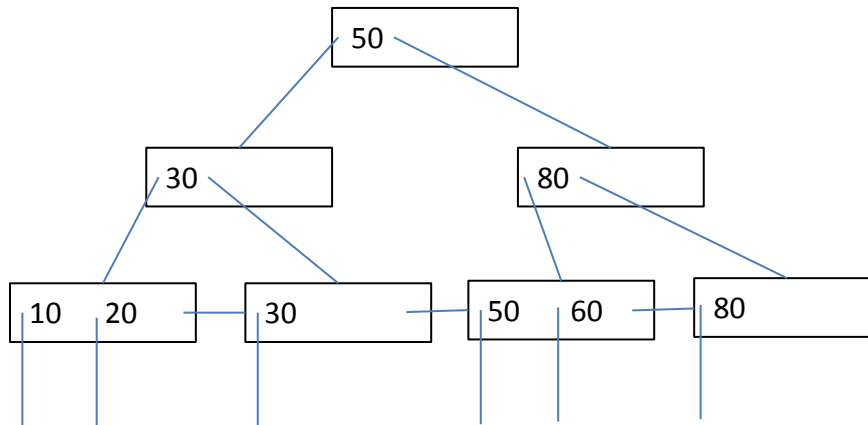


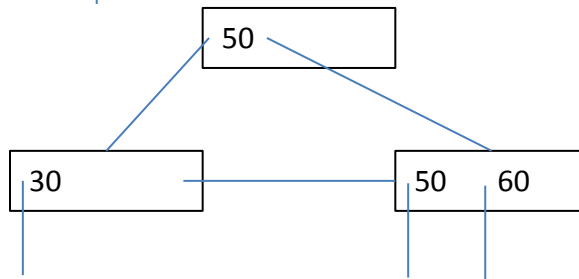
1.

- a. $6 \text{ platters} \times 10000 \text{ cylinders} \times 500 \text{ sectors} \times 1 \text{ kB} = 30,000,000 \text{ kB}$
- b. Seek time: 10ms
 Rotational Delay: $6000 \text{ rotation}/60 \text{ sec} = 0.5 \text{ rotation}/5\text{ms}$
 Transfer time: $500 \text{ sectors}/10\text{ms} = 1 \text{ sector}/0.02\text{ms}$
 Total: **15.02ms**
- c. $1000 \times (2 + 4 \times 5 + 30 + 20) = 72 \text{ bytes/tuple}$
 $(1024 \text{ bytes/block})/(72 \text{ bytes/tuple}) = 14 \text{ tuples/block}$
 $1000 \text{ tuples}/(14 \text{ tuples/block}) = \mathbf{72 \text{ blocks}}$
- d. Seek time: 10ms
 Rotational Delay: $6000 \text{ rotation}/60 \text{ sec} = 0.5 \text{ rotation}/5\text{ms}$
 Transfer time: $500 \text{ sectors}/10\text{ms} = 72 \text{ sectors}/1.44\text{ms}$
 Total: **16.44ms**
- e. Seek time: 10ms
 Rotational Delay: $6000 \text{ rotation}/60 \text{ sec} = 0.5 \text{ rotation}/5\text{ms}$
 Transfer time: $500 \text{ sectors}/10\text{ms} = 3 \text{ sectors}/0.06\text{ms}$
 Total: $24 \times 15.06 = \mathbf{361.44\text{ms}}$
- f. It will be $n \times 15.02\text{ms}$, where n is the number of classes where year = 2005. It is helpful to create a B+ tree.

2.

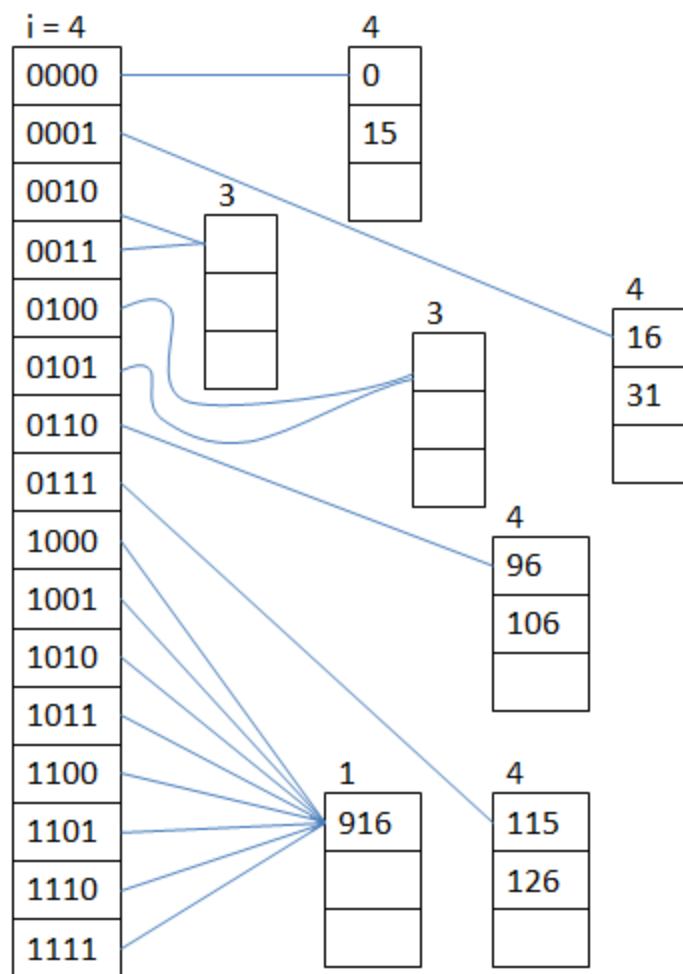


a.



b.

3. Min and max are both 4.



4.