Chapter 11

—作业

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作业(1)

11.6 Consider a file system on a disk that has both logical and physical block sizes of 512 bytes. Assume that the information about each file is already in memory. For each of the three allocation strategies (contiguous, linked, and indexed), answer these questions:

a. How is the logical-to-physical address mapping accomplished in this system? (For the indexed allocation, assume that a file is always less than 512 blocks long.)

b. If we are currently at logical block 10 (the last block accessed was block 10) and want to access logical block 4, how many physical blocks must be read from the disk?

作业(2)

- There are two text files A and B in the file system. The size of the file A is 15MB, and the size of the file B is 300KB. When using the linked allocation scheme, each block's size is 1024B, and the block address in the block is of 4 bytes length. The directory entries are already in main memory.
- 1) What is the size of the maximum file in this file system?
- 2) When the file A will be revised, how many disk I/O operations are required if the information in the 15698^{th} byte in the file A is to be revised?

作业(3)

- Consider a file system on a disk. The size of disk blocks is 512B. The directory is organized into a tree structure, as shown in Fig.3, and the root directory resides in memory
- As shown in Fig.1, each directory entry has one bit **type** to define the entry as a subdirectory or as a file, and two 2-byte fields, one holds a file name and the other holds a pointer to a disk block
- For a directory file in Fig.1, the directory name and its first disk block address are recorded
- Directory files are organized into linked files, and common data files are organized into indexed files

name	address	type
A	Pointer to 1st block	directory
B	Pointer to 1st block	directory
C	Pointer to 1st block	directory
D	Pointer to FCB block	file

Figure 1 directory file

	other attributes
1	pointer
2	pointer
...	
10	pointer
11	pointer
12	pointer
13	pointer

Figure 2 FCB structure

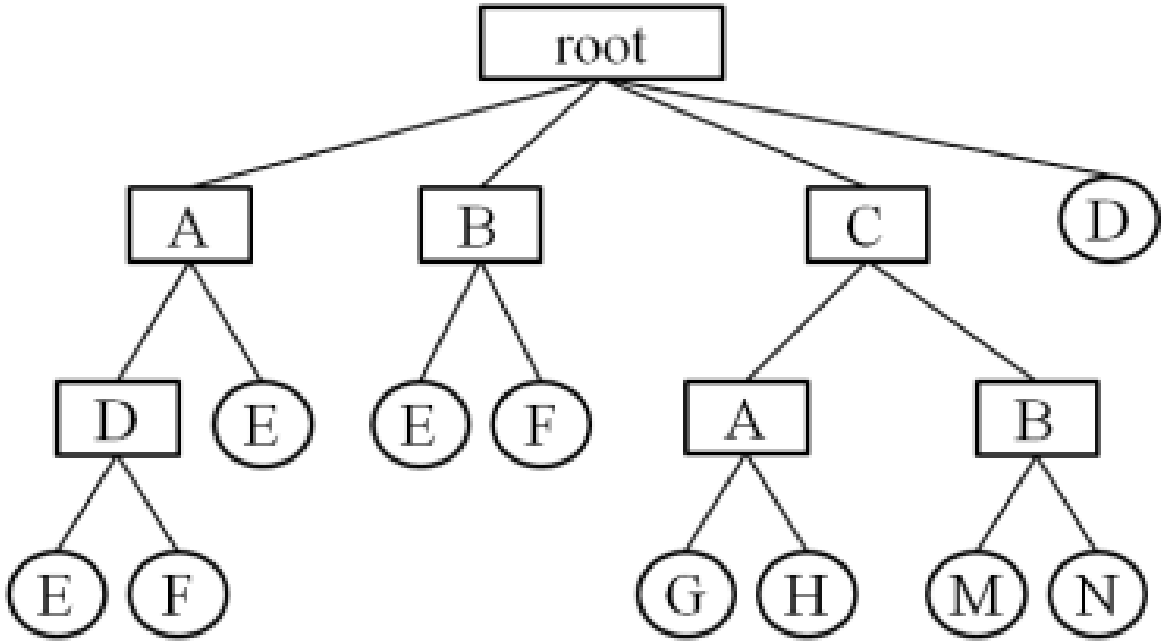


Figure 3 directory tree

作业(3)

- For a data file, the file name and the disk address where its FCB resides are recorded, described as the file D in Fig.1
- The structure of the directory file is shown in Figure 1, and the structure of FCB is shown in Figure 2

