2019

(October)

COMPUTER SCIENCE

(Honours)

(CS-501 T)

(Operating System and Introduction to LINUX)

Marks : 56

Time : 3 hours

The figures in the margin indicate full marks for the questions

Answer **one** question from each Unit

UNIT—I

1. *(a)* Describe briefly a process address space. 3

   (b) What are system calls? Explain briefly the read system call. 2+2=4

   (c) Five jobs *A* through *E* arrive at a computer center. They have estimate running times of 9, 3, 7, 2 and 4 minutes. The arrival time of *A* through *E* is 0, 1, 2, 3 and 4 respectively. Use the shortest remaining time next to determine the turnaround time for each job and the mean turnaround time. 5

2. *(a)* Discuss the four principal events that cause processes to be created. Compare FCFS with SJF scheduling. 4+2=6

(b) What is busy waiting in mutual exclusion? Explain how the mutual exclusion problem is solved using lock variables. 2+4=6

UNIT—II

3. *(a)* What is a resource? Describe deadlock detection and recovery. 1+4=5

(b) Given a total of 10 units of a resource type, and given the state shown below, should process P2 be granted a request of 2 additional resources? Justify your answer : 4

Process	*Used*	*Max*
P1	2	5
P2	1	6
P3	2	6
P4	1	2
P5	1	4

(c) Explain on deadlock prevention using attacking the no preemption condition. 2

(Continued)

4. *(a)* Discuss the Banker's algorithm for a single resource. 6

(b) Why do operating systems like UNIX and WINDOWS ignore the deadlock problem? 2

(c) Explain deadlock detection with one resource of one type. 3

UNIT—III

5. *(a)* Bring out the differences between the following : 2½×2=5

(i) Pages and Page Frames

(ii) Internal Fragmentation and External Fragmentation

(b) What do you understand by page fault? Explain the function of a page table. 2+4=6

6. *(a)* Explain on the function of the optimal page replacement algorithm to handle page requests, citing with an example. 5

(b) Compute the number of page faults for the following page requests made of three page frames using the Least Frequently Used Algorithm : 6

7 0 1 2 0 3 0 4 2 3 0 3 2 1 2

(Turn Over)

UNIT—IV

7. *(a)* Explain the three essential requirements of using files for long-term information storage. 3

(b) Bring out the differences between sequential file access and random file access. 4

(c) What is an i-node? Explain the various file attributes that deal with the protection of the file. 4

8. *(a)* Describe the various categories of I/O devices. 3

(b) Explain any four goals of I/O Software. 4

(c) Write a short note on the Elevator Disk Arm Scheduling Algorithm. 4

UNIT—V

9. *(a)* What is the difference between cat a.txt and cat > a.txt? Give the syntax of chmod command. 3+2=5

(b) What do you understand by command substitution in UNIX? 3

(c) Explain the use of character class in pattern matching. Give an example. 2+1=3

(Continued)

10. *(a)* Write a shell program that checks whether a given integer number is an Armstrong number or not. 5

(b) Write short notes on the following with an example of each : 2×3=6

(i) head

(ii) cp

(iii) mv

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