

Question 1. Buffer size (PA4_BUFFER_SIZE) = 2048

Buffer cache replacement policy = FIFO

Write policy = WRITE THROUGH

Disk Scheduling = C-LOOK

TEST 1 and TEST 2:

DISK 0:

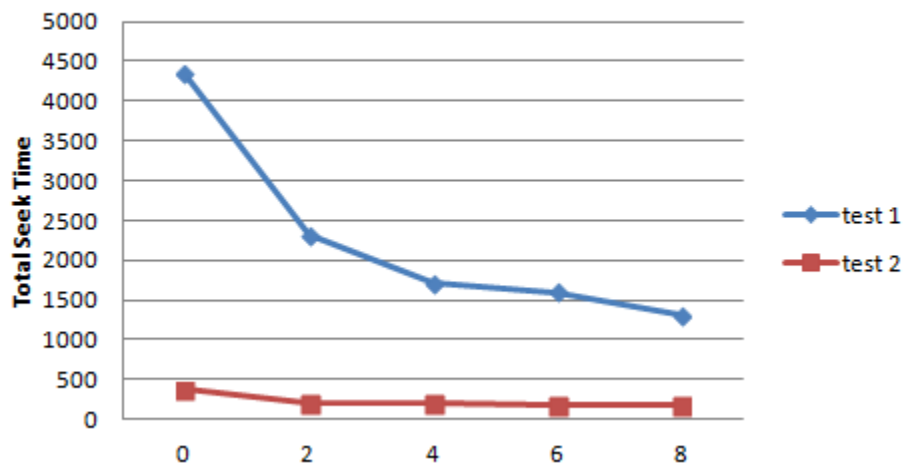
If data is prefetched then it takes less time for successive reads and the buffer is being built.

This concept is inspired by locality of reference. It is observed that the next likely read block will be in most cases is near the block that is just being read. Thereby prefetching the data we are increasing the probability of cache hits.

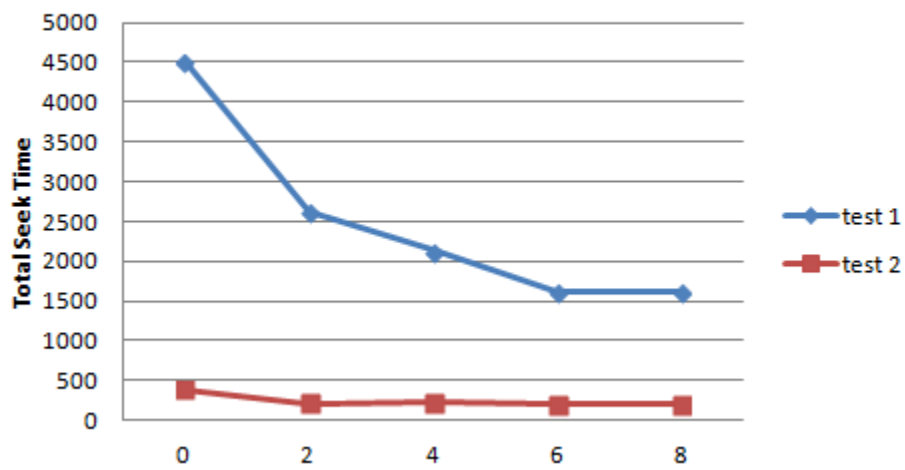
Thus in the below graphs, as prefetching values are increased we see a decrease in seek time.

However, the downside to this method is that more read requests are issued when only one was actually required. i.e. if a user makes read request for random blocks which are far from the one just accessed then prefetching may not provide good results.