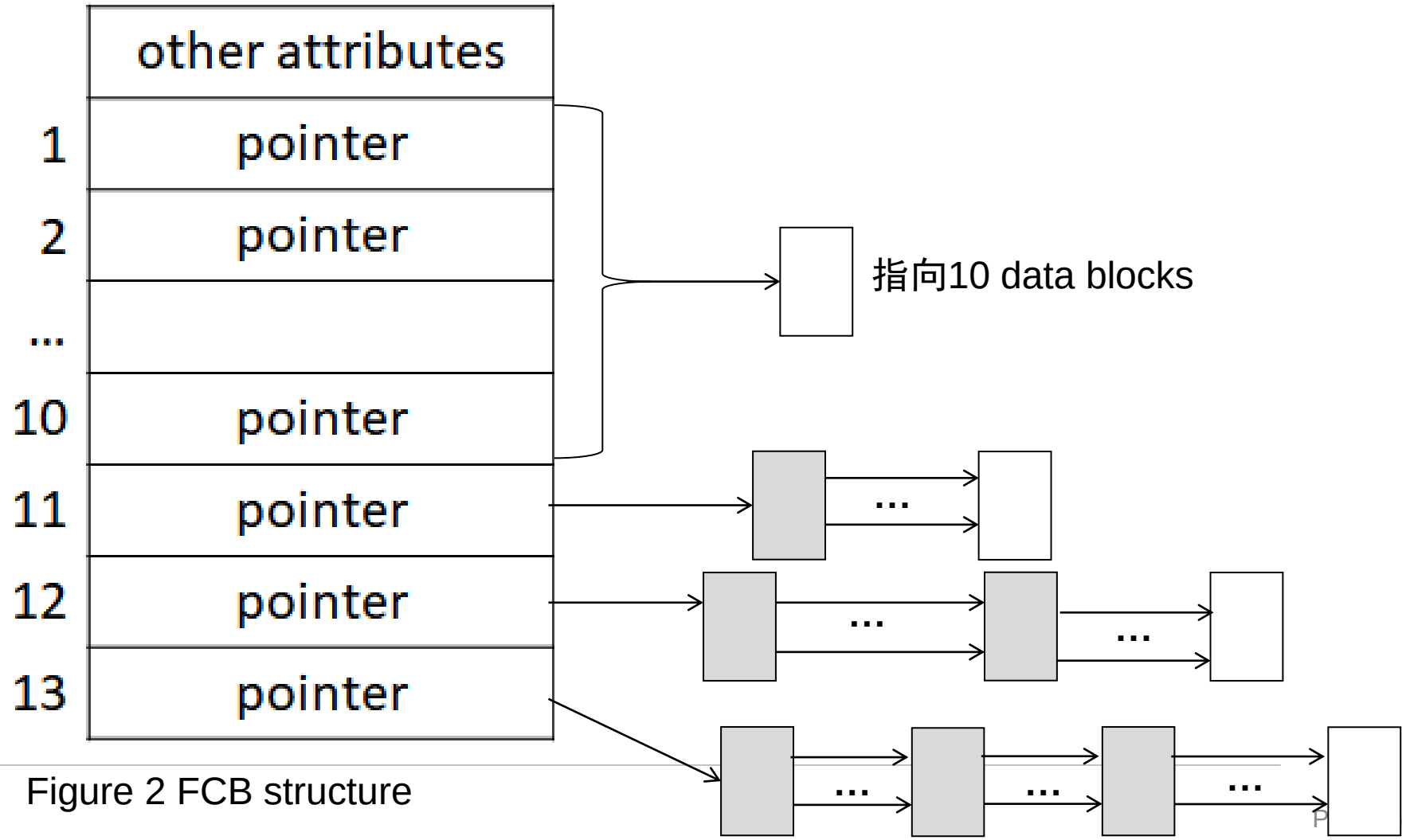
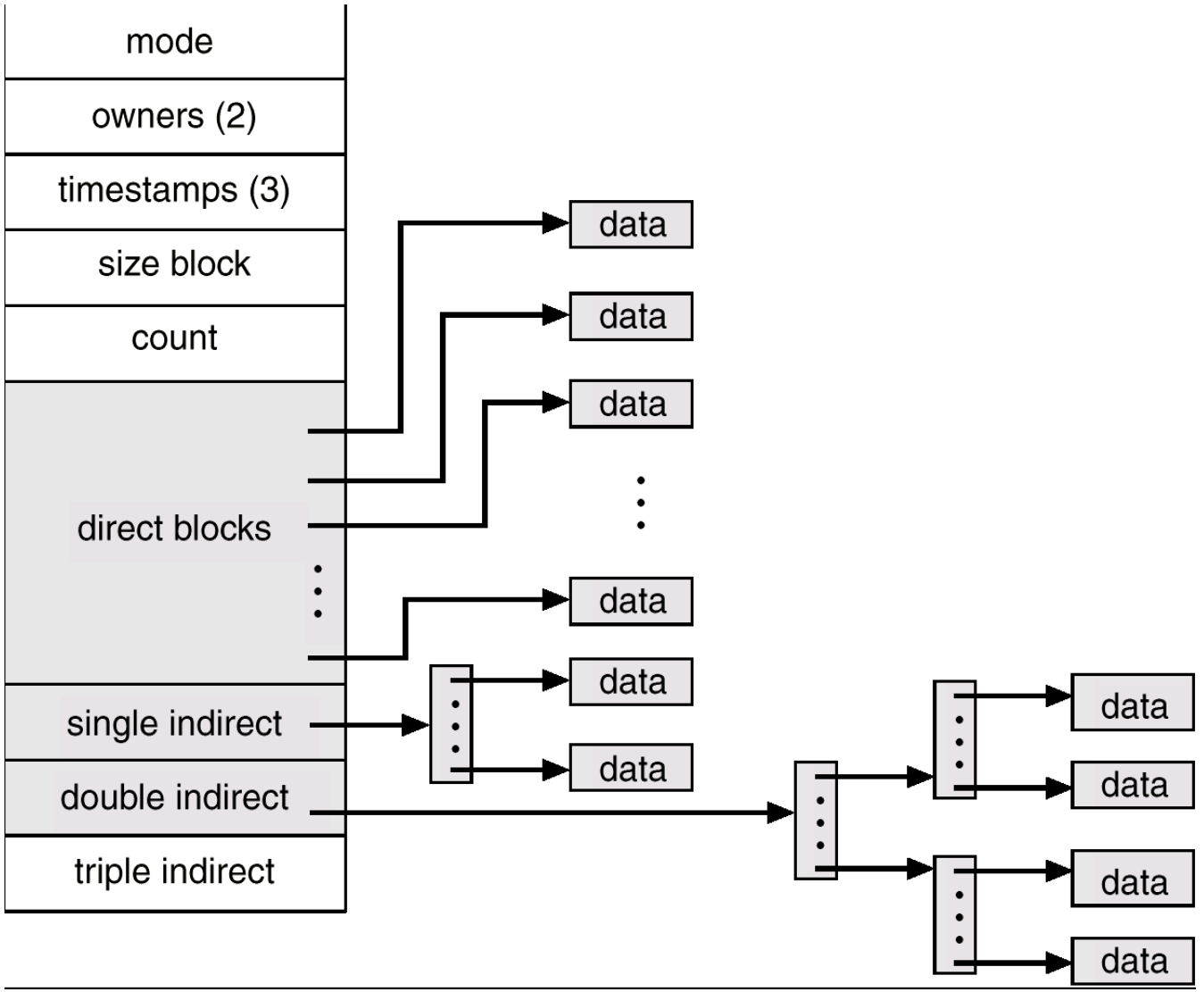


Figure 2 FCB structure

作业(3)


mode
owners (2)
timestamps (3)
size block
count
direct blocks
single indirect
double indirect
triple indirect
data
data
data
data
data
data
data
data
data
data

作业(3)

- There are 13 pointers in the file’ s FCB. Each pointer (disk address) requires 2 bytes.
- The first 10 of these pointers directly point to data blocks of files
- The next three pointers point to indirect index blocks, and among these three pointers,
  - the first points to a single indirect block, which is an index block containing the addresses of data blocks;
  - the second points to a double indirect block, which contains the address of index blocks, and these index blocks contain the addresses of data blocks;
  - the last pointer contains the address of a triple indirect block.

作业(3)

- Questions
  - (1) Calculate the maximum size of the file that can be accessed only through the direct index in FCB
  - (2) Calculate the maximum address space accessible through the FCB
  - (3) Suppose the directory tree of the file system is shown in Figure 3

    Now, we want to read the content at the 10240th byte in file M into memory, how many and which disk blocks must be read into memory?

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- 作业提交截止时间：2022年12月15日