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)*

(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 : 5×3=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 : 10×3=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

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