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NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: IV - CARRY OVER THEORY EXAMINATION - SEPTEMBER 2022

Subject: Operating Systems

Time: 3 Hours   Max. Marks: 100

General Instructions:

1. The question paper comprises three sections, A, B, and C. You are expected to answer them as directed.

2. Section A - Question No- 1 is 1 mark each & Question No- 2 carries 2 mark each.

3. Section B - Question No-3 is based on external choice carrying 6 marks each.

4. Section C - Questions No. 4-8 are within unit choice questions carrying 10 marks each.

5. No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.

SECTION A   20

1. Attempt all parts:-

1-a.   CLI stands for (CO1)   1

                (a) Command line interpreter

                (b) Character language interface

                (c) command line Interface

                (d) Communication line interface

1-b.   The initial program that is run when the computer is powered up is called (CO1)   1

                (a) boot program

                (b) bootloader

                (c) initializer

                (d) bootstrap program

1-c.   Consider the following set of processes, the length of the CPU burst time given in   1
milliseconds. Process Burst time P1 6 P2 8 P3 7 P4 3 Assuming the above process being
scheduled with the SJF scheduling algorithm.(CO2)

                (a) The waiting time for process P1 is 3ms

                (b) The waiting time for process P1 is 0ms

                (c) The waiting time for process P1 is 9ms

(d) The waiting time for process P1 is 16ms

1-d.   With round robin scheduling algorithm in a time shared system(CO2)   1

(a) using very large time slices converts it into First come First served scheduling algorithm

(b) using very small time slices converts it into First come First served scheduling algorithm

(c) using extremely small time slices increases performance

(d) using very small time slices converts it into Shortest Job First algorithm

1-e.   For a deadlock to arise, which of the following conditions must hold simultaneously (CO3)   1

(a) Mutual exclusion

(b) No preemption

(c) Hold and wait

(d) All of the mentioned

1-f.   To avoid deadlock (CO3)   1

(a) there must be a fixed number of resources to allocate

(b) resource allocation must be done only once

(c) all deadlocked processes must be aborted

(d) inversion technique can be used

1-g.   Consider a paging hardware with a TLB. Assume that the entire page table and all the pages   1
are in the physical memory. It takes 10 milliseconds to search the TLB and 80 milliseconds
to access the physical memory. If the TLB hit ratio is 0.6, the effective memory access time
(in milliseconds) is (CO4)

(a) 120

(b) 122

(c) 124

(d) 118

1-h.   Paging (CO4)   1

(a) solves the memory fragmentation problem

(b) allows modular programming

(c) allows structured programming

(d) avoids deadlock

1-i.   Preemptive Shortest Job First scheduling is sometimes called _____ .(CO5)   1

(a) Fast SJF scheduling

(b) EDF scheduling – Earliest Deadline First

(c) HRRN scheduling – Highest Response Ratio Next

(d) SRTN scheduling – Shortest Remaining Time Next

1-j.   What is 'Aging'? (CO5)   1

(a) keeping track of cache contents

(b) keeping track of what pages are currently residing in memory

(c) keeping track of how many times a given page is referenced

(d) increasing the priority of jobs to ensure termination in a finite time

2. Attempt all parts:-

2.a.   Differentiate between uniprocessor and multiprocessor system.(CO1)   2

2.b.   What do you mean by TLB ? (CO2)   2

2.c.   Define critical section.(CO3)   2

2.d.   What is page hit? (CO4)   2

2.e.   Name File Access Mechanism.(CO5)   2

SECTION B   30

3. Answer any <u>five</u> of the following:-

3-a.   State the advantages and disadvantages of distributed system (CO1)   6

3-b.   Define Real time systems? What are the applications of real-time systems? How are they   6
            different from time-sharing system? (CO1)

3-c.   How to evaluate the CPU scheduling algorithm? Explain in detail. (CO2)   6

3-d.   Distinguish between CPU bounded, I/O bounded processes. (CO2)   6

3-e.   Discuss the classical problems of synchronization in detail. (CO3)   6

3.f.   Explain how paging supports virtual memory. With a neat diagram explain how logical   6
            address is translated into physical address.(CO4)

3.g.   Discuss various issues involved in selecting appropriate disk scheduling algorithm.(CO5)   6

SECTION C   50

4. Answer any <u>one</u> of the following:-

4-a.   Define essential properties of the following types of Operating system: i) Batch operating   10
            system ii) Interactive operating system iii) Time sharing operating system iv) Distributed
            operating system (CO1)

4-b.   What are the various objectives and functions of Operating systems? Discuss in detail.(CO1)   10

5. Answer any one of the following:-

5-a.   Explain the concept of 'process'. also describe the contents of a process control block(PCB)   10
         in details.(CO2)

5-b.   Draw & discuss process state diagram with example.(CO2)   10

6. Answer any one of the following:-

6-a.   Discuss in detail the critical section problem and also write the algorithm for   10
         Readers/Writers Problem with semaphores.(CO3)

6-b.   Give solution for Producer/Consumer problem using Semaphores.(CO3)   10

7. Answer any one of the following:-

7-a.   What is dynamic storage allocation problem? Mention the names of different methods used   10
         to solve the above problem (CO4)

7-b.   Explain about advantages and disadvantages of paging? And Explain difference between   10
         paging and segmentation? (CO4)

8. Answer any one of the following:-

8-a.   Explain the following Page Replacements Algorithms with the help of examples. (CO5)   10
         (i) FIFO
         (ii) Optimal Page Replacement
         (iii) LRU

8-b.   What is disk scheduling? Explain LOOK and C-LOOK disk scheduling algorithms.(CO5)   10