UTTARANCHAL UNIVERSITY, DEHRADUN
UTTARANCHAL SCHOOL OF COMPUTING SCIENCES
MID TERM EXAMINATION
EVEN SEMESTER 2024-25
BCA | 4TH SEMESTER
OPERATING SYSTEM AND LINUX| BCA – C401

Time: **1:15 Hour** Max. Marks: **30**

Note: All questions are compulsory.

Q.1- Answer the following questions. **(1 x 6 = 6 Marks)**

Multiple Choice Questions

a) When a process is "Blocked" waiting for some I/O service. When the service is completed, it goes to the _____. (CO-2, BL-1)

a. Suspended state b. Terminated state
c. Running state d. Ready state

b) What does restarting an operating system do?(CO-1, BL-1)

a. restarts all the processes b. Shut down the operating system completely
c. terminate all running programs completely d. all of the above

c) Which of the functionalities listed below need **NOT** to be supported by the operating system for real-time systems? (CO-1, BL-1)

a. Batch programming b. Virtual memory
c. Time sharing d. None of These

State True/ False

d) Virtual memory space is always smaller than physical memory space. (CO-1, BL-1)

e) If a deadlock is detected, the OS should always kill the process in the deadlock. (CO-2, BL-1)

f) The threads of a multithreaded process share heap memory and global variables. (CO-2, BL-1)

Q.2-Write a short note on any two (up to 70 words) **(2 x 3 = 6 Marks)**

a) Direct memory access is used for high-speed I/O devices in order to avoid increasing the CPUs execution load. 'How does the CPU interface with the device to coordinate the transfer? (CO-2, BL-3)

b) Advantages of LINUX/UNIX operating system over Windows. (CO-5, BL-3)

c) Describe the actions taken by a kernel to context-switch between processes (CO-1, BL-2)

Q.3-Attempt any one of the following (1 x 6 = 6 Marks)

a) What is Semaphore? Give the implementation of Bounded Buffer Producer Consumer Problem using Semaphore. (CO-2, BL-4)

OR

b) Write a shell script to find the greater number out of 3 numbers. (CO-5, BL-4)

Q.4- Attempt any one of the following. (1 x 6 = 6 Marks)

a) What List five services provided by an operating system that are designed to make it more convenient for users to use the computer system. In what cases it would be impossible for user-level programs to provide these services? Explain. (CO- 1, BL-4)

OR

b) What is the difference between Preemptive and Non Preemptive scheduling with Example? (CO- 2, BL-4)

Q.5- Attempt any one of the following. (1 x 6 = 6 Marks)

a) What do you mean by Deadlock Avoidance? Explain the use of Banker's Algorithm for Deadlock Avoidance with an illustration. (CO- 2, BL- 4)

OR

b) Consider the following set of processes, with the length of the CPU-burst time given in milliseconds: (CO- 2, BL-4)

Process	P1	P2	P3	P4	P5
Burst Time	10	1	2	1	5
Priority	3	1	3	4	2

The processes are assumed to have arrived in the order P1, P2, P3, P4, P5, all at time 0. The execution of these processes use FCFS, SJF, a nonpreemptive priority (a smaller priority number implies a higher priority), and RR (quantum = 1) scheduling.

i. What is the turnaround time of each process for each of the scheduling algorithms?

ii. What is the waiting time of each process for each of the scheduling algorithms?

iii. Which of the schedules in part a results in the minimal average waiting time (over all processes)?