Name: Zhang Yuanbo

Hawk ID: A20478825

Question 1.1

1. $\lfloor \frac{2048-24}{100+8} \rfloor = 18$, We could fully fit 18 records in a block.

2. Assume the size of each record is $\lfloor X \rfloor$. In order to maximize the size, I can get this equation.

$$\frac{2048-24}{10X+80} = 1 \quad \Rightarrow \quad X = 194.4$$

So, the size of each record is 194 bytes.

According to the problem, this means that each record no longer has an offset, but a value that represents the offset of all records.

3. $\lfloor \frac{2048-24}{200} \rfloor = 10$, We can fully fit 10 records in a block.

Question2.1

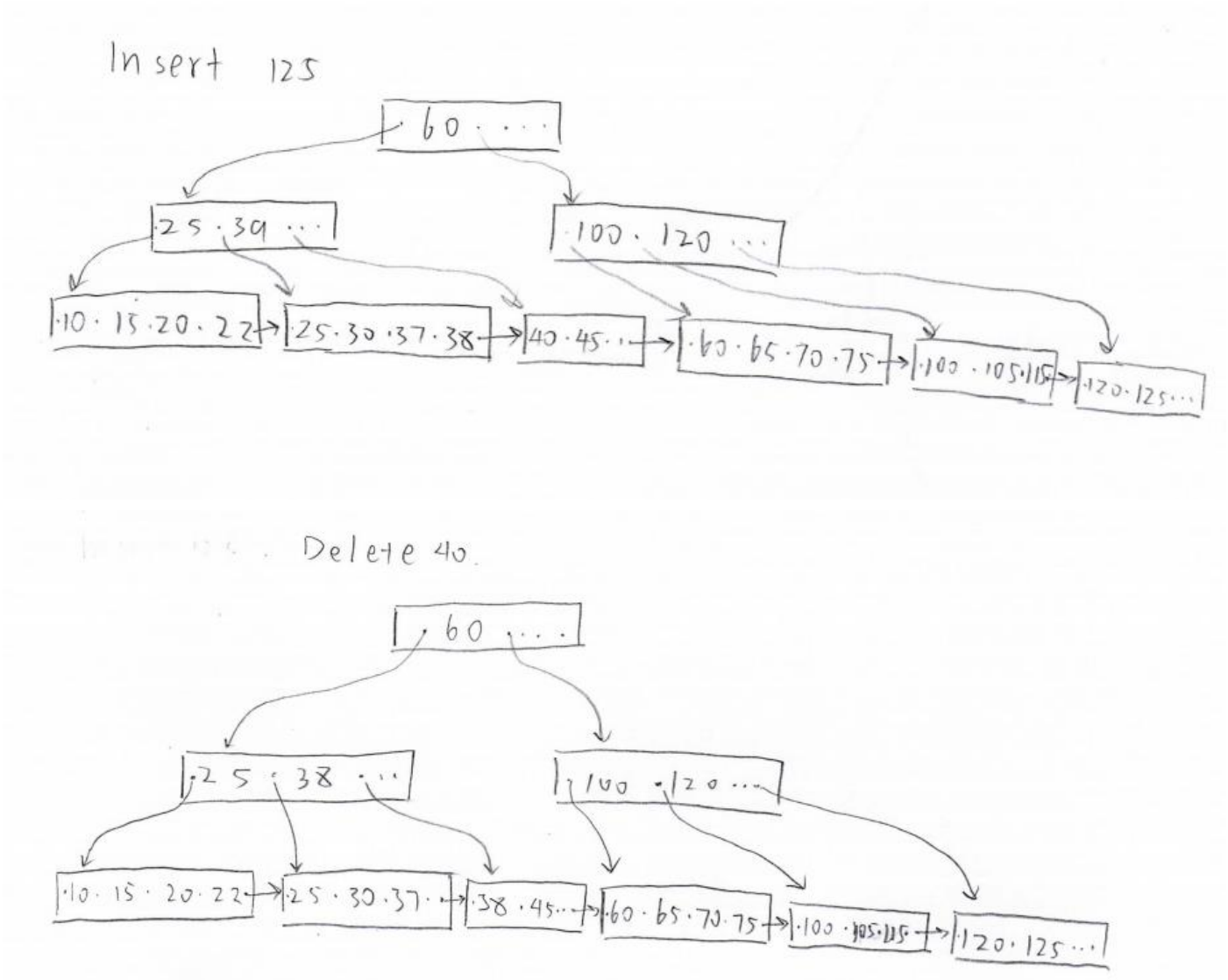
a)

there are five index page I/Os from the root node.[10, 15,20,22]→[60,65,70,75]

