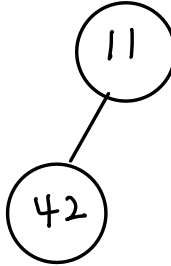
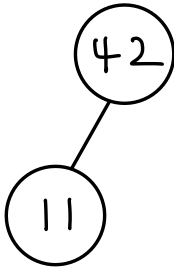



Problem 1

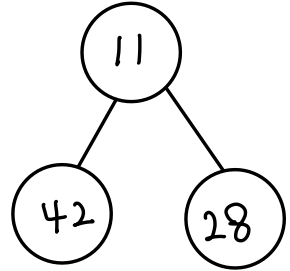
insert 42



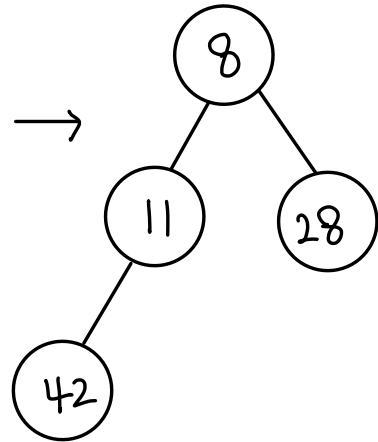
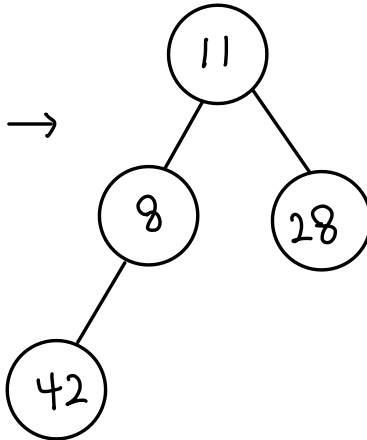
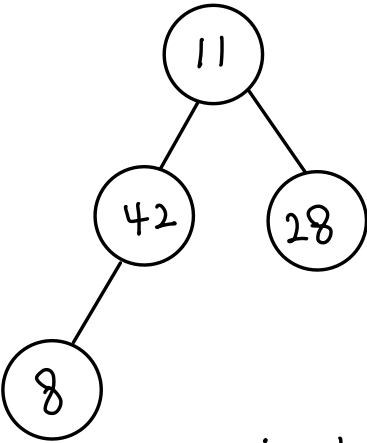
insert 11



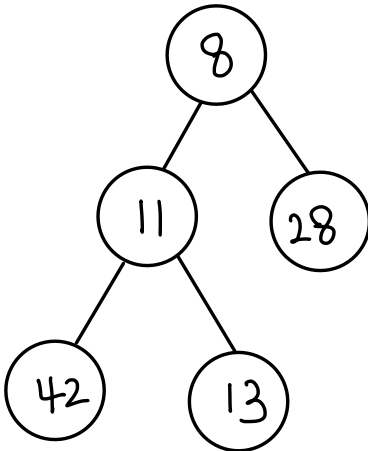
insert 28



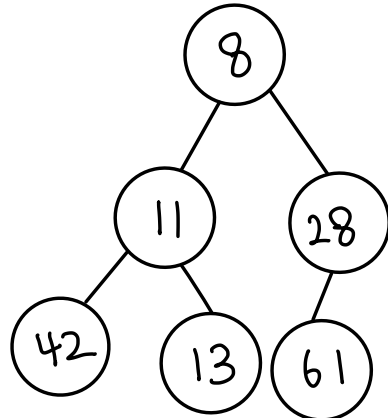
insert 8

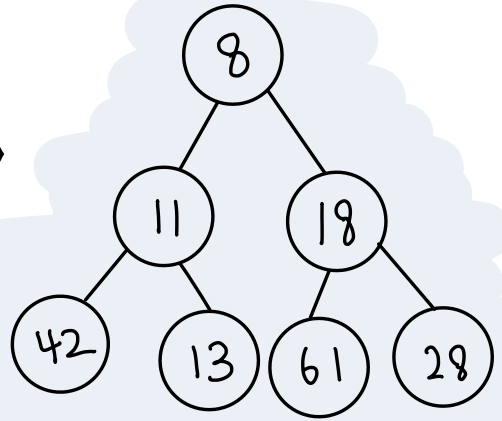
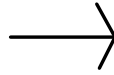
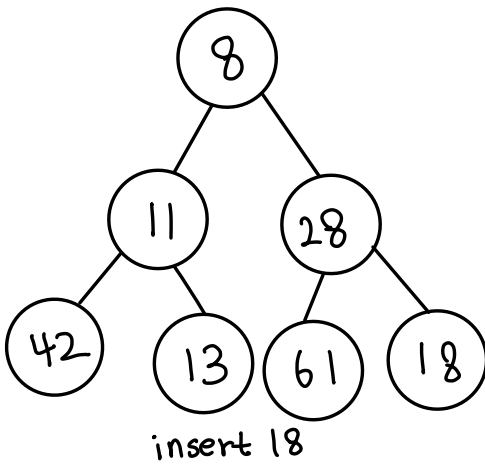


