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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) $1 \times 7 = 7$
 - (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