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

Paper ID : 214301 | Roll No. | | | | | | | | | |

MCA

(SEM. III) THEORY EXAMINATION, 2015-16

OPERATING SYSTEMS

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

Section-A

1. Attempt all parts. Write answer of each part in brief. (10x2=20)

   (a) What is the advantage of having different time quantum size on different levels of a multilevel queuing system ?

   (b) What is a thread and how is it different from a process ?

   (c) Define thrashing.

   (d) What is the difference between hard real time and soft real time operating systems ?

   (e) What is advantage of layerd approach of designing an operating system ?

   (f) What is a Safe State in deadlock avoidance ?

(g) On a system with 2^{24} bytes of memory and fixed partitions, all of size 65,536 bytes, how many bits must the limit-register have ?

(h) What is the role of request manager LINUX ?

(i) Explain preemptive SJF scheduling algorithm ?

(j) A system has two processes and three identical resources. Each process needs a maximum of two resources to complete. Is deadlock possible ? Give reason.

Section-B

Note: Attempt **any five** questions from this section :

(5x10 = 50)

2. What are the disadvantages of semaphores and discuss a suitable technique to overcome them ?

3. Under what circumstances do page faults occur? Describe the actions taken by the operating system when a page fault occurs ?

4. In a paged segmented system, a virtual address consists of 32 bits of which 12 bits are a displacement, 11 bits are a segment number and 9 bits are a page number. Calculate (i) page size (ii) maximum segment size (iii) maximum number of pages (iv) maximum number of segments (v) offset bits.

5. We wish to schedule four process P1, P2, P3 and P4 on a uniprocessor system. The priorities, CPU time requirements and arrival times of the process are as shown below :

Process	Priority	Burst Time	Arrival Time (hh:mm:ss
P1	4	5	0.0000
P2	2	4	2.0001
P3	6	2	2.0001
P4	3	4	4.0001

What are the average turnaround times using preemptive and non-preemptive scheduling respectively ?

6. What is Semaphore ? Write the code for Producer-Consumer problem using a Semaphore.

7. Discuss the various security measurments for developing a secured operating system.

8. Explain the objectives and implementation of short term scheduling and long term scheduling.

9. What are the various process states ? Depict process state diagram. What do you understand by context switching and various process involved in it.

Section-C

Note : Attempt **any two** questions from this section.

(2x15=30)

10. Discuss Banker's Algorithm. Consider the following snapshot of a system :

Processess	Allocation A B C	Max A B C	Available A B C
P0	1 1 2	4 3 3	2 1 0
P1	2 1 2	3 2 2	
P2	4 0 1	9 0 2	
P3	0 2 0	7 5 3	
P4	1 1 2	1 1 2	

Answer the following questions using the Banker's algorithm

(a) What is the content of the matrix need ?

(b) Is the system in a safe state ?

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

11. What do you understand by system call and system program? How does a new process created in UNIX OS? Explain.

12. Explain Monitors with suitable example. Also differentiate between monitor and semaphore.

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