insert 13



insert 61

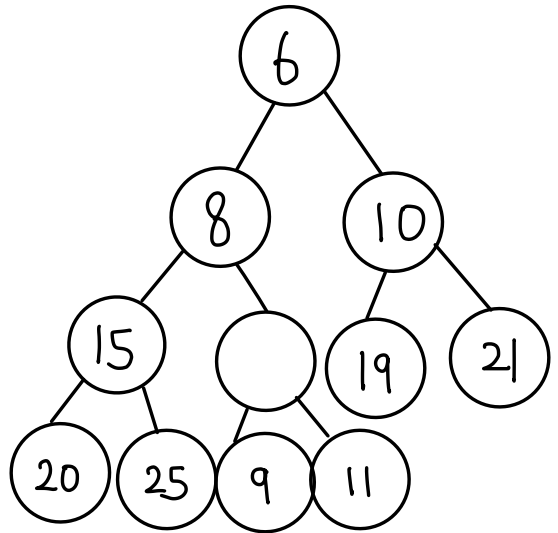
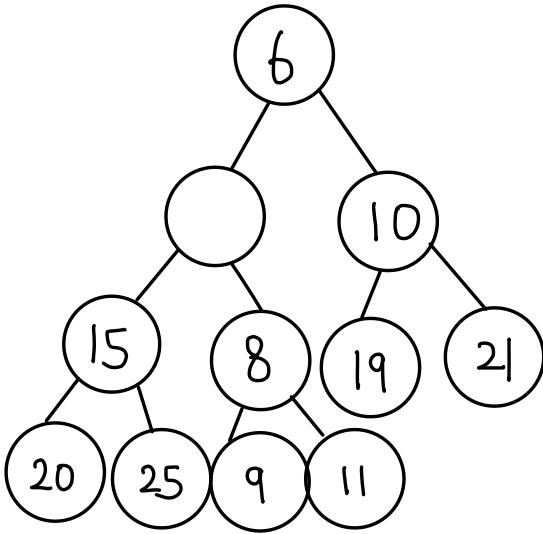
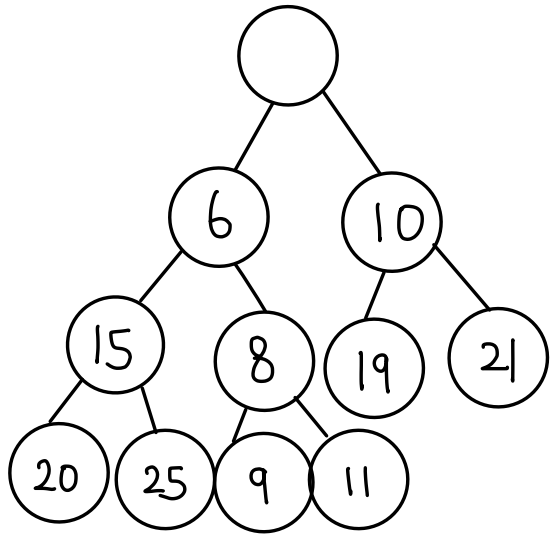
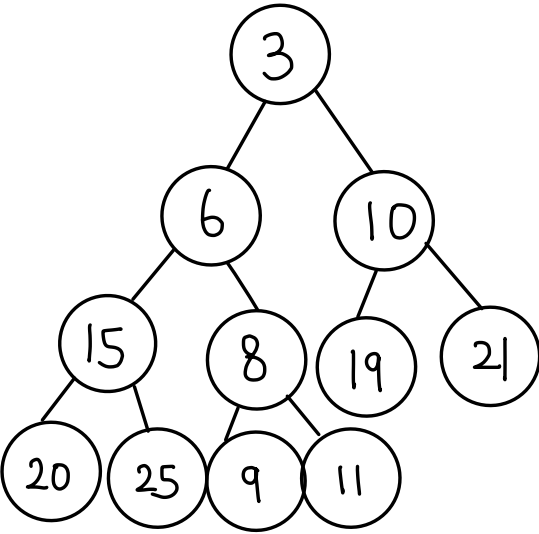


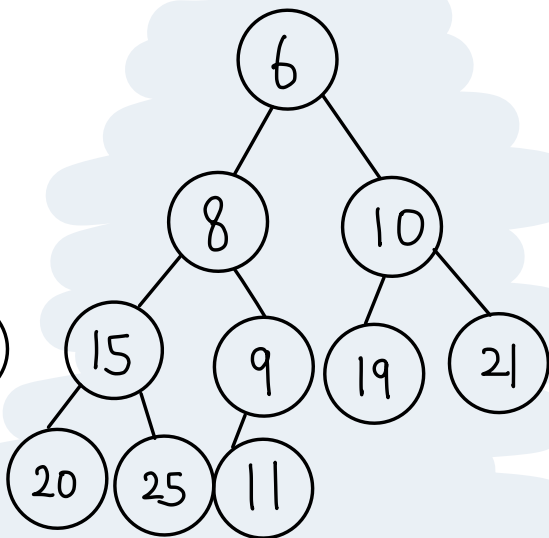
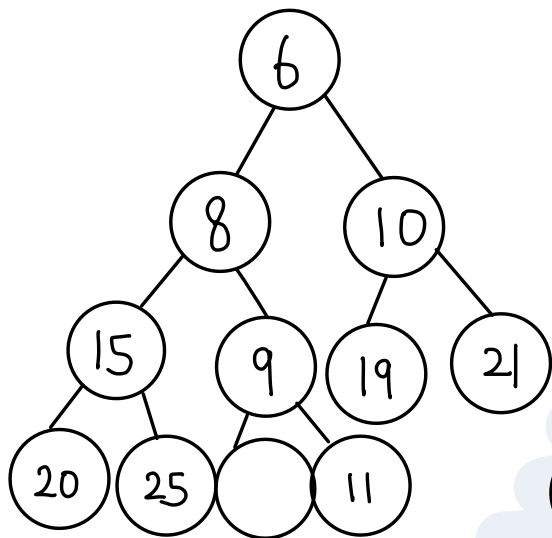


