



BRAINWARE UNIVERSITY

Term End Examination 2024-2025

Programme – BCA(MAWT)-Hons-2024

Course Name – Operating System

Course Code - BMT20202

(Semester II)

Library
Brainware University
398, Ramkrishnapur Road, Barasat
Kolkata, West Bengal-700125

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) What is the primary function of an operating system?
 - a) Manage hardware resources
 - b) Manage application programs
 - c) Manage memory
 - d) All of these
- (ii) Which of the following is NOT a function of an operating system?
 - a) Memory management
 - b) File management
 - c) Application development
 - d) Process management
- (iii) Which of the following is an example of a system call?
 - a) open()
 - b) print()
 - c) scanf()
 - d) printf()
- (iv) Which type of operating system is designed for system that requires real-time processing?
 - a) Batch operating system
 - b) Multi-user operating system
 - c) Real-time operating system
 - d) Distributed operating system
- (v) Which of the following is an example of a graphical user interface (GUI)?
 - a) Windows
 - b) DOS
 - c) Unix
 - d) Linux
- (vi) Identify the mechanism used to implement mutual exclusion in concurrent programming.
 - a) Semaphore
 - b) Deadlock
 - c) Paging
 - d) Multithreading
- (vii) Select the correct statement regarding mutual exclusion in operating systems.
 - a) Mutual exclusion ensures that multiple processes can access a shared resource at
 - b) Mutual exclusion is only required in single-threaded programs.

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- the same time. c) Mutual exclusion prevents race conditions by allowing only one process to access critical sections at a time. d) Mutual exclusion solves deadlocks by allowing multiple processes to share resources.
- (viii) Identify the number of pages in a 1 MB memory if each page is 4 KB.
- a) 256 b) 512
c) 128 d) 64
- (ix) Predict the page size if a system has 1024 pages and the total memory is 4 MB.
- a) 4 KB b) 8 KB
c) 2 KB d) 1 KB
- (x) Choose the role of a semaphore in process synchronization.
- a) To control access to shared resources by multiple processes b) To manage memory allocation between processes
c) To swap pages between memory and disk d) To handle process termination
- (xi) Select how the Banker's Algorithm avoids deadlock.
- a) Ensuring that resource allocation always leads to a safe state b) By preemptively killing processes in circular wait
c) By limiting the number of processes that can request resources d) By using priority-based scheduling
- (xii) Select the meaning of the term preemptive scheduling.
- a) A process can be interrupted and moved to a waiting state if a higher-priority process arrives b) Processes execute to completion once they begin
c) CPU cycles are evenly distributed among all processes d) Processes are scheduled based on arrival time
- (xiii) Interpret the role of a Process Control Block (PCB).
- a) Tracking the state of the process b) Storing user input data
c) Space wasted due to page swapping d) Monitoring system performance
- (xiv) Choose the memory allocation strategy that involves dividing memory into fixed-size blocks.
- a) Paging b) Segmentation
c) Contiguous Allocation d) Dynamic Partitioning
- (xv) Select the function of the translation lookaside buffer (TLB) in a system with virtual memory.
- a) It caches recent virtual-to-physical address translations to speed up address resolution b) It stores the most frequently accessed pages
c) It manages the swapping of pages between disk and RAM d) It allocates memory to different processes

Group-B

(Short Answer Type Questions)

3 x 5=15

2. List the primary functions of an operating system. (3)
3. Describe the layered approach of Operating System. (3)
4. Write the meaning of "context switching" in an operating system. (3)

5. Write the purpose of the wait() and signal() operations in semaphore-based synchronization. (3)

6. Compare and contrast multitasking and multiprogramming operating systems, highlighting their key differences and similarities. (3)

OR

Explain the necessary conditions for deadlock. (3)

Group-C

(Long Answer Type Questions)

5 x 6=30

7. What are the different types of operating systems? Explain in details. (5)
8. Describe the process state transition diagram in OS. (5)
9. Write the differences between time-sharing and real-time operating systems. (5)
10. Explain the relative advantages and disadvantages of user level thread and kernel level thread. (5)
11. Consider a system with 3 processes (P0, P1, P2) and 3 resource types (A, B, C). The available resources are A = 5, B = 3, and C = 2. The maximum demand and current allocation for each process are as follows: P0: Max = (7, 5, 3), Allocation = (2, 1, 1); P1: Max = (3, 2, 2), Allocation = (2, 1, 1); P2: Max = (9, 0, 2), Allocation = (3, 0, 2). Using the banker's algorithm justify whether there exists a safe sequence. (5)
12. Analyze the concept of virtual memory and explain how address translation is performed using Memory Management Unit (MMU). (5)

OR

Justify the disk architecture and mention the different disk scheduling algorithms. (5)

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