CHAROTAR UNIVERSITY OF SCIENCE AND TECHNOLOGY

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SEMESTER: 4TH SUBJECT:DATA WAREHOUSING AND DATA MINING DATE:23-03-2020

UNIT-1 ITRODUCTION TO OPERATING SYSTEM

1	What is Os? What are the common tasks performed by OS? When this tasks are performed by OS?	7
2	Defined distributed operating system. Give the key concept and techniques of distributed operating system.	6
3	Explain the working of micro kernel based os with neat diagram.	6
4	What are the two main functions of operating system?	1
5	What is the principle advantage of multiprogramming?	1
6	What is operating system? Explain batch operating system, multiprogramming, multitasking and distributed operating system.	7
7	Write a note on multi processor system.	4
8	Write a note on Real Time System. Also explain the advantages and disadvantages.	4
9	List five services provided by an Operating System. Explain how each of them provides convenience to user? Explain in which condition it is impossible for user level programs to provide their services.	5
10	Describe the stages of evolution of an operating system in brief.	7
11	Number process completed per unit time is _____	1
12	A program in execution is_____	1

UNIT-2 PROCESS MANAGEMENT

1	Define process and explain the process state diagram with neat diagram.	7
2	With the diagram explain the working of long term, medium term and short term scheduler.	7
3	For the following given process scheduling:	7

Process	P1	P2	P3	P4	P5
Admission Time	0	2	3	4	8
Service Time	3	3	5	2	3

Calculate mean turnaround time and mean weighting time for the 1)FCFS 2) Round Robin with time slice=1

4	Describe the action taken by an operating system to switch the context between kernel level thread.	3
5	Differentiate between user level thread and kernel level thread.	4
6	Explain the different types of scheduling queues.	7
7	Difference between kernel and shell.	1
8	Define the terms: Multiprogramming and Multithreading	2
9	What is the role of scheduler in operating system? List the types of scheduler.	2
10	Define process. Explain the content of PCB in detail.	4
11	Explain why interrupts are not appropriate for implementing synchronization primitives in multiprocessor system.	
12	What is the different thread library used? Explain pthread library with example.	7
13	What are the criteria for deciding a good process scheduling policy?	3

14 What is system call? 1

15 What are the responsibilities of OS in context of process management? 7

16 Explain the different scheduling criteria. 7

17 Consider the following set of processes with CPU burst time. 7

Process	Burst Time	Priority
P0	10	3
P1	13	1
P2	3	3
P3	8	4

Calculate mean turnaround time and average waiting time for 1)FCFS 2) Priority Scheduling-Preemptive approach. Assume the arrival of processes in P0-P1-P2-P3 order.

18 Write a note on threading issues. 3

19 Consider the processes given below. 7

Process	Burst Time	Arrival Time
P0	5	0
P1	3	1
P2	3	2
P3	1	4

Calculate average turnaround time and average waiting time for Round Robin algorithm with time slice=2. Why round robin scheduling algorithm is used to schedule the process.

20 For the processes with CPU burst and arrival time, 7

Process	Burst Time	Arrival Time
P0	12	0
P1	5	1
P2	9	2
P3	7	3

Calculate mean turnaround time and average waiting time for 1)FCFS 2) SJF 3)SRTF

21 Explain the following system call with example: 1) Wait and Signal 2) Fork 3) execlp 4

22 What are the differences between preemptive and non preemptive scheduling approaches? 4

23 Explain context switching. 2

24 Which algorithm results in starvation? Explain with suitable example. 4

25 What is interrupt? How it is handle by operating system.

26 Consider the following five processes with the length of the CPU burst time in milliseconds.

Process	Burst Time	Arrival Time
P0	10	3
P1	1	1
P2	2	3
P3	1	4
P4	5	2

Processes are Assumed to have arrived at time 0.

For the above set of processes find the average waiting time and average around time for each of the

following scheduling algorithm using Gantt chart. Consider 1 is highest priority.

1. SJF
2. Non preemptive Priority
3. RR (Q = 2)

27 Following table gives arrival time and expected run time of five processes. 7

Process	Burst Time	Arrival Time
P0	8	1
P1	1	4
P2	2	2
P3	1	5
P4	5	6

Ignore process switching overhead. Find average turnaround time for following scheduling algorithm.

1. Round robin (quantum = 1 sec)
2. Shortest Job First.

28 Define term Scheduler, Scheduling and Scheduling Algorithm with example. 3

29 Differentiate between preemptive and non-preemptive scheduling. Solve following by SJF preemptive and non-preemptive. Draw Gantt Chart, Average Waiting Time and Average Turnaround Time. Which one is better as per average turnaround time? 7

Process	Burst Time	Arrival Time
P0	6	0
P1	4	1
P2	5	3
P3	3	5

UNIT-3 INTER PROCESS COMMUNICATION

1 What is primary issue in implementing message passing? 7

2 Explain Dining Philosopher problem. 7

3 Explain briefly about inter process communication. 7

4 What is the race condition? Illustrate it with example. Why the presence of race condition is is considered as bad design. 7

5 Describe the way of implementing semaphores. 7

6 Define a critical section problem and its solution by using semaphore. Use this approach to solve producer/consumer problem. 7