Problem 2

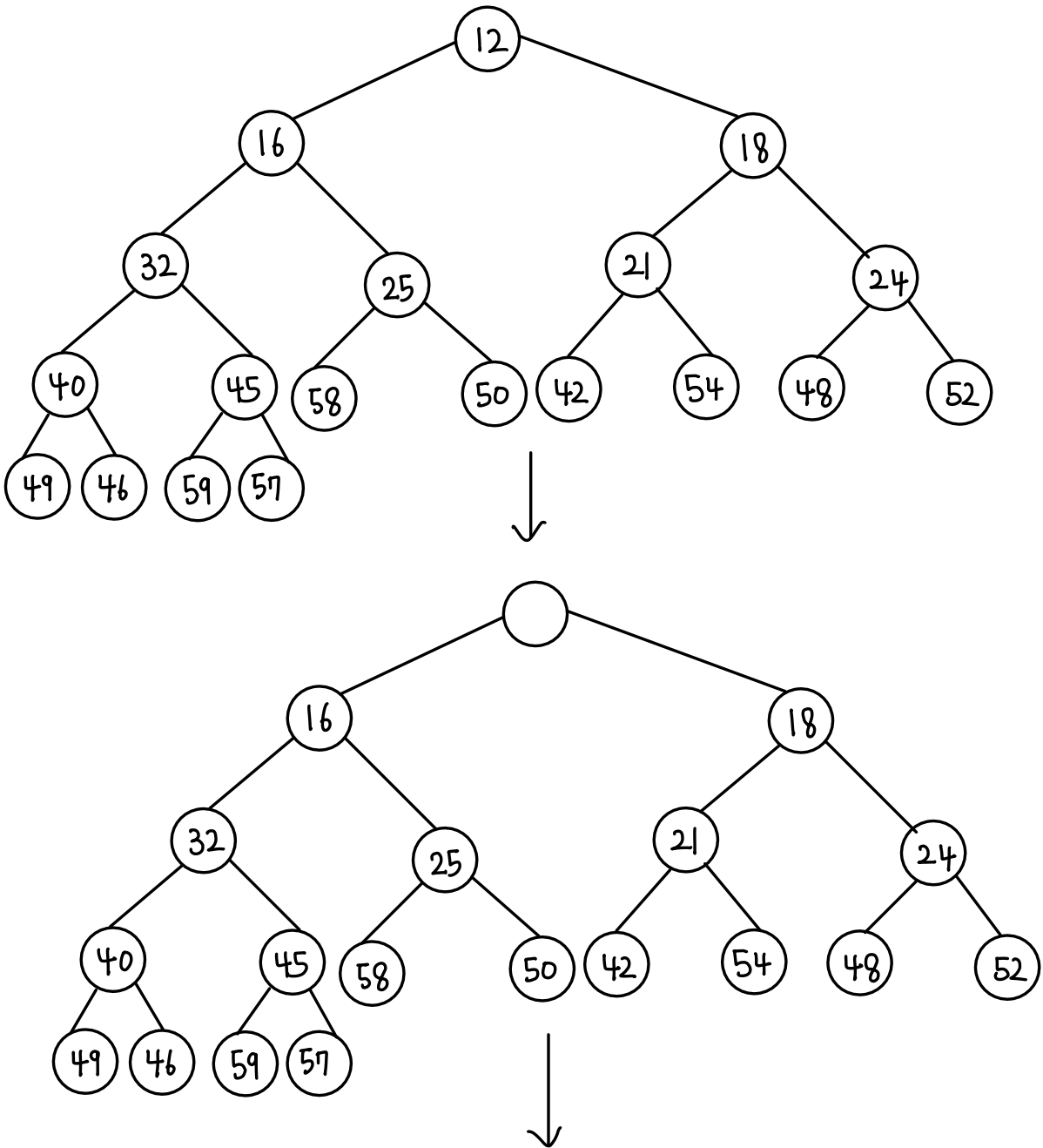
	8	11	18	42	13	61	28		
0	1	2	3	4	5	6	7	8	9

