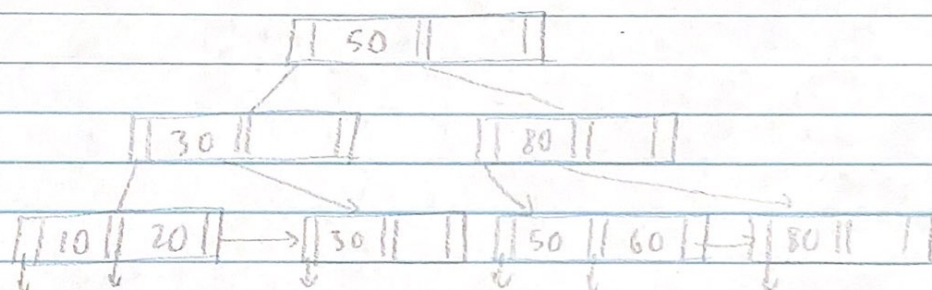
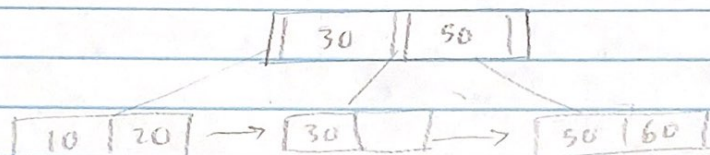
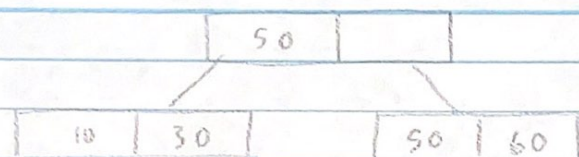


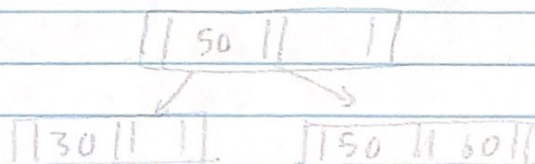
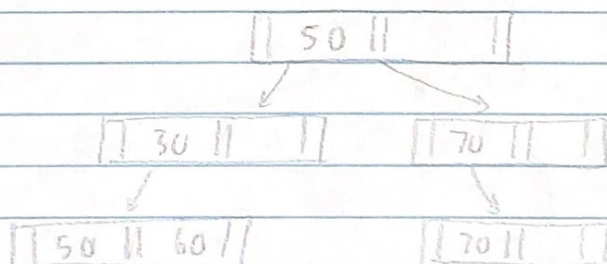
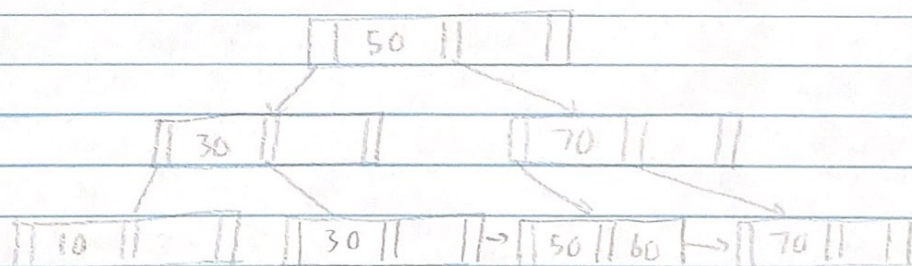
Ethan Wang
305319009
11/18/21

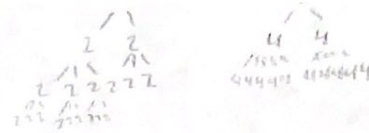
CS 143 HW6

1. a)



b)





2. 300 records $n=5$

At most
min 4

At least	Leaf : 2 keys , 3 pointers		4 keys , 5 pointers
	Non-leaf : 2 keys , 3 pointers		4 keys , 5 pointers
	Root : 1 key , 2 pointers		2 keys , 2 pointers

Minimum:

① Leaf $\lceil 300/4 \rceil = 75$

② $\lceil 75/5 \rceil = 15$

③ $\lceil 15/5 \rceil = 3$

④ Root Node

Min : 4 layers

Maximum:

① Leaf $\lceil 300/2 \rceil = 150$

② $\lceil 150/3 \rceil = 50$

③ $\lceil 50/3 \rceil = 16$

④ $\lceil 16/3 \rceil = 5$

⑤ $\lceil 5/3 \rceil = 1$ (Root Node)

Max 5 layers

3.

$$h(n) = n \bmod 256$$

8-bit hash key

n	n % 256	binary	
106	106	01101010	✓
115	115	01110011	✓
916	148	10010100	
0	0	00000000	✓
96	96	01100000	✓
126	126	01111110	✓
16	16	00010000	✓
15	15	00001111	✓
31	31	00011111	✓

i = 4 (4 bits used in hash keys)

0000

0001

0010

x

0011

x

0100

x

0101

x

0110

0111

1000

1001

1010

1011

1100

1101

1111

i = 4

0

15

i = 4

16

31

i = 4

106

96

i = 4

115

126

i = 1

916

(only one that starts with 1 (binary form))