Data Structure & Algorithm

Assignment 4.

NO. SHIH-HAN WANG.

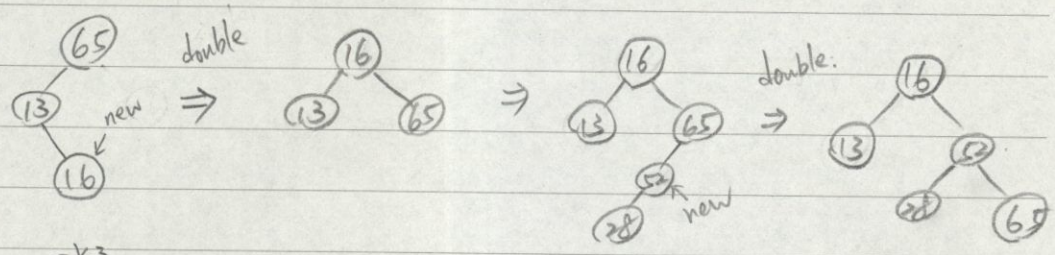
DATE >02138 9848

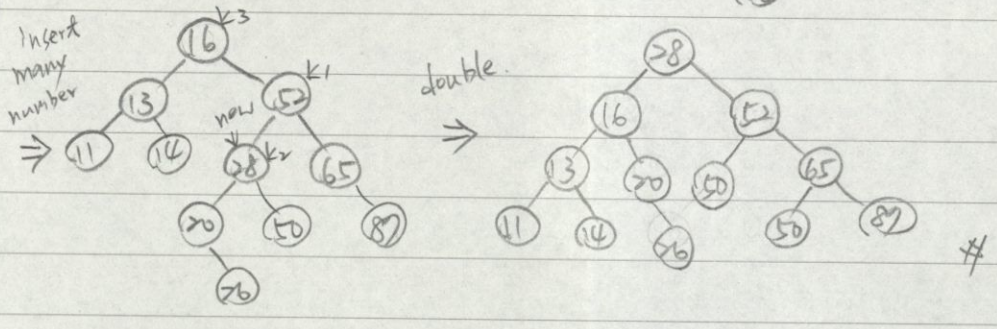
1) a. a c e d f n r w s

b. f e c a d r n s w

c. a c d e n w s r f

2)





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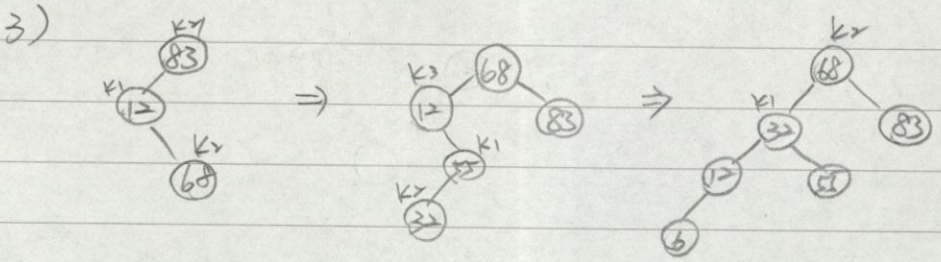
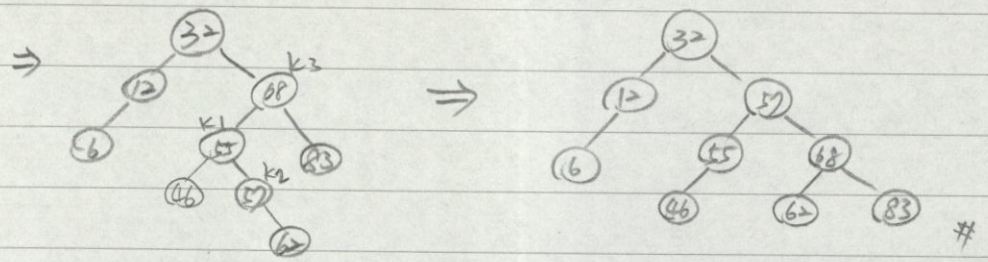
3)