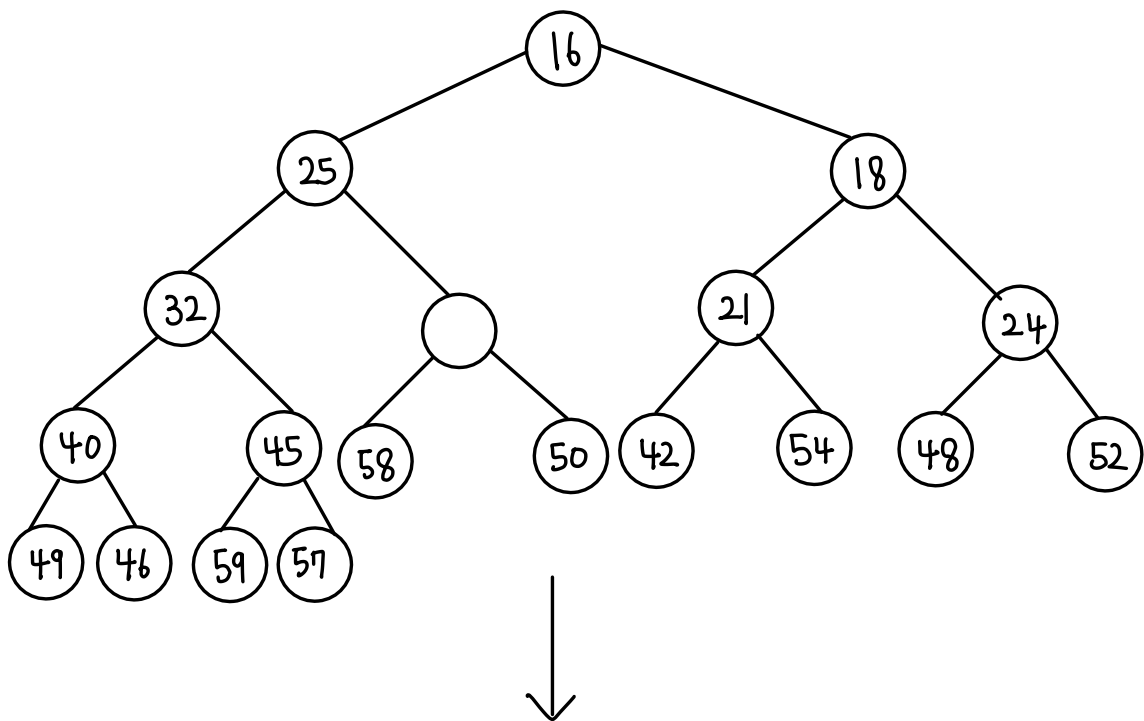
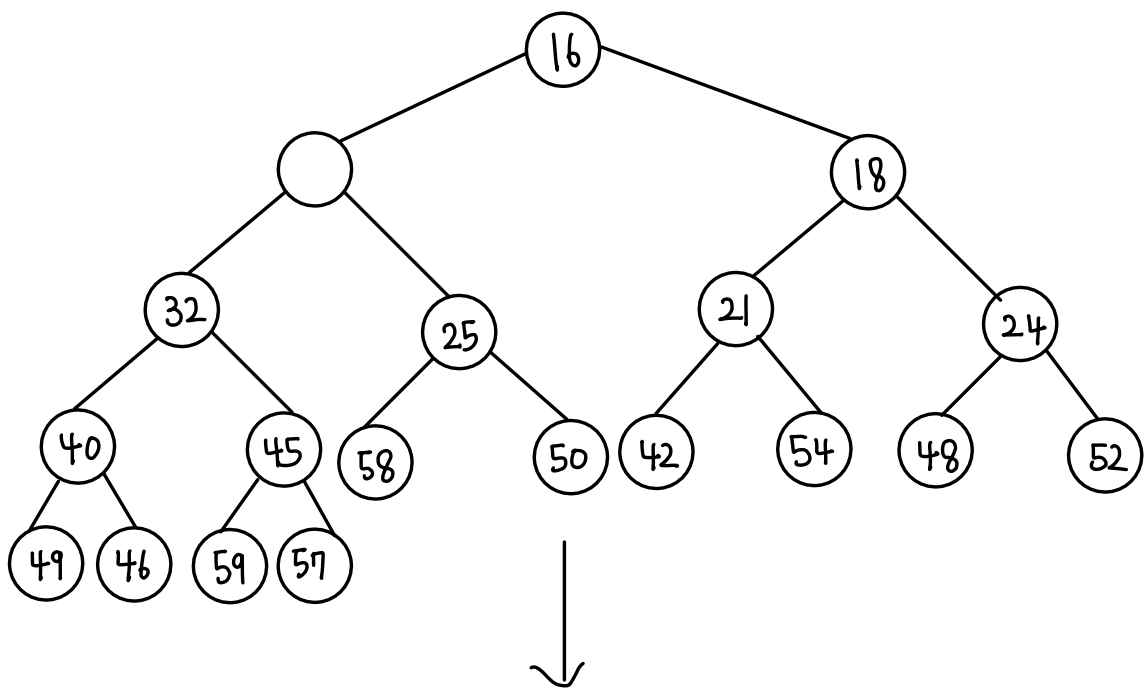
Problem 3