Test1/Test2 for Disk0



Test1/Test2 for Disk1

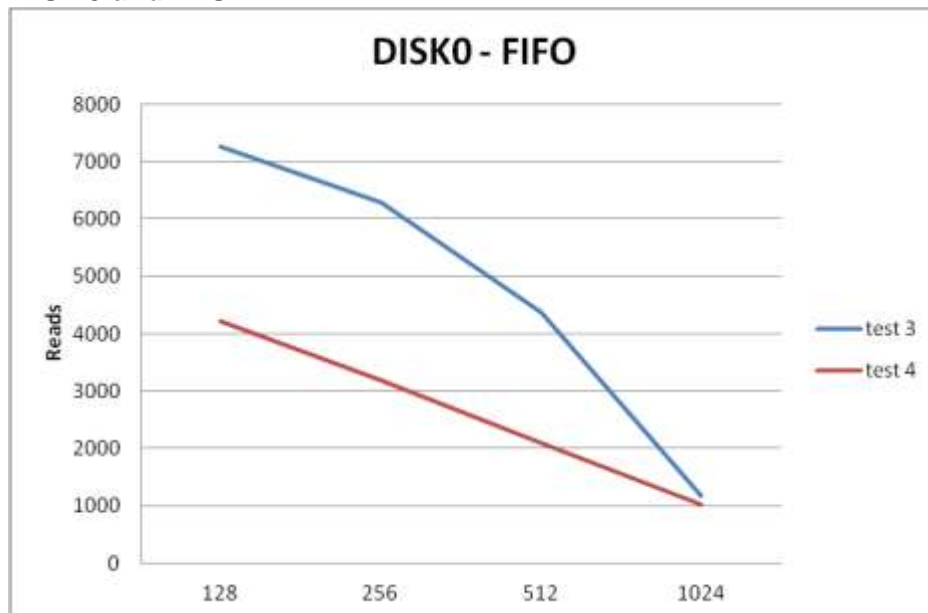


Question 2. Prefetch size = 0
Write policy = WRITE THROUGH
Disk scheduling = C-LOOK

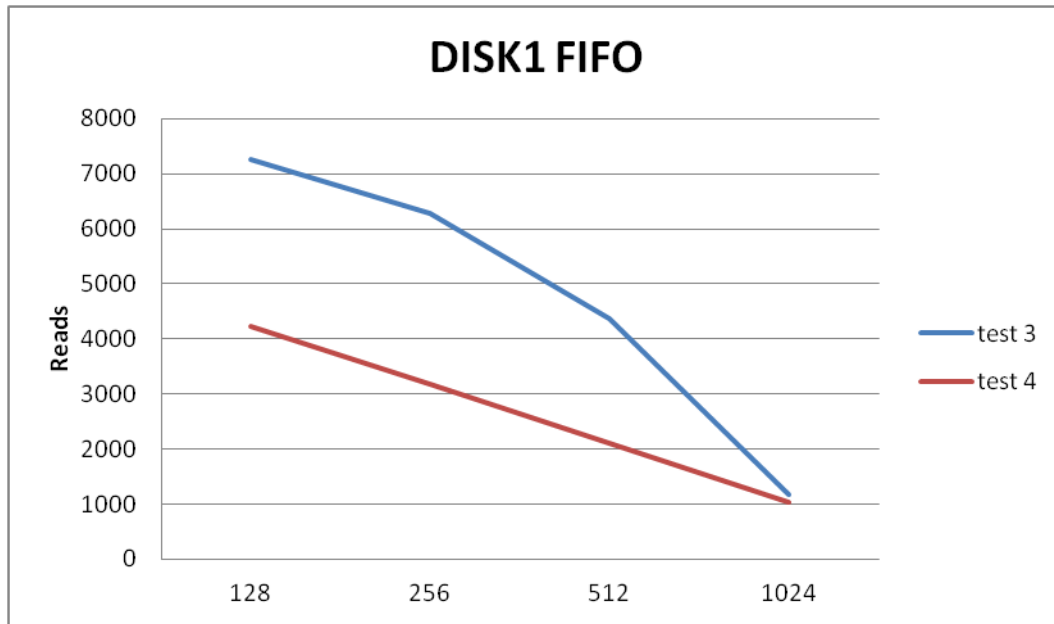
With gradual increase in buffer size, the eviction is reduced to a considerable format. Hence the number of read requests decrease as the buffer size increases.

This can be observed in the below graph. As buffer size increases from 128 to 1024 there is a drop in number of reads.

FIFO for Disk 0:
TEST 3 and TEST 4:

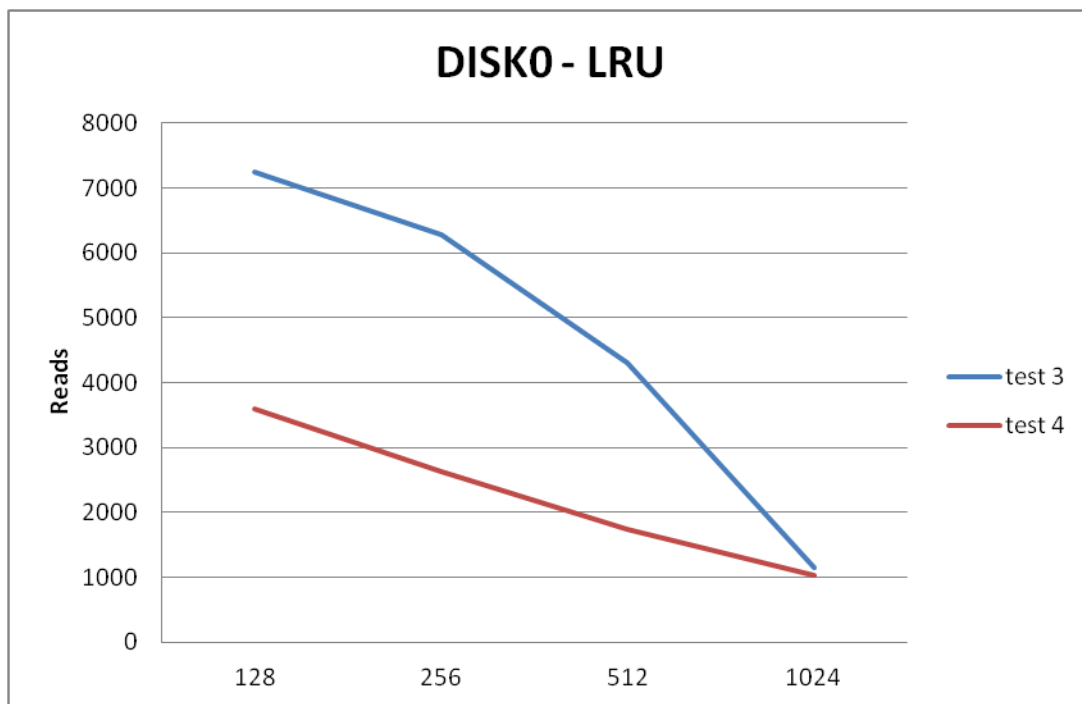


FIFO for Disk 1:
TEST 3 and TEST 4:



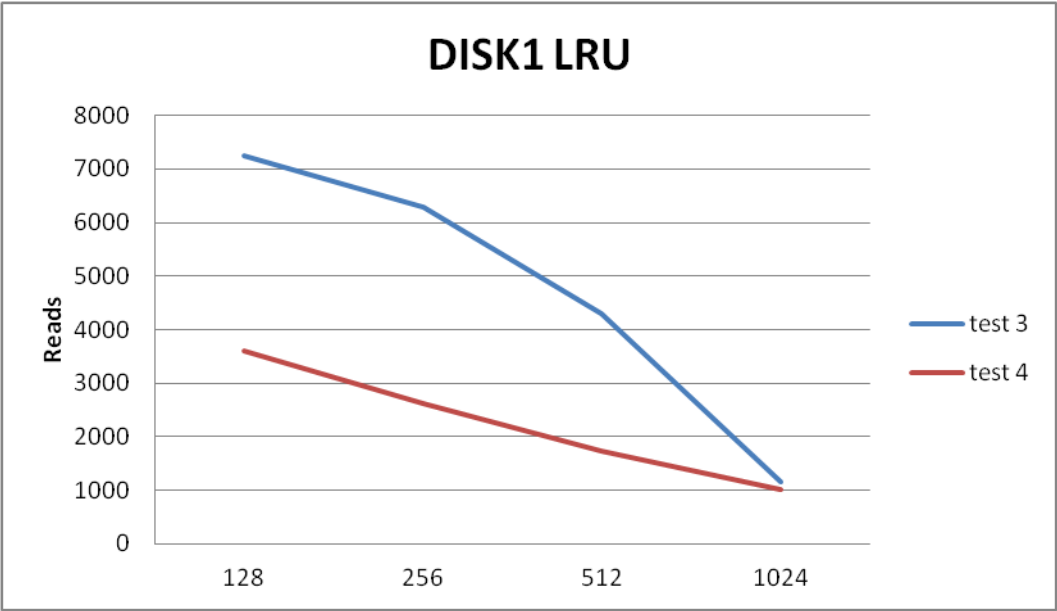
LRU for Disk 0:

TEST 3 and TEST 4:



LRU for Disk 1:

TEST 3 and TEST 4:



3. Prefetch size = 0

Buffer size = 256

Write policy = DELAYED WRITE

Buffer cache replacement = LRU

TEST 5:

SSTF searches for the next block for which the seek time from the current position is the shortest amongst all.

CLOOK goes sequentially in one direction in the disk to fetch the next request block.

On the other hand, FIFO will just take next request in the queue. This will decrease the performance for FIFO as the next request in queue could be any random position on the disk, which would increase the seek time. Thus, the total seek time for SSTF and CLOOK would be better than that of FIFO as SSTF and CLOOK disk scheduling algorithms are enhanced versions of the disk scheduling algorithms the total seek time will improve as compared to FIFO algorithm.

