

4061 Project 3 Experiment

In order to quantify the performance of our file system we will be looking at how long it takes to read a file from our file system. To do this we added a Count variable in our program that increments for every low level function. We then take only the amount of Count for read functions. We then divide this by our total number of files to get the average number of accesses per file.

Files in our file system: 14

Number of read accesses: 7358

Average accesses per file: ~526

Now that we know the average number of accesses for a file we look at the time it takes for our given disk to complete these actions. Disk access time is quantified by summing the Average Seek time, Average rotation time and Average transfer time. Average seek time is given to us as **4 ms**. Average rotation time is $\frac{1}{2} * \frac{1}{\text{RPM}} * 60 \text{ sec}$ and equals **2ms**. The average transfer time is given by $\frac{1}{\text{RPM}} * \frac{1}{\text{avg sectors per track}} * 60 \text{ sec}$ and equals **0.004ms**.

When looking at the Best case for reading the file we will only seek and rotate once and then transfer for every access to our file system.

Best Case: 4ms (avg seek) + 2ms (avg rotate) + 0.004ms * 526 (avg accesses) = 8.104ms

When looking at the Average case for reading the file we will need to seek, rotate and transfer for every access as the blocks are randomly mapped and will need to be located.

Average case: (4ms + 2ms + 0.004ms) * 526 = 3158.1ms

So from our results we can see that the seek and rotation time dominate the performance of our file system. When we do not have to seek and rotate for every access (best case) the performance of our file system is greatly improved.