1019
B.E. (Computer Science and Engineering)
Fourth Semester
CS-403: Operating System

Time allowed: 3 Hours
Max. Marks: 50

NOTE: *Attempt* _five_ *questions in all, including Question No. I which is compulsory and selecting two questions from each Unit.*

x-x-x

I. a) What do you mean by Kernel?
    b) What are the states of a Process?
    c) Define Semaphore.
    d) What is the situation of Deadlock in operating system?
    e) What is Thrashing?
    f) How the concept of Virtual memory is implemented?
    g) What is Physical address space?
    h) List the services provided by an operating system.
    i) What is meant by Seek time in case of disk drive?
    j) Write any two components of a Linux System? (10X1)

UNIT I

II. a) What are the differences between Batch processing system and Real Time Processing System?
    b) What is a Process? Explain about various fields of Process Control Block. (5,5)

III. Consider the following set of processes, with the length of the CPU burst given in milliseconds:

Process	Burst time	Priority
P_1	2	2
P_2	1	1
P_3	8	4
P_4	4	2
P_5	5	3

The processes are assumed to have arrived in the order P_1, P_2, P_3, P_4, P_5 all at time 0. Draw the Gantt charts that illustrates the execution of these processes using First Come First Serve (FCFS), Shorestest Job First (SJF), non-preemptive Priority (a larger priority number implies a higher priority) and Round Robin (RR) (quantum = 2) scheduling algorithm. Which of these algorithms results in the minimum average waiting time? (10)

IV. a) Explain the Resource-Allocation-Graph algorithm for deadlock avoidance.
    b) Describe the techniques to recover from the deadlock. (5,5)

P·T·O·

UNIT II

V. a) Explain the difference between internal and external fragmentation.
b) Consider the following page reference string: 2, 3, 4, 2, 1, 5, 6, 4, 1, 2, 3, 7, 6, 3, 2, 1. Calculate the number of page faults that would occur for Optimal replacement algorithm with frame size of 4.

(5,5)

VI. a) Explain the Bit vector and Linked list approaches of free space management.
b) What are the design principles of LINUX system.

(5,5)

VII. Suppose that the disk drive has 5000 cylinders, number 0 to 4999. The drive is currently serving a request at cylinder 143 and the previous request was at 125, the queue of the pending request in FIFO order is:

86, 1470, 913, 1174, 948, 1509, 1022, 1750, 130

Starting from the current head position, what is the total distance (cylinders) that the disk arm moves to satisfy all the pending requests for each of the following disk scheduling algorithms.
i. SSTF
ii. SCAN
iii. LOOK
iv. C-LOOK

(10)

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