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CBSE NET DECEMBER 2004

OPERATING SYSTEM QUESTION

The principle of Locality of reference justifies the use of :

- (A) Virtual memory
- (B) Interrupts
- (C) Cache memory
- (D) Secondary memory

Ans: C

Explanation:

Locality of reference is also called the principle of locality. Locality of reference the term applied to situations where the same value or related storage locations are frequently accessed. There are three basic types of locality of reference: temporal, spatial and sequential:

Temporal locality: Here a resource that is referenced at one point in time is referenced again soon afterwards.

Spatial locality: Here the likelihood of referencing a storage location is greater if a storage location near it has been recently referenced.

Sequential locality: Here storage is accessed sequentially, in descending or ascending order.

Reason behind occurrence of locality of reference:

The reason locality occurs is often because of the manner in which computer programs are created. Generally, data that are related are stored in consecutive locations in storage. One common pattern in computing is that processing is performed on a single item and then the next. This means that if a

lot of processing is done, the single item will be accessed more than once, thus leading to temporal locality of reference. Furthermore, moving to the next item implies that the next item will be read, hence spatial locality of reference, since memory locations are typically read in batches.

Locality often occurs because code contains loops that tend to reference arrays or other data structures by indices.

Increasing and exploiting locality of reference are common techniques for optimization. This can happen on several levels of the memory hierarchy. Paging obviously benefits from spatial locality. A cache is a simple example of exploiting temporal locality, because it is a specially designed faster but smaller memory area, generally used to keep recently referenced data and data near recently referenced data, which can lead to potential performance increases. Data in cache does not necessarily correspond to data that is spatially close in main memory; however, data elements are brought into cache one cache line at a time. This means that spatial locality is again important: if one element is referenced, a few neighbouring elements will also be brought into cache. Finally, temporal locality plays a role on the lowest level, since results that are referenced very closely together can be kept in the machine registers. Programming languages such as C allow the programmer to suggest that certain variables are kept in registers.

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60. What is Process Scheduling, CPU Scheduling, Disk Scheduling? Explain Short, Medium and Long term Scheduler?
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62. Explain the following in brief Contiguous and Linked list allocation for implementing file system?

63. Explain various Disk scheduling algorithms with Illustrations ?
64. Define process and thread. What is PCB ? Explain its various entries with their usefulness ?
65. Discuss advantages and disadvantages of the Buffer cache ?
66. Explain different types of OS with examples of each ?
67. What is an Operating System? Write down its desirable characteristics ?
68. Define a deadlock ? Write down the conditions responsible for deadlock? How can we recover from deadlock ?
69. What are the various services provided by Operating system ?
70. What do you mean by PCB? Where is it used? What are its contents? Explain.
71. What is Binary and Counting semaphores ?
72. What is File? What are the different File attribute and operations?
73. What are System call? Explain briefly about various types of system call provided by an Operating System?
74. Describe necessary conditions for deadlocks situation to arise.
75. What are points to be consider in file system design? Explain linked list allocation in detail?
76. Write a Semaphore solution for dining Philosopher's problem?
77. Consider the following page reference string:1,2,3,4,5,3,4,1,2,7,8,7,8,9,7,8,9,5,4,5.
How many page faults would occur for the following replacement algorithm, assuming four frames:a) FIFO b) LRU
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