Enroll. No._____

MARWADI UNIVERSITY

Faculty of Technology

Information and Communication Technology

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

Subject: - Operating System-01CT0409 **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) To access the services of the operating system, the interface is provided by the _____
a) Library
b) System calls
c) Assembly instructions
d) API

(3) CPU scheduling is the basis of _____
a) multiprogramming operating systems
b) larger memory sized systems
c) multiprocessor systems
d) none of the mentioned

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

(5) What is a mutex?
a) is a binary mutex
b) must be accessed from only one process
c) can be accessed from multiple processes
d) none of the mentioned

(6) 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

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

(8) Operating System maintains the page table for _____
a) each process

b) each thread
c) each instruction
d) each address

(9) _____ is generally faster than _____ and _____.
a) first fit, best fit, worst fit
b) best fit, first fit, worst fit
c) worst fit, best fit, first fit
d) none of the mentioned

(10) Which of the following page replacement algorithms suffers from Belady's Anomaly?
a) Optimal replacement
b) LRU
c) FIFO
d) Both optimal replacement and FIFO

Question 1(b) **Answer the following questions in one line.** **10**

(1) What is critical section?
(2) IPC stands for?
(3) What is semaphore?
(4) Name two memory allocation technique.
(5) What is process?
(6) Name different types of operating system.
(7) What is independent process?
(8) What is multiprogramming?
(9) What is page fault?
(10) Give classification of cpu process scheduling.

Question 2(a) Explain operating system services in detail. **8**

(b) What is thread? Explain it with its type. **8**

Or

(b) What is scheduler? Explain 3 types of scheduler. **8**

Question 3(a) Explain system call with example. **8**

(b) Define : (1) Turnaround time (2) TLB (3) Mutual Exclusion (4) Deadlock **4**

(c) Differentiate process and thread. **4**

Or

Question 3(a) Explain dining philosopher problem using semaphore. **8**

(b) Explain kernel with its types. **4**

(c) Explain semaphore with its types. **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. Ignore process swapping overhead. Round Robin (q=3), priority (non pre-emptive), FCFS, SJF. **8**

(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. Consider smaller priority number as higher priority. **8**

Enroll. No._____

Process	Arrival Time	Burst Time	Priority
P0	3	8	5
P1	2	7	6
P2	0	4	7
P3	4	6	4
P4	1	2	2

(b) Explain producer consumer problem with 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 deadlock recovery mechanism. **6**
(b) Explain reader writer problem. **6**
(c) Differentiate paging and segmentation. **4**

Question 6(a) Explain banker algorithm. **8**
(b) Explain TLB Hit and TLB miss. **4**
(c) Explain demand paging. **4**

or

Question 6(a) Find page fault ratio and page hit ratio for the given string using FIFO, LRU 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) Explain page table in brief. **4**
(c) Explain fragmentation. **4**

---Best of Luck---

Enroll. No._____

– 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