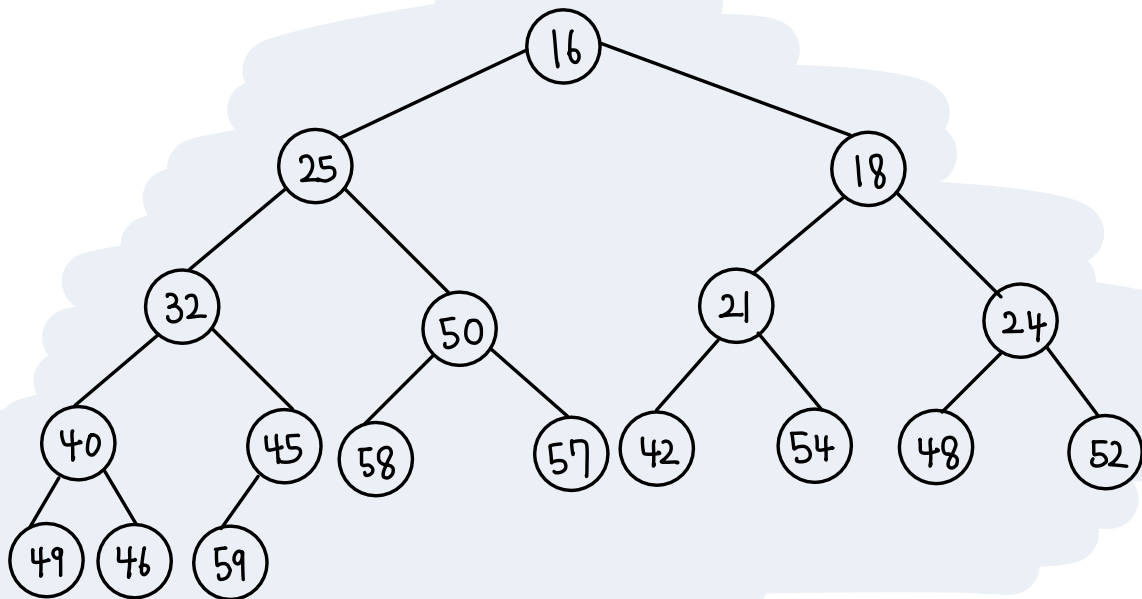
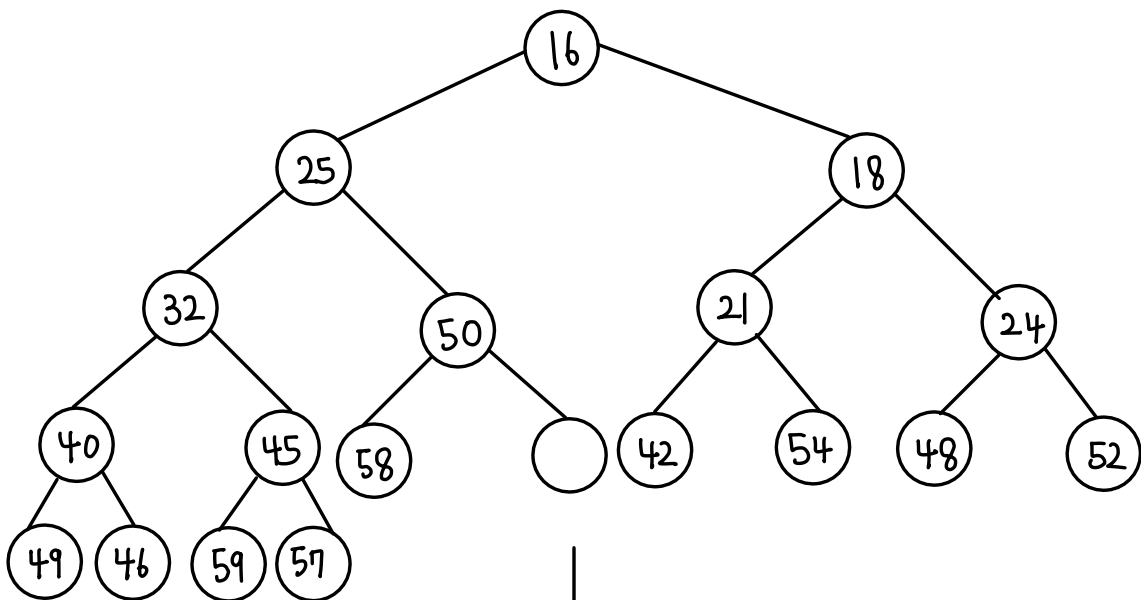




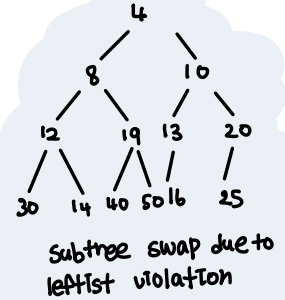
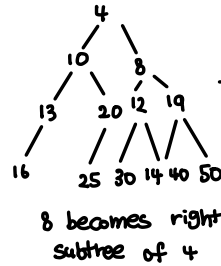
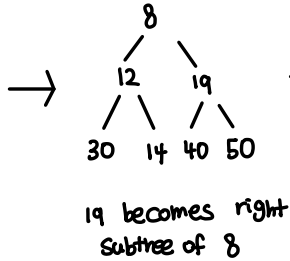
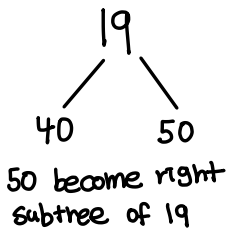
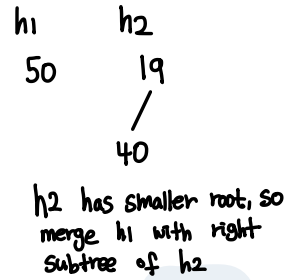
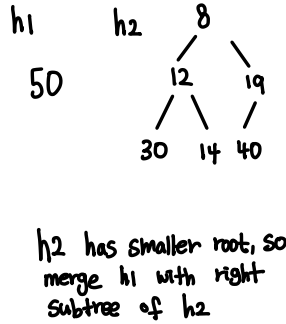
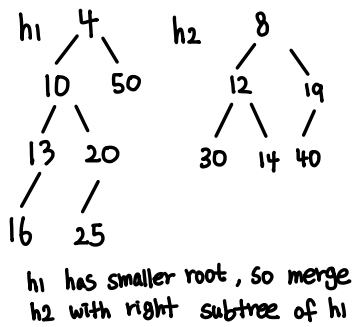
Problem 4