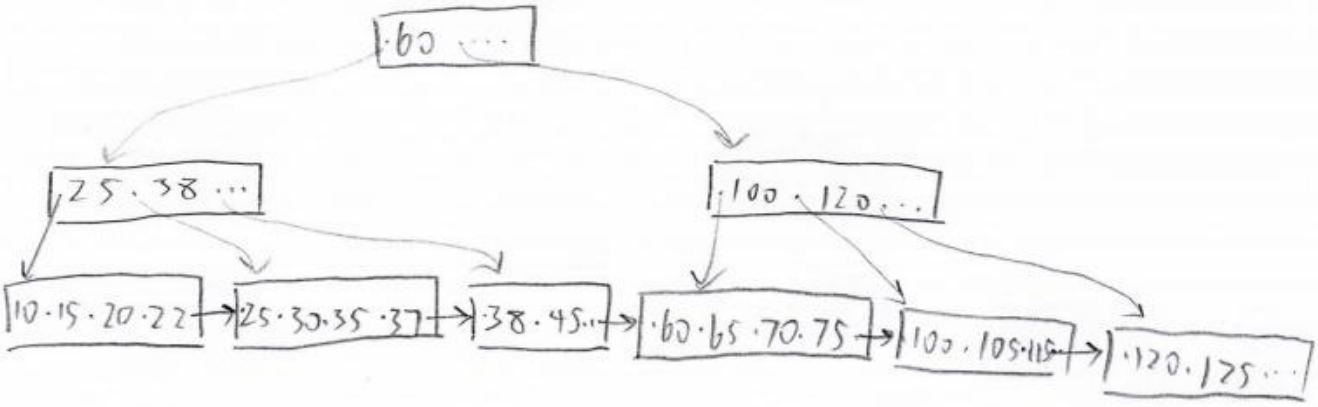
Between 15 and 65, Between 15 and 65, there are 11 nodes:15,20,22,25,30,37,38,40,45,60,65.
11 records page I/Os

So, the number of disk I/Os is 5+11=16

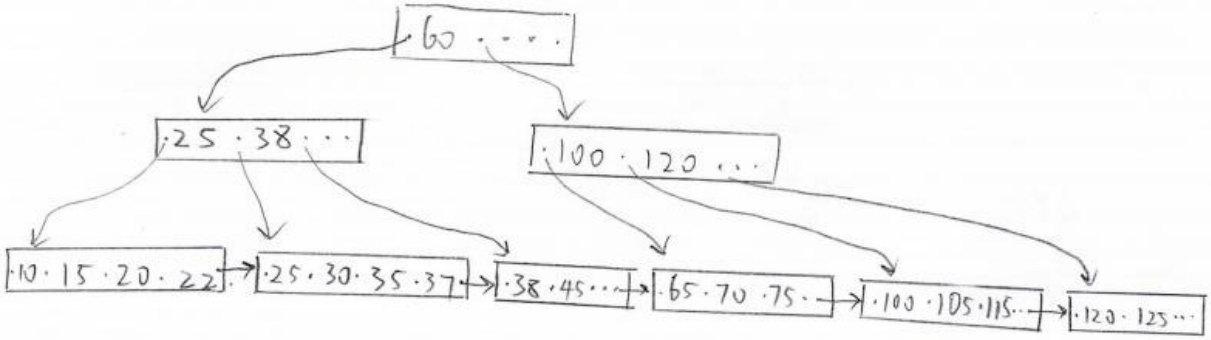
b)



insert 35

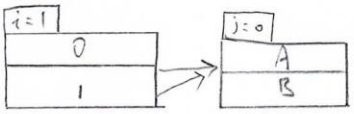


Delete 60

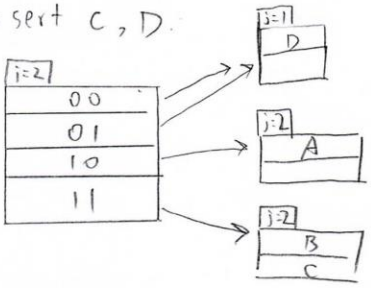


Question2.2

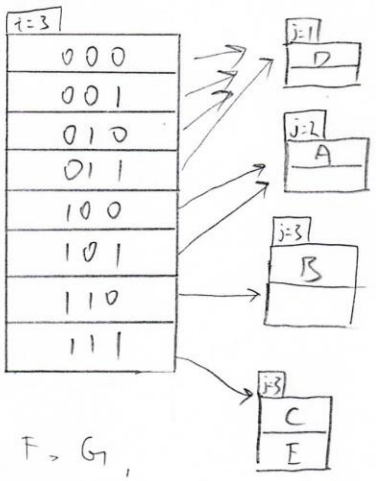
insert A, B



insert C, D.



insert E



insert F, G,