IT 252 HW 8 text

Name: Lehi Alcantara

HomeWork Problems answered is followed bellow:

**2.64:**

Tavg rotation = 1/2 \* Tmax rotation

1/2 \* (60 secs / 15,000 RPM) \* 1000 ms/sec

= 2

The average transfer time is:

Tavg transfer = (60 secs / 15,000 RPM) \* 1/800 sectors/track \* 1000 ms/sec

= 0.0025

Putting it all together, the total estimated access time is:

Taccess = Tavg seek + Tavg rotation + Tavg transfer

= 4 ms + 2 ms + 0.0025 ms

= 6.0025

**6.25:**

The file consists of 4000, 512-byte logical blocks. For the disk, Tavg seek = 4 ms, Tmax rotation = 60/15000 \* 1000 = 4 ms. Tavg rotation = 2.

**A) Best Case**: In the optional case. The blocks are mapped to contiguous sectors, on the same cylinder, that can be read one after the other without moving the head. Once the head is positionedover the first sector it takes four full rotations (1000 sectors per rotation) of the disk to read all 4000 blocks. So the total time to read the file is Tavg seek + Tavg rotation + 2 \* Tmax rotation = 4 + 2 + 4\*4 = 22 ms.

**B) Random Case:** In this case, where blocks are mapped randomly to sectors, reading each of the 4000 blocks requires Tavg seek + Tavg rotation ms, so the total time to read the files is (Tavg seek + Tavg rotation) \* 4000 = (4+2)\*4000 = 24,000 (24 seconds!).

**6.26:**

1. S = C/B\*E = 1024/4\*4 = 64; s= log2 (64) = 6 ;b = log2(4) = 2 ; t=m-(s+b) = 32-(6+2) = 24

2. . S = C/B\*E = 1024/4\*256 = 1; s= log2 (1) = 0 ;b = log2(4) = 2 ; t=m-(s+b) = 32-(0+2) = 30

3.S = C/B\*E = 1024/8\*1 = 128; s= log2 (128) = 7 ;b = log2(8) = 3 ; t=m-(s+b) = 32-(7+3) = 22

4. S = C/B\*E = 1024/8\*128 = 1; s= log2 (1) = 0 ;b = log2(8) = 3 ; t=m-(s+b) = 32-(0+3) = 29

5. S = C/B\*E = 1024/32\*1 =32; s= log2 (32) = 5 ;b = log2(32) = 5 ; t=m-(s+b) = 32-(5+5) = 22

6. S = C/B\*E = 1024/32\*4 = 8; s= log2 (8) = 3 ;b = log2(32) = 5 ; t=m-(s+b) = 32-(3+5) = 24

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| cache | m | C | B | E | S | t | s | b |
| 1. | 32 | 1024 | 4 | 4 | 64 | 24 | 6 | 2 |
| 2. | 32 | 1024 | 4 | 256 | 1 | 30 | 0 | 2 |
| 3. | 32 | 1024 | 8 | 1 | 128 | 22 | 7 | 3 |
| 4. | 32 | 1024 | 8 | 128 | 1 | 29 | 0 | 3 |
| 5. | 32 | 1024 | 32 | 1 | 32 | 22 | 5 | 5 |
| 6. | 32 | 1024 | 32 | 4 | 8 | 24 | 3 | 5 |

**6.27:**

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| cache | m | C | B | E | S | t | s | b |
| 1. | 32 | 2048 | 8 | 1 | 256 | 21 | 8 | 3 |
| 2. | 32 | 2048 | 4 | 4 | 128 | 23 | 7 | 2 |
| 3. | 32 | 1024 | 2 | 8 | 64 | 25 | 6 | 1 |
| 4. | 32 | 1024 | 32 | 2 | 16 | 23 | 4 | 5 |

1. C = B\*E\*S = 8\*1\*256 = 2048 ; S = 2s = 28 = 256

2. B=2b = 22 =4 ; E = C/(B\*S) = 2048/(4\*128) = 4

3.t = m-(s+b) = 32-(6+1)= 25 ; s = log2(S) = log2(64) = 6

4. B = 2b = 25 = 32 ; b= m-s-t = 32-4-23 = 5