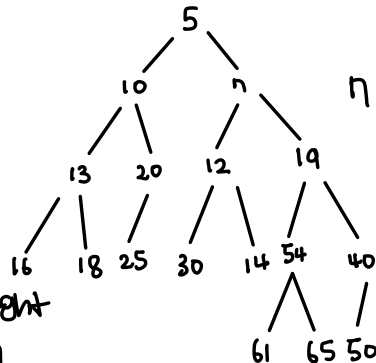
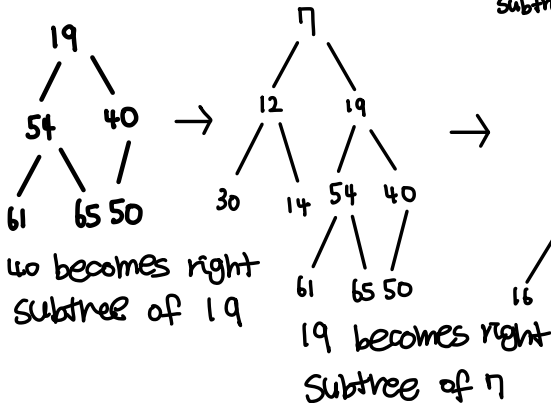
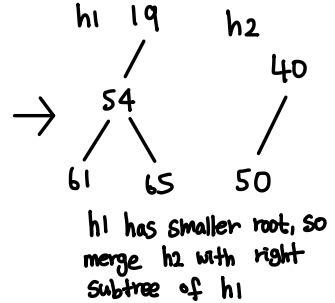
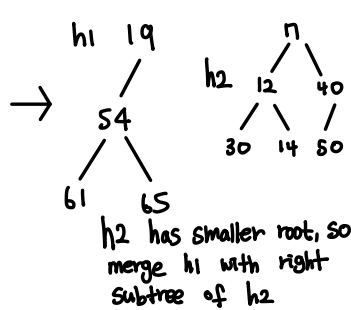
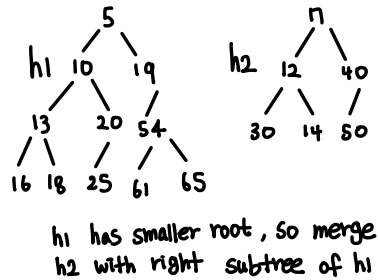




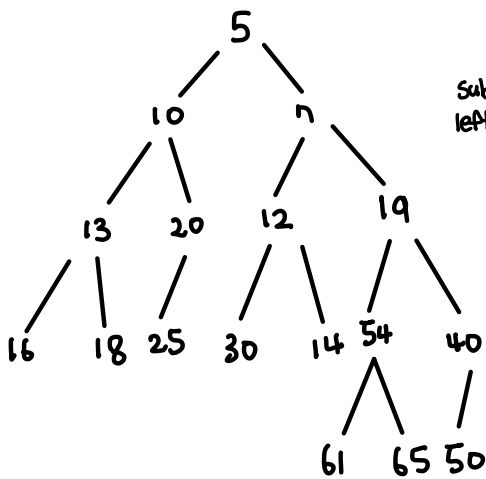
Problem 5



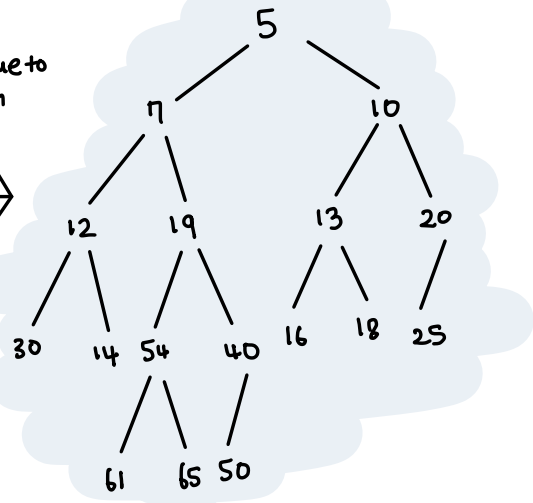
Problem 6



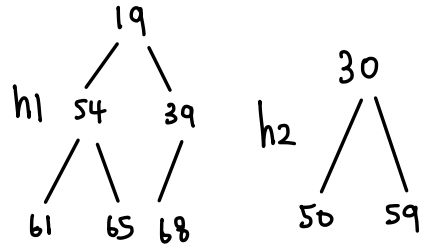
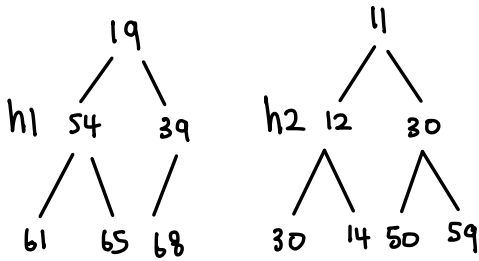
7 becomes right subtree of 5



