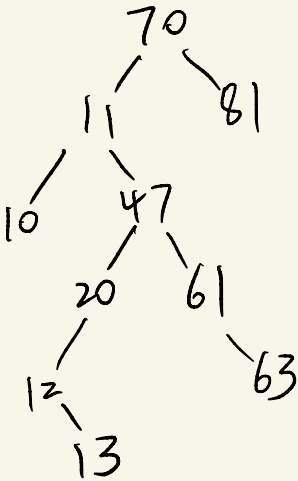


COMP2012-HW2

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1. (a)



(b)

root: 70

leaves: 10, 13, 63, 81

(c)

Not a balanced tree, because the leaves are not with heights h or $h-1$.

(d)

Inorder:

10, 11, 12, 13, 20, 47, 61, 63, 70, 81

(e)

preorder:

70, 11, 10, 47, 20, 12, 13, 61, 63, 81

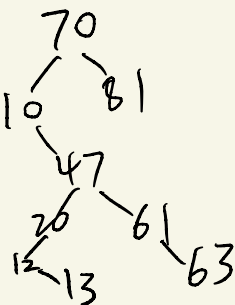
(f) postorder:

10, 13, 12, 20, 63, 61, 47, 11, 81, 70

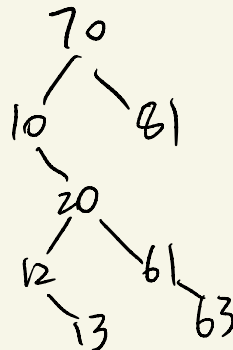
(g)

70, 11, 47, 20, 12, 13

(h)

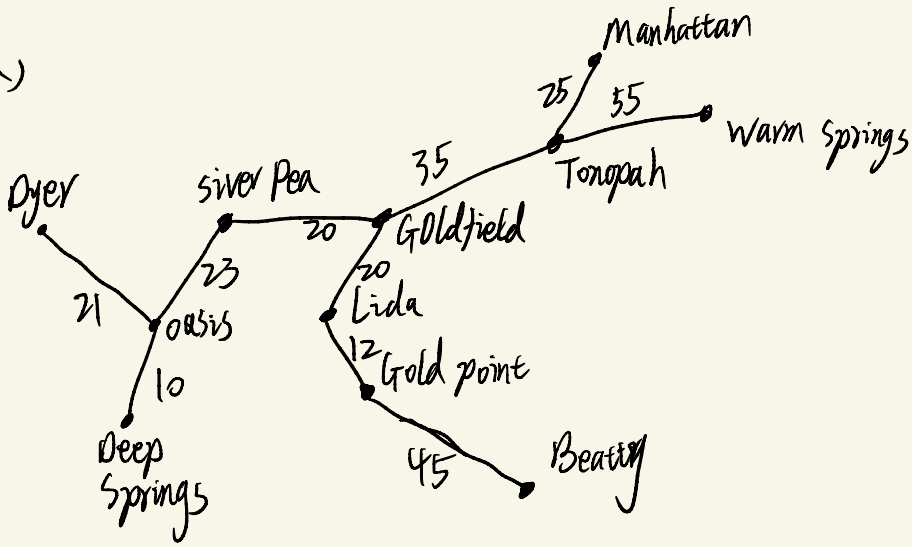


(i)



2.

(a)



$$\begin{aligned} \text{The weights} &= 10 + 12 + 20 + 20 + 21 + 23 + 25 + 35 + 45 + 55 \\ &= 266 \end{aligned}$$

3.

(a)

$$X = (B \text{ NOR NOT } A) \text{ NAND } (A \text{ XOR } C)$$

(b)

B	A	C	!A	B!A	A!C	output(X)
1	1	1	0	1	0	0
0	1	1	0	0	0	0
1	0	1	1	1	0	1
0	0	1	1	1	1	1
1	1	0	0	1	0	1
0	1	0	0	0	0	0
1	0	0	1	1	0	0
0	0	0	1	1	1	0

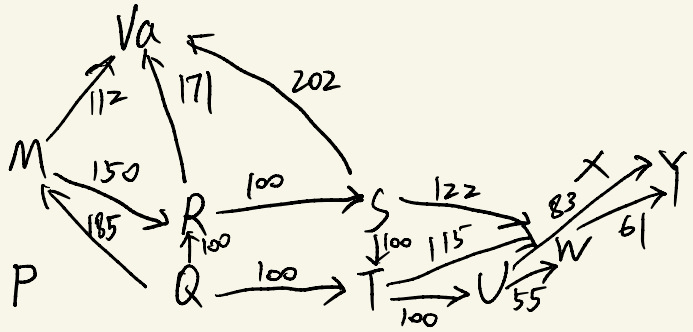
4.

(a)

A		
B	G	H
C	F	J
D	E	
		L

VS

V



[1] Extract vertex Q, update vertices M, R, T
(M:185),(Y:0),(VA:0),(R:100),(T:100),(S:0),(W:0),(U:0)

[2] Extract vertex R, update vertices S, VA
(M:185),(Y:0),(VA:271),(T:100),(S:200),(W:0),(U:0)

[3] Extract vertex T, update vertices W, U
(M:185),(Y:0),(VA:271),(S:200),(W:215),(U:200)

[4] Extract vertex M
(Y:0),(VA:271),(S:200),(W:215),(U:200)

[5] Extract vertex S
(Y:0),(VA:271),(W:215),(U:200)

[6] Extract vertex U, update vertices Y
(Y:283),(VA:271),(W:215)

[7] Extract vertex W, update vertices Y
(Y:276),(VA:271)

[8] Extract vertex Y
(Y:276)

(i)

$Q \rightarrow M: 185 \text{ meter}$

(ii)

$Q \rightarrow Y_{302}:$

$Q \rightarrow T \rightarrow W \rightarrow Y \Rightarrow 100 + 115 + 61 = 276 \text{ meter}$

(iii)

$Q \rightarrow 7\text{-Eleven (Va)}:$

$Q \rightarrow R \rightarrow Va \Rightarrow 100 + 171 = 271 \text{ meter}$

(b)

$Q \rightarrow Y_{302}(Y):$

$Q \rightarrow T \rightarrow W \rightarrow Y$