CSE 120: Homework 4

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Question 1

A total of 10 reads are necessary. There are 5 directories/files, and there has to be a read for the inode and a read for the data block.

Question 2

The 10 direct pointers can point to $40K$ of data. The indirect pointer points to a block of entirely direct pointers, so there are $1K$ direct pointers in here. That is $4M$ of data. The double indirect pointer has $1M$ of direct pointers, which stores $4G$ of data. In total that is $4,004,040K$ bytes of data.

Question 3

1. There is a total of $2KB * 1M = 2GB$ of waste.
2. There is a total of $256B * 1M = 256MB$ of waste.
3. Unless I had a very large amount of storage space, I would probably want this benefit.

Question 4

It does not necessarily fit in the same inode. All zip can do is access files and directories, but it is up to the operating system file system to create the inodes.

Question 5

1. In Unix I could individually give each 4990 users permission, or I could make a group.
2. I could make a blacklist of the users that do not have access to the file.

Question 6

A file system cache helps improve performance by storing block location pointers in physical memory instead of disk, which is much faster. However physical memory is limited, so systems cannot use incredibly large caches.

Question 7

I\X	100ms	10 ms	1 ms	0.1 ms
25 ms	20%	71%	96%	99.6%
5 ms	4.8%	33%	83%	98%
0.1 ms	0.0999%	0.99%	9.09%	50%
0.005 ms	0.005%	0.05%	0.498%	4.76%
0.001 ms	0.001%	0.01%	0.1%	0.99%