18L-1182

Q #1:

Time Complexity:

$= 1$

$= N^2 - \frac{N(N+1)}{2}$

if loop (largest i^{th}) $\rightarrow N^2 - \left(\frac{N}{2}(N+1)\right)$

Swap $\rightarrow N-2$

$= 1 + N^2 - \frac{N}{2}(N+1) + N^2 - \frac{N}{2}(N+1) + N - 2$

$= 2N^2 - 2N\frac{(N+1)}{2} + N - 1$

Now Total itrations

$= 2N^2 - N(N+1) + N - 1 + 3$

$= 2N^2 - N(N+1) + N + 2$

$= O(N^2)$ Ans:

j	i	No. of itration
0	1	
1	2	
2	3	
3	4	
4	5	
⋮	⋮	
N-2	N-1	

$S_n = \frac{n}{2}(2a_1 + (n-1)d)$

$= \frac{N}{2}(2(1) + N - 1)$

$= \frac{N}{2}(N+1)$

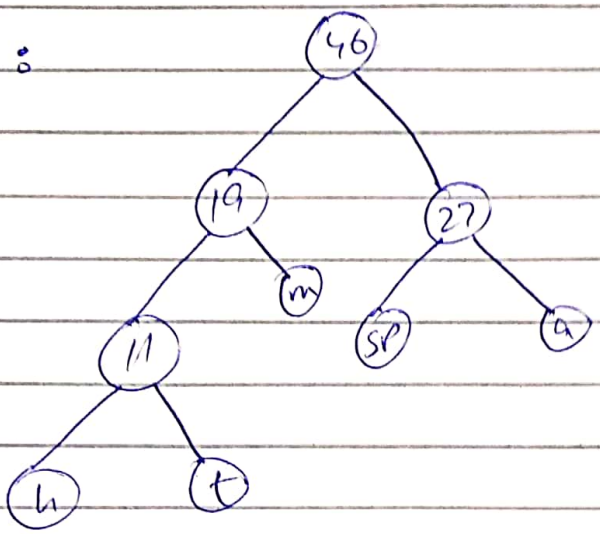
(b) For better sol. to improve running time is heap sorting.

Time complexity of heap sorting will be $n\log(n)$.

184-1182

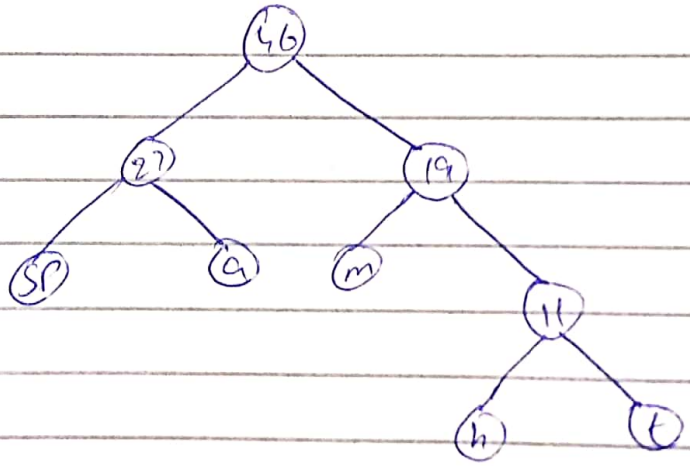
Q # 3

Agent 2 :



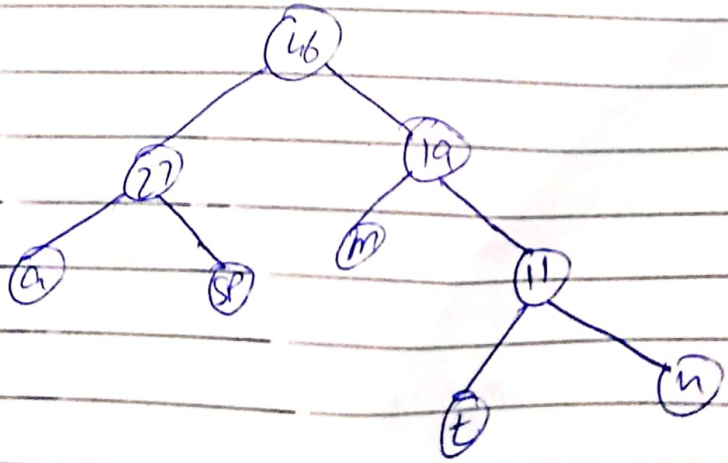
a : 11
h : 000
m : 01
t : 001
sp : 10

Agent 3 :



a : 01
h : 110
m : 10
t : 111
sp : 00

Agent 1 :



a : 00
h : 111
m : 10
t : 110
sp : 01

As All code are correct, show in above three diagrams or trees and I also write huffman codes according to trees drawn by me. So all codes are correct.

