B tree in data structure pdf

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Figure 19.2 shows a typical disk drive. The disk surface is covered with magnetizable material. The reading / recording head can read or write data magnetically on the rotation disc surface. The reading / recording arm can position the head at different distances from the center of the disc. When the head is stationary, the surface that goes underneath it is a track called. The information stored in each range is generally divided into a fixed number of equal size pages; For a typical disc, a page can be 2048 bytes in length. The basic information storage unit and recovery is usually a page of information - that is, disc readings and recording are typically of entire pages. Access time - Access time - The required access time to position the reading / recording head and wait for a particular page of information to go under the head - It can be large (for example, 20 milliseconds), while the time to read or write a page once accessed, is small. The price paid by the low cost of magnetic storage techniques is, therefore, the relatively long time it takes to access the data. How to move trons is much easier than to move large (or even small) objects, fully electronic storage devices such as silicon memory chips, have a much smaller access time than the devices storage that have mobile pieces such as magnetic disk units. However, once everything is positioned correctly, read or write a magnetic disk is fully electronic (album of the disk rotation), and large amounts of data can be read or written quickly. It often takes more time to access a page of information and it's a disc from a disk than it takes to the computer to examine all the read information. For this reason, in this chapter, we will seek separately in the two main components of the execution time: the number of disc accesses and the CPU time (compution). The number of disc accesses is measured in terms of number of information pages that need to be read or recorded on the disc. We note that the disk access time is not constant - depends on the distance between the current range and the desired range and also in the initial disk route state. However, use the number of read or written pages as an approximation of first gross order of the total time spent accessing the disc. In a typical B tree application, the amount of treated data is so great that all data does not fit into the main memory of a once time. The B tree algorithms copy the selected pages from the disk to the main memory as needed and write back into disk page that have changed. As the B-ring algorithms need a constant number of pages in the main memory at any time, the main memory size does not limit the size of the B trees that can be treated. We model the disk operations on our pseudocódigo as follows. Let x be a pointer to an object. If the object is currently in the computer's primary memory, we can refer to the objects of the object as usual: [x] key, for example. If the object referred to by X resides on the disk, however, we must run the Reading (X) operation disc to read Object X on the main memory before its fields can be referred. (We assume that if x is already in the main memory, then disc-read (x) does not require disk access; is an "noop".) In the same way, the disc operation -Write (x) is used to save any changes that have been made to the X object fields. That is, the typical pattern to work with an object is the following. 1 . . 2 x A pointer for some objects 3 Disk Reading Operations (x) 4 that accesses and / or modifying the X 5 disk recording (x) fields omitted if X Field were changed. 6 Other operations that access, but do not modify X 7 fields ... Figure 19.3 a tior B tall 2 containing more than one bouquet of keys. Each internal node and leaf contain 1000 keys. There are 1001 in-depth 1 and more than one million leaves the depth 2. shown inside each n ° n [x], the number of keys in x. The system can only maintain a limited number of pages in the main memory at any time. Let's assume that the pages do not are released from the main memory of the system; Our Tree-B algorithms will ignore this issue. Once most systems the run time of a B-tree algorithm is determined mainly by the number of read and disk-writing disk operations performs, it is sensible to use these operation Intensiva to have read or write as much information as possible. Thus, a b-tree is usually as large as an entire disk page. The number of children in a tree B node may have, therefore, limited by the size of a disk page. For a large B tree stored on a disk, branching factors between 50 and 2000, are often used, depending on the size of a key relative to the size of a page. A large branch factor dramatically reduces the tree height and the number of disc accesses to find any key. Figure 19.3 shows a Tree-B with a 1001 branching factor and height 2 that can store more than one basket of keys; However, since the node can be maintained permanently in the main memory, only two access to the disc, in the maximum, are required to find any key on this tree! 19.1 Definition of trees-B to keep things simple, let's assume, as we have to search Binaria trees and red and black trees, that any "information Saté Lite "associated with a key is stored in the same node as the key. In the practice, one can actually store each key only a pointer to another page disc that contains the information of SatÃ © Lite for that key. Pseudocódigo in this chapter implicitly assumes that Saté's information associated with a key, or pointer of such information by Saté Lite, travels with the key when the key is moved from n³ to Nó. More commonly used â € â € â €