Printed Pages: 5 | 545 | ECS-501

(Following Paper ID and Roll No. to be filled in your Answer Book)

Paper ID :110511 | Roll No. | | | | | | | | | |

B.TECH

(SEM. V) THEORY EXAMINATION, 2015-16

OPERATING SYSTEM

[Time:3 hours] [Total Marks:100]

Note: Attempt questions from all Sections as per directions.

Part-A

Attempt all parts of this section. Answer in brief.

(2×10=20)

Q.1 (a) Define process.

(b) What is busy waiting?

(c) Differentiate shell and kernel.

(d) What do you understand by system call?

(e) What is the reason behind dual mode operation of processors?

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(f) Differentiate page and segment.

(g) What is the role of Thread?

(h) What are the advantages of the layered approach to the design of operating system?

(i) What is an operating system? Define the components of an operating system.

(j) What are Semaphores?

Section-B

Attempt **any five** questions from this section. (10×5=50)

2. Define the different states of a process with diagram. Explain the need of process suspension.

3. Define Message passing and shared memory inter-process communication.

4. What is process control block? Discuss the difference among short-term, medium-term and long-term scheduling.

5. List various performance criteria for scheduling algorithms. Five prcesses A, B, C, D, and E require CPU burst of 3, 5, 2, 5 and 5 units respectively. Their arrival times in the system are 0, 1, 3, 9 and 12 respectively. Draw Gantt chart and compute the average turn around time and average waiting time of these processes for the Shortest job First (SJF) and Shortest Remaining Time First (SRTF) scheduling algorithms.

6. Consider a logical address space of eight pages of 1024 words, each mapped onto a physical memory of 32 frames then:

   (i) How many bits are in logical address?

   (ii) How many bits are in physical address?

   Also explain the difference between internal and external fragmentation.

7. Write and explain Peterson solution to the critical section problem.

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8. Describe the Banker's algorithm for safe allocation. Consider a system with five processes and three resource types and at time 'T' the following snapshot of the system has been taken:

	Allocated			Maximum			Available		
Process Id	R1	R2	R3	R1	R2	R3	R1	R2	R3
P1	1	1	2	4	3	3	3	1	0
P2	2	1	2	3	2	2			
P3	4	0	1	9	0	2			
P4	0	2	0	7	5	3			
P5	1	1	2	11	2	3			

(i) Determine the total amount of resources of each type.

(ii) Compute the Need matrix.

(iii) Determine if the state is safe or not using Banker's algorithm.

(iv) Would the following request be granted in the current state?

(a) P1 <3, 3, 1>

(b) P2 <2, 1, 0>

9. Explain the need of process synchronization.

Part-C

Attempt **any two** questions from this sections.

15×2=30)

10. Explain Linked list and bit map approach for free space memory management.

11. Explain the SSTF and SCAN disk scheduling policies. Obtain the total number of head movements needed to satisfy the following sequence of track requests for each of the two policies.

27, 129, 110, 186, 147, 41, 10, 64, 120

Assume that the disk head is initially positioned over track 100 and is moving in the direction of decreasing track number.

12. What is a Directory? Define <u>any two</u> ways to implement the directory.

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