

(Please write your Exam Roll No.)

Exam Roll No. 00711604422

END TERM EXAMINATION

FIRST SEMESTER [MCA] FEBRUARY 2023

Paper Code: MCA-105

Subject: Operating Systems with Linux

Time: 3 Hours

Maximum Marks: 75

Note: Attempt five questions in all including Q. No.1 which is compulsory. Select one question from each unit.

- Q1 Attempt **all** questions:- (10x2.5=25)
- (a) List the differences between Internal Fragmentation and external Fragmentation.
 - (b) Explain the function of the ready queue?
 - (c) What is multi-threading?
 - (d) What are basic requirements of any solution to the critical sections problem?
 - (e) Differentiate between multiprogramming and multiprocessing.
 - (f) Differentiate between kernel level and user level threads.
 - (g) What is meant by context switch?
 - (h) What is the use of fork and exec system calls?
 - (i) Differentiate between pre-emptive and non-preventive scheduling.
 - (j) Differentiate between long-term and short-term scheduling.

UNIT-I

- Q2 (a) List five services provided by an operating system. Explain how each provides convenience to the users. Explain also in which cases it would be impossible for user-level programs to provide these services. (6)
- (b) What is directory? What are the different ways to implement a directory? (6.5)
- Q3 (a) Differentiate how Distributed operating systems differ from Multi-programmed and Time-shared Operating systems? Give key features of each. (6)
- (b) Explain the following: (i) Multitasking System (ii) Real-time System. (6.5)

UNIT-II

- Q4 (a) What is a semaphore? Explain busy waiting semaphores. (6)
- (b) Explain the differences with diagram between multilevel queue and multilevel feedback queue scheduling. (6.5)
- Q5 (a) How semaphores help in process synchronization? What is the difference between binary and counting semaphores? (6)
- (b) Process P1, P2 and P3 arrive for execution at times indicated. Using non-pre-emptive scheduling, answer the questions below: (6.5)

Process	Arrival Time	Burst Time
P1	0.0	8
P2	0.4	4
P3	0.8	1

P.T.O.

MCA-105
P_{1/2}

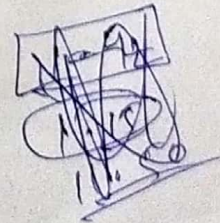
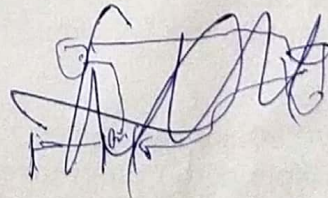
- (i) What is the average turnaround time for these processes with FCFS scheduling?
- (ii) What is the average turnaround time for these processes with SJF scheduling?
- (iii) What is the average turnaround time if the CPU is left idle for first 1 unit and then SJF scheduling is used?

UNIT-III

- Q6 (a) What is the cause of thrashing? How does the system detect thrashing? Once it detects thrashing, what can the system do to eliminate this problem? (6)
- (b) Consider the following page reference string: (6.5)
1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6.
How many page faults would occur for the following replacement algorithms, assuming three frames? Remember all frames are initially empty, so your first unique pages will all cost one fault each.
- (i) LRU replacement
 - (ii) FIFO replacement
 - (iii) Optimal replacement
- Q7 (a) Write Banker's algorithm for deadlock avoidance. (6)
- (b) What is virtual memory? How demand paging supports the virtual memory? Explain in detail. (6.5)

UNIT-IV

- Q8 (a) Explain about file directories and its attributes in detail. (6)
- (b) What is RAID? Explain various RAID levels. (6.5)
- Q9 (a) What are the three methods for allocating disk space? Explain. (6)
- (b) Describe various file access methods. (6.5)



MCA-105
P2/2