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3 (Sem-3/CBCS) CSC HC 2

2022

COMPUTER SCIENCE

(Honours)

Paper : CSC-HC-3026

(Operating System)

Full Marks : 60

Time : Three hours

The figures in the margin indicate full marks for the questions.

1. Answer the following questions as directed :

(any seven)

1×7=7

(a) Multiprogramming operating system requires CPU Scheduling.

(State True **or** False)

(b) A _____ operating system has strict time constraints for any job to be performed. (Fill in the blank)

(c) _____ system call is used to create a child process identical to the parent process. (Fill in the blank)

Contd.

(d) _____ is the core that provides basic services for all other parts of the OS.
(Fill in the blank)

(e) Segmentation could result in external fragmentation. ((State True or False)

(f) Paging is faster in comparison to segmentation. (State True or False)

(g) _____ is a non-preemptive scheduling algorithm.
(Fill in the blank)

(h) In any secure system users must be authenticated. (State True or False)

(i) In Linux, system configuration files are stored in _____ directory.
(Fill in the blank)

(j) A _____ is a situation where each of the computer process waits for a resource which is being assigned to some another process.
(Fill in the blank)

(k) Critical section is the part of a program which tries to access shared resources.
(State True or False)

(l) On most Linux distributions, virtual files are located in the _____ directory.
(Fill in the blank)

2. Define the following terms: **(any four)**

2×4=8

(a) Batch system

(b) Threads

(c) Virtual memory

(d) Paging

(e) Kernel

(f) Non-preemptive scheduling

(g) IPC

(h) Authorization

3. Answer **any three** of the following questions : $5 \times 3 = 15$

(a) State the basic functions of operating system.

(b) What is the difference between timesharing and multiprogramming systems ?

(c) What is the difference between kernel and user mode ? Explain how having two distinct modes aids in designing an operating system.

(d) What are the advantages and disadvantages of implementing threads in user space ?

(e) What is deadlock ? What are the necessary and sufficient conditions for a resource deadlock to occur ?

(f) Explain how time quantum value and context switching time affect each other, in a round-robin scheduling algorithm.

(g) What are the file allocation methods ? Give brief description of *one* such method.

(h) What is page fault ? Explain *any one* page replacement algorithm.

4. Answer **any three** of the following questions : $10 \times 3 = 30$

(a) Give description of different types of operating system.

(b) Describe the issues related to Inter Process Communication.

(c) The arrival time and burst time of six processes are shown below :

Process ID	Arrival Time	Burst Time
1	0	5
2	1	6
3	2	3
4	3	1
5	4	5
6	6	4

Calculate completion time, waiting time and turnaround time for the processes if Round Robin Scheduling algorithm is used. Time quantum of the system is 4 units.

(d) In paging, how virtual addresses are mapped onto physical addresses? Explain.

(e) What are the goals of I/O software? Explain.

(f) Write short notes on security policy mechanism and authorization.

(g) Write a program to report behaviour of Linux kernel including information on configured memory, amount of free and used memory.

(h) Write short notes on :

(i) Fixed and variable partitions

(ii) File operations