2C7113

Roll No. : _____ Total Printed Pages : 3

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MCA (I Year) (Sem. II) (New Scheme) Examination, July - 2010
Operating System
(MCA)

Time : **3** Hours] [Maximum Marks : **80**
[Min. Passing Marks : **32**

*Attempt overall **five** questions.*
***All** questions carry **equal** marks.*

Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)

1. Nil 2. Nil

1 Answer the following questions in one word and one line only:

(a) Every _____ generated by the CPU is divided into two parts : page number (P) and a page offset (d).

(b) The run-time mapping from virtual to physical addresses is done by a piece of hardware in the CPU, called the _____.

(c) The set of all logical addresses generated by a program form the _____ of a process.

(d) _____ shares characteristics with both hardware and software.

(e) The virtual memory manager manages memory in the windows-NT environment by using _____

(f) What is meant by saying that a program is re-entrant ?

(g) What are the two file system types that windows-NT supports ?

(h) What is meant by the statement that a process is in the BLOCKED state ?

(i) Which low level scheduling scheme is best suited to interactive system ?

(j) What is the state of the processor, when a process in waiting for some event to occur ?

1×10=10

2 Answer each part in maximum 50 words :

(a) A typical page size is 4 k bytes. How many virtual pages would this imply given the virtual space approx 4.3×10^9 bytes ? If each page table entry is 5 bytes. How much space is required for the whole page table ?

(b) Distinguish between deadlock and indefinite postponement. How do you prevent deadlocks ?

(c) In a typical implementation, the password takes 5 character combinations of the 26 alphabets. Assuming that it takes 3 seconds to attempt a password, how much time will it take to guess the correct password in the worst case ?

(d) In a demand paging memory management system, usually there is a lower limit to the number of memory frame that must be made available to a running process. Give reasons for this.

(e) State the essential differences between internal and external memory fragmentation. Which of this technique is used in a paging scheme ?

3×5=15

3 Answer each part in maximum 150 words :

(a) What are the differences between a multiprogramming operating system and a time-sharing operating system ?

(b) What is thrashing ? Explain and suggest one method to control thrashing.

(c) Prove that the shortest-job-first (SJF) algorithm gives the minimum average waiting time for a given set of jobs.

(d) What is a semaphore ? How can the basic semaphore operations be implemented using "test-and-set" kind of instruction ?

(e) Consider the following setup processes :

Process	Burst time	Priority
P1	10	3
P2	1	1
P3	2	3
P4	1	4
P5	5	2

Calculate the turnaround time, waiting time for each of the scheduling FCFS, SJF algorithm.

4×5=20

4 (a) What is virtual memory ? Explain demand paging. What are the advantages of demand paging ?

10

(b) Consider a distributed system with two sites A and B. Consider whether site A can distinguish among the following:

(i) B goes down.

(ii) The link between A and B goes down.

(iii) B is extremely overloaded and response time is 100 times longer than normal. What implications does your answer have for recovery in distributed systems ?

10

5 'n' process share 'm' resource units, which can be reserved and released only one at a time. The maximum need of a process does not exceed m, and the sum of all maximum needs is less than m+n. Show that a deadlock cannot occur in the system ?

15

OR

Consider the following sequence of memory references from a 460-word program :

[10, 11, 104, 170, 73, 309, 185, 245, 246, 434, 458, 364]

(i) Show the page reference string for this sequence assuming a page size of 100 words, with 200 words of primary memory available to the program.

(ii) Compute the number of page faults assuming FIFO and LRU page replacement policies.

7+8=15