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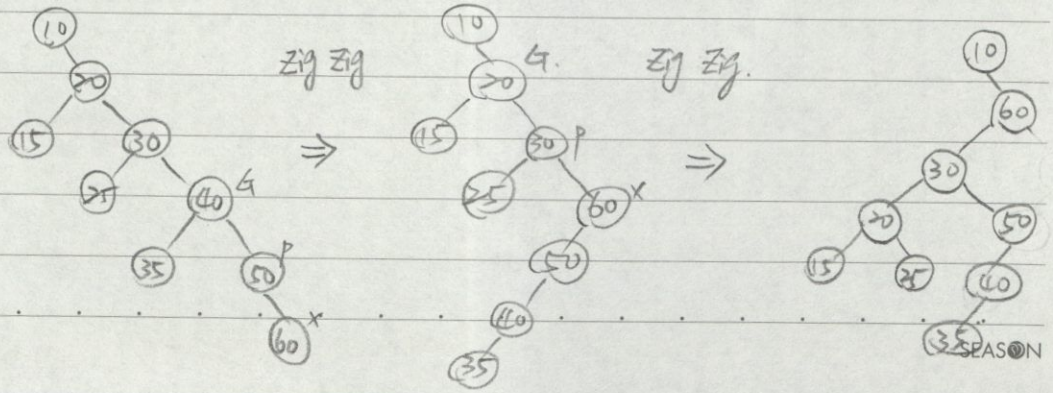
4)



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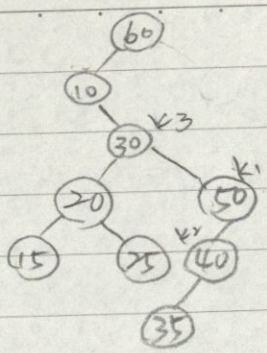

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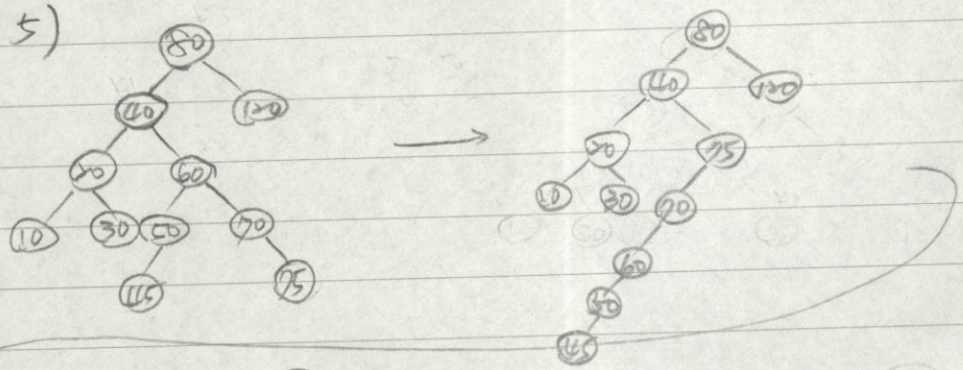
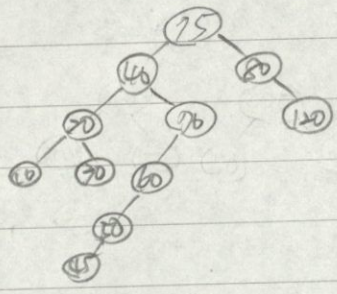
5)



Zig Zag.



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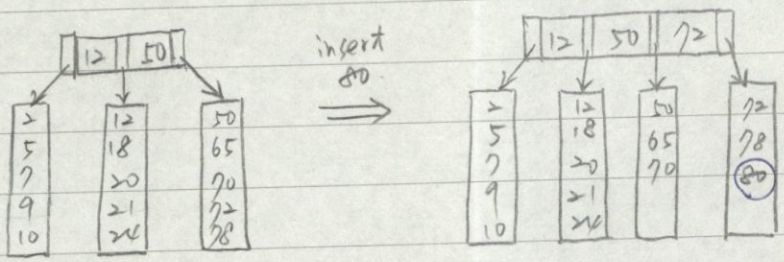
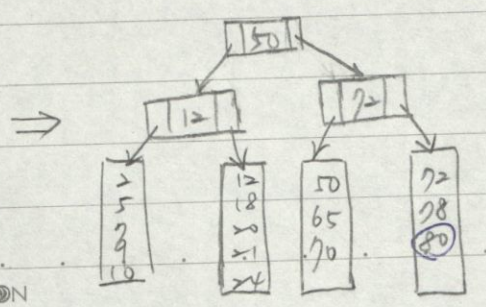
6) $M = 3 \xrightarrow{Max} key = M-1 = 2$; $L = 5 \xrightarrow{Max}$ Leaf Node = 5