Subtree swap due to leftist violation

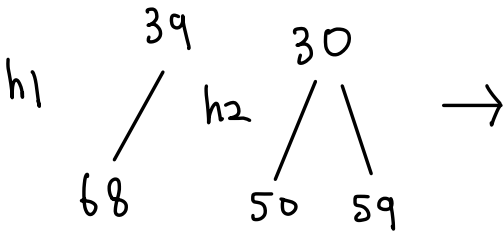


Problem 7

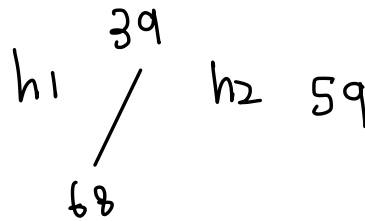


h2 has smaller root, so
merge h1 with right
subtree of h2

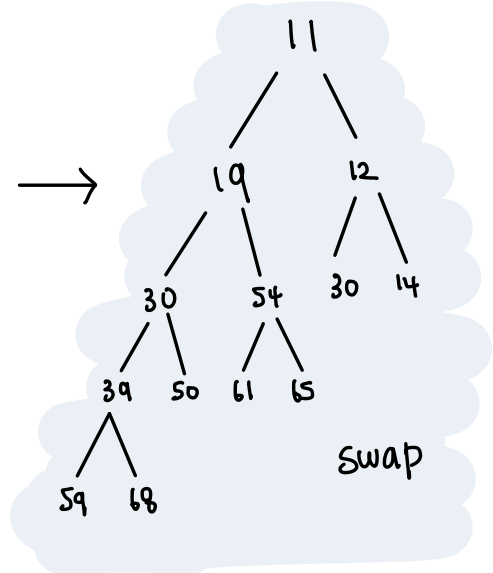
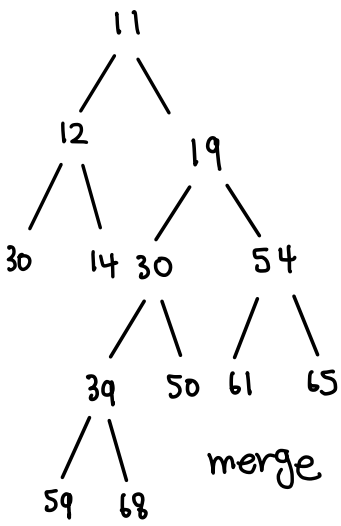
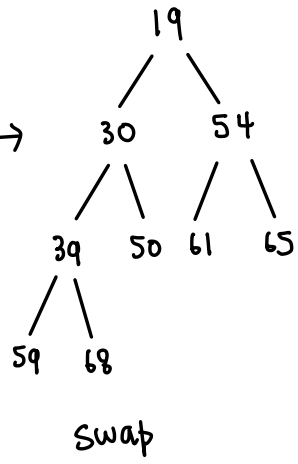
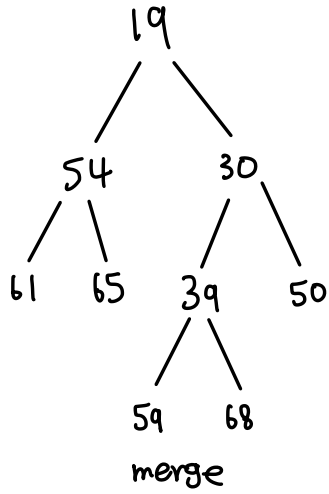
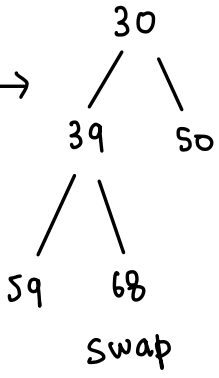
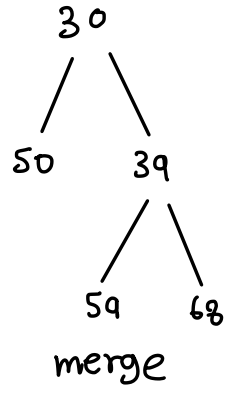
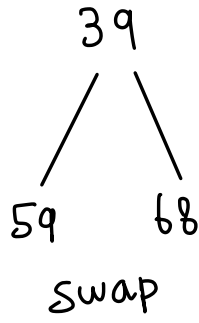
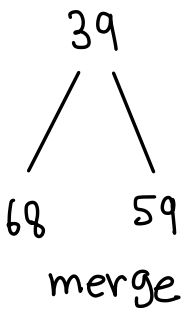
h1 has smaller root, so
merge h2 with right
subtree of h1



h2 has smaller root, so
merge h1 with right
subtree of h2

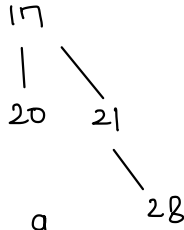


h1 has smaller root, so
merge h2 with right
subtree of h1



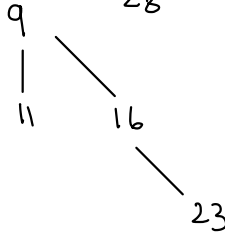
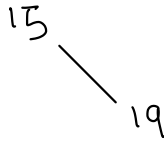
Problem 8

