Printed Pages : 4

NMCA-311

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

PAPER ID : 214317

Roll No.

M. C. A.

(SEM. III) (ODD SEM.) THEORY EXAMINATION, 2014-15

OPERATING SYSTEMS

Time : 3 Hours] [Total Marks : 100

Note : Attempt **all** questions.

1 Answer any **four** parts: 5×4=20

(a) What is spooling? What are advantages of spooling over buffering?

(b) What is the purpose of command interpreter? Why is it usually Separate from the kernel?

(c) Describe the three general methods for passing parameters to the operating system.

(d) Define the essential properties of the following types of operating systems:
(i) batch
(ii) time sharing
(iii) real time
(iv) distributed

(e) Draw the process state diagram and describe the various process states.

(f) What is the process control block? Explain all its components.

2 Answer any **two** parts: **10×2=20**

(a) What is the difference between preemptive and non-preemptive scheduling ? State, why strict non-preemptive scheduling is unlikely to be used in computer centre? Explain the operation of multilevel scheduling.

(b) Suppose that the following process arrive for execution at the times indicated. Each process will run for the amount of time listed. In answering the questions, use non preemptive scheduling and base all decisions on the information you have at the time the decision must be made:

Process	**Arrival time**	**Burst time**
P1	0.0	8
P2	0.4	4
P3	1.0	1

(i) What is the average turnaround time for these processes with the FCFS scheduling algorithm?

(ii) What is the average turnaround time for these processes with the SJF scheduling algorithm?

(c) Can a multithreaded solution using multiple user level threads achieve better performance on a multiprocessor system than on a single processor system? Explain.

3 Answer any **two** parts : **10×2=20**

(a) A file is to be shared among different processes, each of which has a unique number. The file can be accessed simultaneously by several processes, subject to the following constraint: the sum of all unique numbers associated with all the processes currently accessing to the file must be less than n. Write a monitor to coordinate the access to the file.

(b) What is optimistic assumption made in the deadlock detection algorithm? How can this assumption be violated? Is it possible to have a deadlock involving only a single process? Explain your answer.

(c) What is critical section? What is critical section problem? List the constraints Dijkstra placed on solutions to the critical sections problems. Describe the producer consumer problem and dinning philosopher problem.

4 Answer any **two** parts : **10×2=20**

(a) Consider the following reference string :
1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6

How many page fault would occur for the following replacement algorithms, assuming three, five, or six frames? Remember all frames are initially empty, so your first unique pages will all cost one fault each.

(i) LRU replacement

(ii) Optimal replacement

(b) Compare the memory organization schemes of the contiguous memory allocation, pure segmentation, pure paging with respect to the following issues:
(i) External fragmentation
(ii) Internal fragmentation

(c) (i) Describe the hardware that is required to support paging with an acceptable amount overhead.
(ii) Why are segmentation and paging sometimes combined into one scheme?

5 Answer any **two** parts: **10×2=20**

(a) Define the following:
(i) Sector, track, cylinder
(ii) Seek time ,latency time
(iii) Contiguous, indexed, linked allocation
(iv) SCAN algorithm.

(b) In what situations would we use memory as a disk be more useful than using it as a disk cache? Why is it advantageous to the user for an operating system to dynamically allocate its internal tables? What are penalties to the operating system for doing so?

(c) In what circumstances is the system call sequence fork exevce most appropriate? When is Vfork preferable? What socket type should be used to implement an intercomputer file transfer program? Why? What type should be used for a program that periodically tests to see if another computer is up on the network?