BRAINWARE UNIVERSITY

Term End Examination 2023-2024
Programme – BCA-2022
Course Name – Operating System
Course Code - BCAC301
(Semester III)

Full Marks : 60   **Time : 2:30 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question)   1 x 15=15

1. Choose the correct alternative from the following :

(i) Select the synchronization tool

   a) Semaphore   b) Thread
   c) Process   d) Pipe

(ii) A process refers to 5 pages, A, B, C, D, E in the order : A, B, C, D, A, B, E, A, B, C, D, E. If the page replacement algorithm is FIFO, select the number of page transfers with an empty internal store of 3 frames is

   a) 8   b) 10
   c) 9   d) 7

(iii) Write the correct option for Operating System maintains the page table -

   a) Each process   b) Each instruction
   c) Each thread   d) Each address

(iv) Determine the primary goal of deadlock prevention in an operating system

   a) To detect deadlocks and terminate   b) To ensure that the system never enters a
      processes   deadlock state
   c) To recover from deadlocks gracefully   d) To minimize the occurrence of deadlocks

(v) Identify the condition must be true for a process to request a resource in the resource allocation graph without causing a deadlock

   a) The resource must be currently available   b) The process must be in the terminated
                                                    state
   c) The process must release all its resources d) The process must be in the running state

(vi) In the Round Robin scheduling algorithm, processes are assigned CPU time in:

   a) A non-preemptive manner   b) A priority-based manner
   c) A first-come-first-served manner d) A time-sliced or cyclic manner

(vii) Tell a solution to the problem of external fragmentation is

   a) Larger memory space   b) Smaller memory space
   c) Compaction   d) None

(viii) Tell virtual memory

a) Separation of user logical memory from physical memory.

b) Logical address is divided into blocks.

c) Allows address space to be shated within several processes.

d) It is a scheme which allows the execution of a fully loaded process.

(ix) Indicate the primary drawback of deadlock prevention techniques

a) They require extensive system monitoring.

b) They may lead to resource waste

c) They do not guarantee deadlock avoidance.

d) They are ineffective in large-scale systems.

(x) Select memory management scheme may suffer from external fragmentation

a) Fixed partitioning

b) Variable partitioning

c) Paging

d) Segmentation

(xi) Select the page replacement algorithm that is free from belady\'s anomaly -

a) Fifo

b) Lru

c) Opr

d) None

(xii) Identify component of the operating system that is responsible for managing the execution of processes-

a) Karnel

b) Compiler

c) Shell

d) Scheduler

(xiii) Write external fragmentation exists when

a) The total memory is insufficient to satisfy a request

b) Enough total memory exists to satisfy a request but it is not contiguous

c) A request cannot be satisfied even when the total memory is free

d) None

(xiv) Write the term that is used to implement virtual memory.

a) Demand paging

b) Virtualization

c) Buses

d) none of these

(xv) Due to virtual memory, memory can be shared among:

a) processes

b) instructions

c) threads

d) none of the mentioned

Group-B
(Short Answer Type Questions)

3 x 5=15

2. Illustrate the concept of deadlock. (3)

3. Sate the significance of processor modes (user mode and kernel mode) in operating systems. (3)

4. Write the key concept of paging and mention its advantages. (3)

5. Discuss the Dining Philosopher problem in operating systems. What are some potential solutions? (3)

6. Explain Seek time, rotational latency,blocking I/O. (3)

OR

Discuss track,sector,platter of a hard disk. (3)

Group-C
(Long Answer Type Questions)

5 x 6=30

7. State the difference between multi-threading, time-sharing and real-time. (5)

8. Summarize the concept of segmentation in memory management. How does it work and what are its benefits and drawbacks? (5)

9. Explain the concept of demand paging. (5)

10. Summarize the concept of safe and unsafe states in deadlock. (5)

11. Consider the following problem and solve it using bankers algorithm. **(5)**
    1: What will be the content of the Need matrix?
    2. Find whether it is in safe state or not.

Process	Allocation	Max	Available
	A B C	A B C	A B C
P_0	0 1 0	7 5 3	3 3 2
P_1	2 0 0	3 2 2	
P_2	3 0 2	9 0 2	
P_3	2 1 1	2 2 2	
P_4	0 0 2	4 3 3	

12. Explain Seek Time, Rotational time in disk structure in operating system **(5)**

OR

Illustrate the adavantages and disadvantages of file system in operating system. **(5)**

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