Q#4: 1824-1182

i) Nodes

A	∞		A	0		A	0		A	0	
B	∞		B	3		B	3		B	3	
C	∞	→	C	5	→	C	5		C	5	
D	∞		D	9		D	7		D	7	
E	∞		E	∞		E	10		E	9	
F	∞		F	∞		F	∞		F	9	

A	0		A	0		A	0		A	0	
B	3		B	3		B	3		B	3	
C		→	C	5	→	C	5	→	C	5	→
D	4		D	7		D	7		D	7	
E	6		E	10		E	9		E	9	
F	2		F	13		F	9		F	9	

ii)

A	0
B	3
C	5
D	7
E	9
F	9

Nodes	Final-Cost
A	0
B	3
C	5
D	7
E	9
F	9

182-1182

Q#4 (b)

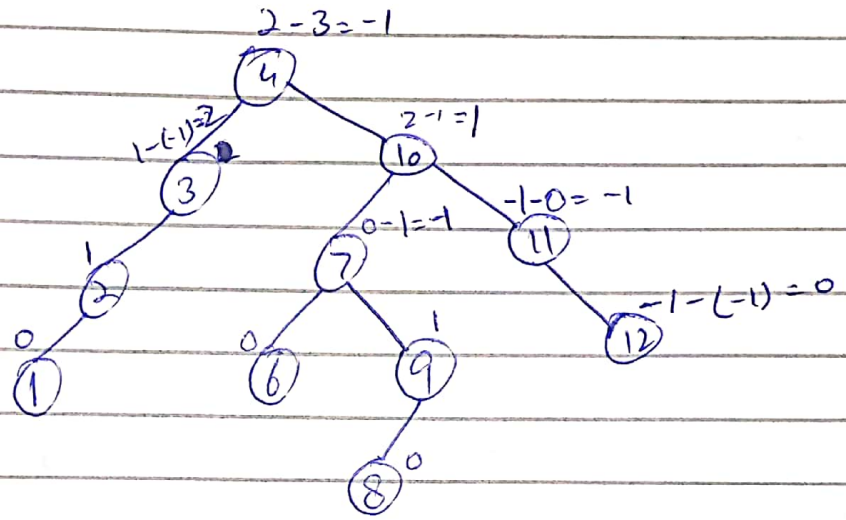
Yes, If we add an edge into minimum spanning tree it will be no more MST because new edge can introduce a cycle & can increase cost as MST already at minimum cost and we are not well known about new edge so we can't add new edge to minimum spanning tree.

But in case of max spanning tree new edge increase the cost overall of a tree.

182 - 1182

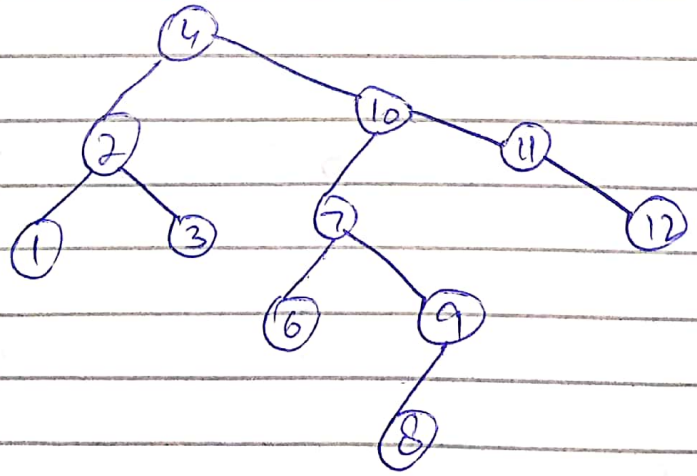
Q # 7

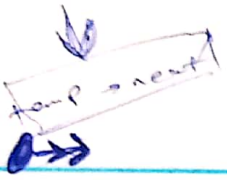
(a) Removing 5



(b)

Right Rotate (1, 2, 3)





18L-1182

RL (4, 7, 10)