

23.(a) Illustrate the Banker's algorithm with step by step procedure and explain with the following example. **(10) 3 5**

Process	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P_0	1	2	1	8	6	4	4	4	3
P_1	3	1	1	4	3	3			
P_2	4	1	3	10	1	3			
P_3	3	2	2	3	3	3			
P_4	1	1	3	5	4	4			

(OR)

(b) **(i)** Discuss about the demand paging in detail with suitable diagram. **(5) 3 5**

(ii) Consider the following page reference string:1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 1, 2, 3, 6. How many page faults would occur in the FIFO and Optimal Algorithm with 3 frames? Remember all frames are initially empty, so your first unique pages will all cost one fault each. **(5) 3 5**

24.(a) Suppose that a Music App like Spotify has 2000 songs, numbered 0 to 1999. The app is currently serving a request at song 143, and the previously played song was 125. The queue of pending song requests, in FIFO order, is 98, 1280, 713, 1574, 648, 1309, 122, 150, 140 Starting from the current song, what is the total distance that the disk arm moves to satisfy all the pending song requests, for each of the following disk scheduling algorithms 1. FCFS, 2. SCAN 3. CSCAN **(10) 4 4**

(OR)

(b) Discuss in detail the most common schemes for defining the logical structure of a directory with suitable diagram. List the operations performed on directory. **(10) 4 4**

25.(a) Analyze the conclusions drawn about the evolution of operating systems? What causes some operating systems to gain its popularity and others to fade? **(10) 5 5**

(OR)

(b)	Discuss about Macintosh Operating System.	**(10)**	**5**	**5**

PART- C (1 x 10 = 10 Marks)

(Q.No.26 is compulsory)

		Marks	CO	RBT LEVEL
26.	State the Dining Philosopher‘s problem and With your recommendations and with suitable monitoring allocate the several resources among several processors in a deadlock and starvation free manner with suitable diagram.	**(10)**	**2**	**5**

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