Node = M = 3





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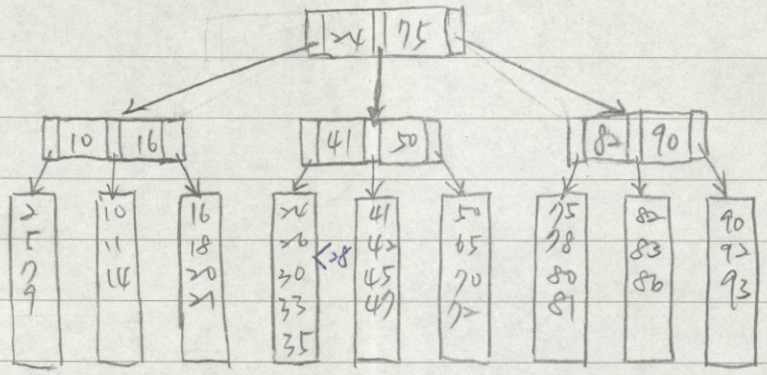
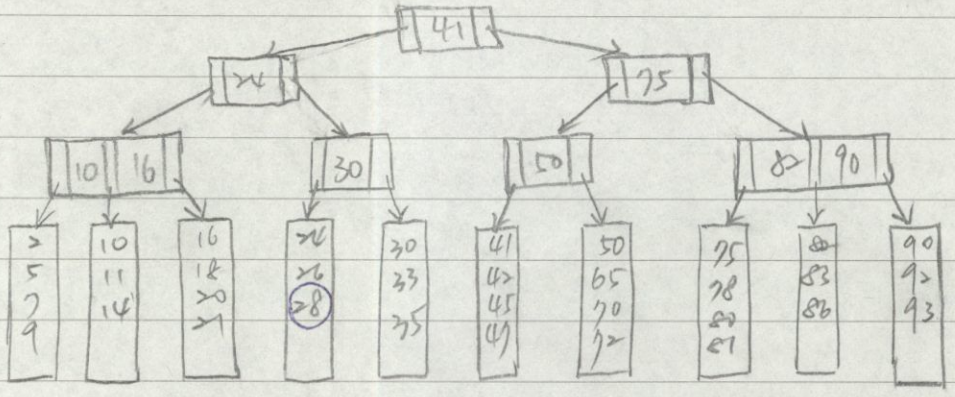
7) $M=3 \xrightarrow{\text{Max}}$ key $= M-1 = 2$; $L=5 \xrightarrow{\text{Max}}$ Leaf Node $= 5$.

Node = 3.





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8) Block size = 3096 bytes. ; key = 4 bytes, data records = 36 bytes each.

M-1 key, M pointer pointer = 4 bytes.

$L = (3096) / (36) = 86$ records in a block

$4(M-1) + 4M = 8M - 4 = 3096 \Rightarrow M = \frac{3100}{8} = 387$.

#

9)

Leaf = $8600000 / 86 = 100000$ leafs #

10) Every node have two outgoing pointers, so if there are N nodes, there must have >N pointers. However, root have an incoming pointer from its parent. This result that the total pointers are

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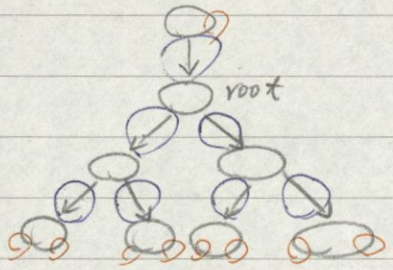
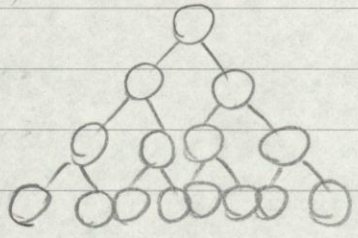
$N-1$, and the remaining null pointers are $N+1$.

ex: $N = 8$



$\begin{cases} N-1 \text{ pointers} = 7 \text{ pointers.} \\ N+1 \text{ null pointer} = 9 \text{ pointers} \end{cases}$ #

11)



level

1 $N_1 = 1 \Rightarrow 2^1 - 1$

2 $N_2 = 3 \Rightarrow 2^2 - 1 \Rightarrow N_2 = 2N_1 + 1$

3 $N_3 = 7 \Rightarrow 2^3 - 1 \Rightarrow N_3 = 2N_2 + 1$

4 $N_4 = 15 \Rightarrow 2^4 - 1 \Rightarrow N_4 = 2N_3 + 1$

$\Rightarrow$ to add another level, the number of node will be $2N+1$ #