7 What is the role of lock variable and TSL instruction in busy waiting? 4

8 What is Mutual exclusion? Explain Peterson's solution for mutual exclusion problem. 3

9 What is semaphore? Give the implementation of Bounded Buffer Producer Consumer Problem using Semaphore. 7

10 What is Mutex? Write a pseudo code to achieve mutual exclusion using mutex. 7

11 What is Semaphore? Explain its properties along with drawbacks. Explain any problem and solve it by Semaphore. 7

UNIT4-DEADLOCK

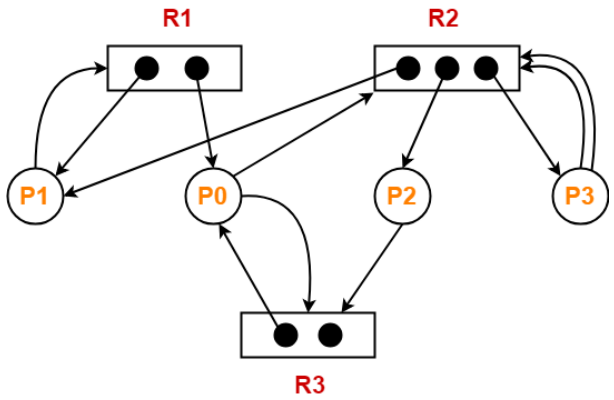
1	Define Deadlock. Explain the four necessary conditions required for deadlock.	5
2	Consider the following snapshot of the system.	7

Process	Allocation A B C D	Maximum A B C D	Available 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	

1) Draw the safe sequence.

2) If the request is coming from pa(0,4,2,0) can the request be granted immediately?

3	Explain in detail the deadlock detection technique.	7
4	Write difference between starvation and deadlock.	4
5	Explain the use of Banker's algorithm for multiple recourses for deadlock avoidance with illustration.	7
6	Explain deadlock recovery techniques in brief.	7
7	What is RAG? Explain briefly.	4
8	For the figure given below, discuss weather the system will be in safe state or not? If system is in safe state, find the safe sequence/sequences.	7



9	An operating system uses the Banker's algorithm for deadlock avoidance when managing the allocation of three resource types X, Y, and Z to three processes P0, P1, and P2. The table given below presents the current system state. Here, the Allocation matrix shows the current number of resources of each type allocated to each process and the Max matrix shows the maximum number of resources of each type required by each process during its execution.	7

	Allocation			Max		
	X	Y	Z	X	Y	Z
P0	0	0	1	8	4	3
P1	3	2	0	6	2	0
P2	2	1	1	3	3	3

There are 3 units of type X, 2 units of type Y and 2 units of type Z still available. The system is currently in a safe state. Consider the following independent requests for additional resources in the current state:

```
REQ1: P0 requests 0 units of X,
      0 units of Y and 2 units of Z
REQ2: P1 requests 2 units of X,
      0 units of Y and 0 units of Z
```

Will the system be in safe state?

10 **Consider a system with 4 types of resources R1 (3 units), R2 (2 units), R3 (3 units), R4 (2 units). A non-preemptive resource allocation policy is used. At any given instance, a request is not entertained if it cannot be completely satisfied. Three processes P1, P2, P3 request the sources as follows if executed independently.** 4

```
Process P1:
t=0: requests 2 units of R2
t=1: requests 1 unit of R3
t=3: requests 2 units of R1
t=5: releases 1 unit of R2
        and 1 unit of R1.
t=7: releases 1 unit of R3
t=8: requests 2 units of R4
t=10: Finishes

Process P2:
t=0: requests 2 units of R3
t=2: requests 1 unit of R4
t=4: requests 1 unit of R1
t=6: releases 1 unit of R3
t=8: Finishes

Process P3:
t=0: requests 1 unit of R4
t=2: requests 2 units of R1
t=5: releases 2 units of R1
t=7: requests 1 unit of R2
t=8: requests 1 unit of R3
t=9: Finishes
```

Which one of the following statements is TRUE if all three processes run concurrently starting at time t=0?

(A) All processes will finish without any deadlock

(B) Only P1 and P2 will be in deadlock.

(C) Only P1 and P3 will be in a deadlock.

(D) All three processes will be in deadlock

11 **Consider a system consisting of four resources of same type that are shared by three processes, each of which at most needs two recourses. Show that system is deadlock free. Initially each process has been allocated one recourse.** 7

12 **Assume we have the following resources:**

- **5 tape drives**
- **2 graphic displays**
- **4 printers**
- **3 disks**

We can create a vector representing our total resources: Total = (5, 2, 4, 3).

Consider we have already allocated these resources among four processes as demonstrated by the following matrix named Allocation.

Process Name	Tape Drives	Graphics	Printers	Disk Drives
Process A	2	0	1	1
Process B	0	1	0	0
Process C	1	0	1	1
Process D	1	1	0	1

Below is a matrix to show the number of each resource still needed for each process; we call this matrix Need.

Process Name	Tape Drives	Graphics	Printers	Disk Drives
Process A	**1**	**1**	**0**	**0**
Process B	**0**	**1**	**1**	**2**
Process C	**3**	**1**	**0**	**0**
Process D	**0**	**0**	**1**	**0**

Discuss weather system is in safe state or not?

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