Enroll. No._____

MARWADI UNIVERSITY

Faculty of Technology

Information and Communication Technology

SEM: 4 **MU FINAL EXAM** **May: 2023**

Subject: - Operating System-01CT1409 **Date:-11/05/2023**

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.**
4. **Do not write/sign/indication/tick mark anything other than Enroll No. at a specific place on the question paper.**

Question 1(a) Answer the following questions. **10**

1 What is an operating system?
- a) interface between the hardware and application programs
- b) collection of programs that manages hardware resources
- c) system service provider to the application programs
- d) all of the mentioned

2 Where is the operating system placed in the memory?
- a) either low or high memory
- b) in the low memory
- c) in the high memory
- d) none of the mentioned

3 When a process is in a "Blocked" state waiting for some I/O service. the service is completed, it goes to the _____
- a) Terminated state
- b) Suspended state
- c) Running state
- d) Ready state

4 A deadlock avoidance algorithm dynamically examines the _____ to ensure That a circular wait condition can never exist.
- a) operating system
- b) resources
- c) system storage state
- d) resource allocation state

5 Which one of the following is the address generated by CPU?
- a) physical address
- b) absolute address
- c) logical address
- d) none of the mentioned

6 Run time mapping from virtual to physical address is done by _____
- a) Memory management unit
- b) CPU
- c) PCI
- d) None of the mentioned

7 The address of a page table in memory is pointed by _____

a) stack pointer
b) page table base register
c) page register
d) program counter

8 Operating System maintains the page table for _____
a) each process
b) each thread
c) each instruction
d) each address

9 In segmentation, each address is specified by _____
a) a segment number & offset
b) an offset & value
c) a value & segment number
d) a key & value

10 The base register is also known as the _____
a) basic register
b) regular register
c) relocation register
d) delocation register

(b) Answer the following questions in one line. **10**

1 What is Operating System?
2 What is Mutual Exclusion?
3 Write the name of Non pre-emptive scheduling algorithm.
4 Give classification of memory allocation technique.
5 What is semaphore?
6 What can be described by resource allocation graph?
7 Belady's anomaly may occur in which page replacement algorithm?
8 When the allotted time to a process is completed, the process will goes from Running State to which state?
9 Name two types of semaphore?
10 IPC stands for?

Question 2(a) Write different service provided by Operating System. **8**
(b) What is system call? How it is handled by Operating System. **8**

Or

(b) What is process state? Explain process state transition diagram. **8**

Question 3(a) Explain process control block in detail. **8**
(b) Define : (1) Critical section (2)Interrupt (3)Response Time (4)TLB **4**
(c) What is process? Differentiate process and program. **4**

Or

(a) Explain thread with its different types. **8**
(b) Differentiate process and thread. **4**
(c) Compare Multiprogramming, Multitasking and Multiprocessing. **4**

Question 4(a) Five batch jobs A to E arrive at same time. They have estimated running times 10, 2,6,8,4 minutes. Their priorities are 3, 2,5,4,1 respectively **with 5 being highest priority**. For each of the following algorithm determine mean process turnaround time. **8**

Ignore process swapping overhead. Round Robin (q=3), Priority Scheduling (Non Preemptive), FCFS, SJF.

(b) Assume arrival order is: P1, P2, P3, P4, P5 at time 0, 1,2,3,4 respectively and a smaller priority number implies a higher priority. Priorities are 3, 2,0,1,4 respectively. They have estimated running times 10, 8,9,6,7 time unit. Draw the Gantt charts for **preemptive and non-preemptive scheduling**. Calculate Average Turnaround Time and Average Waiting Time. Time quantum is 2 time unit. **8**

Or

Question 4(a) Solve the following example with FCFS, SJF, LJF, SRTF, LRTF, Round Robin cpu scheduling algorithm. Draw Gantt chart and calculate average turnaround time and average waiting time. Time Quantum is 2 time unit. Priorities are respectively 3,2,0,1. Consider smaller priority number as higher priority. **8**

Process	Arrival Time	Burst Time
P0	0	10
P1	1	6
P2	3	2
P3	5	4

(b) Explain dining philosopher problem and its solution using semaphore. **8**

Question 5(a) What is deadlock? Explain necessary conditions for deadlock occurrence. **6**

(b) Explain mutual exclusion. **6**

(c) What is monitor? Explain it with example. **4**

Or

Question 5(a) Explain semaphore with its types. **6**

(b) How deadlock can be recovered? **6**

(c) Explain Banker algorithm with example. **4**

Question 6(a) Find page fault ratio and page hit ratio for the given string using FIFO, LRU, MRU and Optimal page replacement algorithm. **8**
FIFO Reference string : 7,0,1,2,0,3,0,4,2,3,0,3,1,2,0
LRU Reference string : 1, 2, 3, 4, 1, 2, 5, 1, 2, 3, 4, 5

(b) Differentiate fixed size partition and dynamic memory allocation. **4**

(c) Explain paging. **4**

or

Question 6(a) Calculate total cylinder movement for given tracks using FCFS, SSTF and C-LOOK disk arm scheduling algorithm. Consider towards large value. 11, 1, 36, 16, 34, 9 and 12. **8**

(b) Explain segmentation. **4**

(c) Differentiate paging and segmentation. **4**

***** Best of Luck *****

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– Bloom'S Taxonomy Report –

Sub: Operating System
Sem.4
Branch: Information and Communication Technology

Que. Paper weightage as per Bloom's Taxonomy

LEVEL	% of weightage	Question No.	Marks of Que.
Remember/Knowledge	20%	1	20
Understand	32%	2,3	32
Apply			
Analyze	16%	4	16
Evaluate	16%	5	16
Higher order Thinking/ Creative	16%	6	16

Chart/Graph of Bloom's Taxonomy