

Pset6 Solutions

Part A

8.4.1

No index: $2 + 98p_1 + 98p_2$

Star index: $4 + 96p_2$

Movie index: $4 + 96p_1$

Both: $6 - 2p_1 - 2p_2$

14.2.1

a)

i.

$(1,000,000 \text{ records} / 10 \text{ records per block}) = 100,000 \text{ blocks}$

$(1,000,000 \text{ records} / 69 \text{ keys per block}) = 14,493 \text{ blocks}$

$14,493 / 70 \text{ pointers} = 208 \text{ blocks}$

$208 / 70 \text{ pointers} = 3 \text{ blocks}$

1 block for the root

total: 114,705

ii. 5: 4 disk I/O to get to the leaf and 1 for lookup

b)

i. 114,705 (same as 14.2.1)

ii. 5

c)

i.

$(1,000,000 / 10) = 100,000$

$100,000 / 69 = 1,450$

$1,450 / 70 = 21$

1

total: 101,472

ii. 4

14.2.2

a)

i. 114,705

ii.

$1,000 \text{ records} / 10 \text{ records per block} = 100 \text{ blocks}$

We have to visit $1000/69 = 15 \text{ leaves}$

4(levels of the tree, we end at 1 leaf) + 14(to move to next leaf pointers) + 100 = **118**

b)

i. 114,705

ii. $3 + (1000/69) \text{ leaves} + 1000 \text{ (not sorted records)} = 1018$

c)

i. 101,472

ii.

One pointer from a leaf points to a block of 10 records. In a leaf we have 69 pointers so it's a total of 69×10 records = 690. We need two leaves for the 1000 records of the answer the query provides.

Go down 3 levels (you end at 1 leaf which contains 69 pointers to blocks of 10 records each), move to the next leaf.

$3(\text{levels}) + 1 + 100 = \mathbf{104}$

Part B