$h_1: 8$

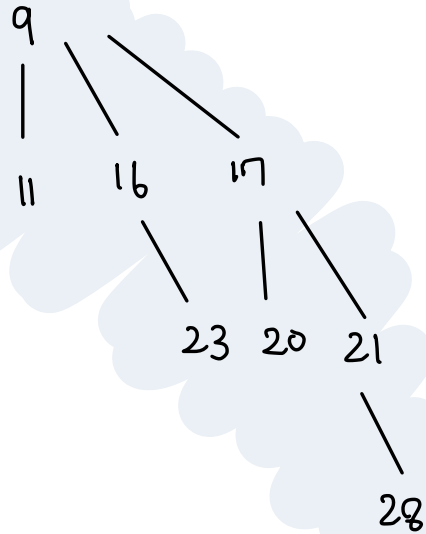
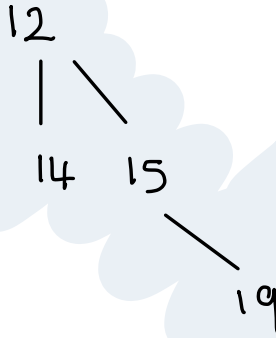


$$\begin{array}{r} 11 \\ 111 \\ + 111 \\ \hline 1110 \end{array}$$

$h_2: 6$

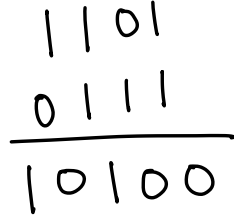
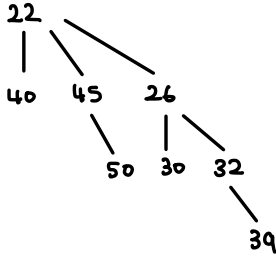
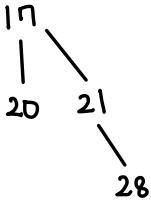


Answer

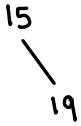


Problem 9

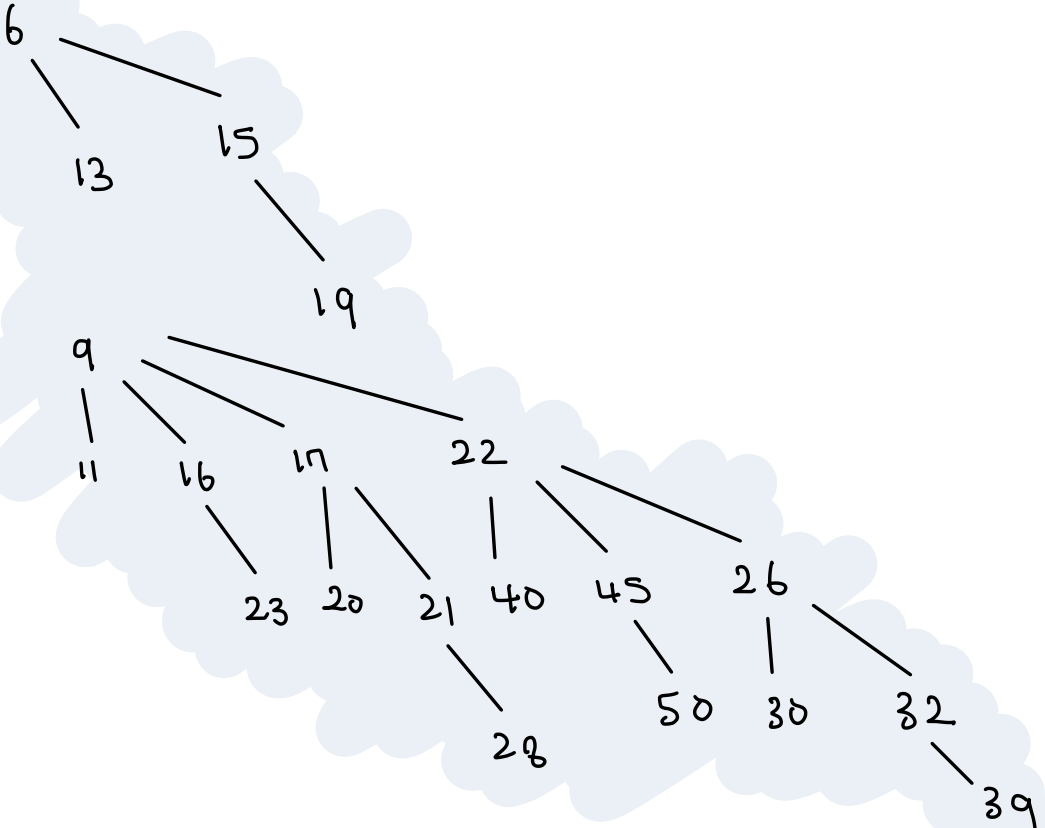
h1: 13



h2: 6



ans wer



Problem 10

(a)

	1	2	3	5	4	7	10	13	15	6	8	17	12	11	9					
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

(b)

when Parent index is a , left child index is $3a-1$
middle child index is $3a$
right child index is $3a+1$

$2 \rightarrow 5 \ 6 \ 7$

$1 \rightarrow 3 \rightarrow 8 \ 9 \ 10$

$4 \rightarrow 11 \ 12 \ 13$

(c)

when child index is a ,

the Parent index is $(a+1)/3$