Enroll. No._____

MARWADI UNIVERSITY

Faculty of Technology

CE/IT B.Tech

SEM: 4 **MU FINAL REMEDIAL** **APRIL: 2023**

Subject: - Operating System (01CE0401) **Date:-27/04/2023**

Total Marks:-100 **Time: -2:00 PM to 5:00 PM**

Instructions:

1. **All Questions are Compulsory.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Question: 1.

(a) Objective MCQ [10]

1) A binary semaphore is a semaphore with integer values :
   a) 1
   b) -1
   c) 0.8
   d) 0.6

2) Which one of the following is the deadlock avoidance algorithm?
   a) elevator algorithm
   b) banker's algorithm
   c) round-robin algorithm
   d) karn's algorithm

3) If the quantum time of round robin algorithm is very large, then it is equivalent to:
   a) Shortest Job Next
   b) Lottery scheduling
   c) First in first out
   d) None of the above

4) A thread is also called :
   a) Heavy Weight Process (HWP)
   b) Medium Weight Process
   c) Average Weight Process
   d) Light Weight Process (LWP)

5) A solution to the problem of external fragmentation is:
   a) compaction
   b) larger memory space
   c) smaller memory space
   d) none of the mentioned

6) A process is_____
   a) A program in main memory
   b) program in execution
   c) Program in cache memory
   d) program in secondary storage

7) Which of the following process scheduling algorithm may lead to starvation
   a) FIFO
   b) Round Robin
   c) Shortest Job Next
   d) None of the above

8) Which of the following do not belong to queues for processes ?
   a) Job Queue
   b) Device Queue
   c) Ready Queue
   d) PCB queue

9) If the wait for graph contains a cycle :
   a) then a deadlock does not exist
   b) then a deadlock exists
   c) then the system is in a safe state
   d) either deadlock exists or system is in a safe state

10) Page fault occurs when
   a) When a requested page is in memory
   b) When a requested page is not in memory
   c) When a page is corrupted
   d) When an exception is thrown

(b) Short Questions [10]

1) Operating system is a program which provides a means of communication between the computer and the person working on it. True or False.
2) State whether true or false :We can not use a computer without its operating system.
3) State whether true or false :DOS refers to Disc Operating System ?
4) To access the services of the operating system, the interface is provided by the system call. True or False
5) logical address is the address generated by CPU? True or False
6) Full form of SJF.
7) Full form of FIFO.
8) Full form of LRU.
9) Full form of RTOS.
10) Full form of RAM

Question: 2.

(a) What is process? Draw a process state transition diagram using five states and explain interpretation of each transition. [08]

(b) What is semaphore? Explain semaphore operation for producer consumer problem with code. [08]

OR

(b) Explain DMA with suitable diagram. [08]

Question: 3.

(a) Consider the following set of processes with the length of CPU burst time given in the milliseconds. [08]

Process	Arrival Time	Burst Time/Service Time
A	0	3
B	2	6
C	4	4
D	6	5
E	8	2

Draw Gantt charts and Calculate average turnaround time and average waiting Time for First-come first served scheduling and Shortest job first scheduling.

(b) Explain functionality provided by OS. [04]

(c) What is page and what is frame. How are the two related? [04]

OR

(a) Consider the following set of processes with the length of CPU burst time given in the milliseconds [08]

Process	Arrival Time	Burst Time/Service Time	Priority
P1	0	21	2
P2	0	3	1
P3	0	6	4
P4	0	2	3

Draw Gantt charts illustrating the execution of these processes using FCFS, Priority-non preemptive (a small priority number implies a higher priority) and Calculate average turnaround time and average waiting time.

(b) Explain the following allocation algorithms: 1) First-fit 2) Best-fit [04]

(c) List out any 5 extensions and attributes of files. [04]

Question: 4

(a) For the Page Reference String: 1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6 [08]
Calculate the Page Faults applying (i) Optimal and (ii) LRU
Page Replacement Algorithms for a Memory with Four frames. Remember all frames are initially empty, so your first unique pages will all cost one fault each.

(b) Consider an imaginary disk with 51 cylinders. A request comes in to read a block on cylinder 11. While the seek to cylinder 11 is in progress, new requests come in for cylinders 1, 36, 16, 34, 9 and 12 in that order. [08]
Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests , for each of following Disk Scheduling algorithms?

1) FCFS
2) SSTF

OR

(a) For the Page Reference String: 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0. 1. 7, 0, 1 [08]
Calculate the Page Faults applying (i) FIFO and (ii) Optimal
Page Replacement Algorithms for a Memory with three frames.

(b) Suppose that a disk drive has 200 cylinders, numbered 0 to 199. The drive is [08]
Currently serving a request at cylinder 100, The queue of pending requests,
55, 58, 39, 18, 90, 160, 150, 38, 184
Starting from the current head position, what is the total distance ((in cylinders) that the disk arm moves to satisfy all the pending requests, for each of the

following disk scheduling (1) SSTF (2) SCAN(consider increasing order)

Question: 5.

(a) Explain the IPC Problem known as sleeping Barber Problem with code. [06]
(b) What is deadlock? Explain the conditions that lead to deadlock. [06]
(c) What are the use of device driver & controller in OS? Explain it. [04]

OR

(a) Explain IPC Problem – Readers & Writers Problem with code. [06]
(b) Explain in detail how a system call is processed. Explain Read system call. [06]
(c) Explain any two File Allocation Methods. [04]

Question: 6.

(a) What is multithreading? Explain threads in brief with its types. [08]
(b) Differentiate preemptive and non-preemptive scheduling in brief. [04]
(c) What is mutual exclusion? List out various methods to achieve it. [04]

OR

(a) Explain following file operations. [08]
1. Seek
2. Get attributes
3. Set attributes
4. Append

(b) Explain PCB. Discuss its major fields. [04]
(c) Discuss fragmentation in brief. [04]

---Best of Luck---

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– Bloom'S Taxonomy Report –

Sub: Operating System
Sem.:4
Branch: CE/IT

Que. Paper weightage as per Bloom's Taxonomy

LEVEL	% of weightage	Question No.	Marks of Que.
Remember/Knowledge	20.930233	Q1(a,b),Q3(b,c-or),Q6(a-or)	36
Understand	48.837209	Q2(a,b,b-or),Q3(c,b-or),Q5(a,b,c,a-or,b-or,c-or),Q6(a,c,b-or,c-or)	84
Apply	0		0
Analyze	2.3255814	Q6(b)	4
Evaluate	27.906977	Q3(a,a-or),Q4(a,b,a-or,b-or)	48
Higher order Thinking/ Creative	0		0

Chart/Graph of Bloom's Taxonomy