

1a)

10 12 3 11 6 8 9

start

no children

10 12 3 11 6 8 9

next, no children w/
lower val

10 12 3 11 6 8 9

next, swap w/6

10 6 3 11 12 8 9

next, no children

10 6 3 11 12 8 9

next, swap w/3

3 6 10 11 12 8 9

next, swap w/8

3 6 8 11 12 10 9

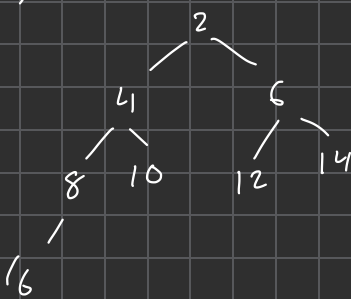
next, no children

3 6 8 11 12 10 9 final answer

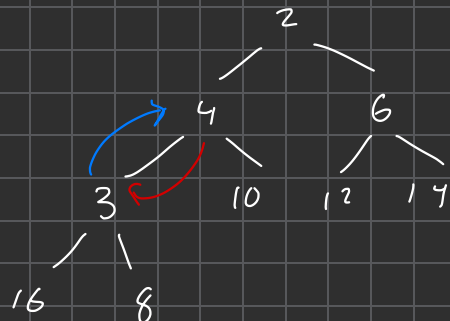
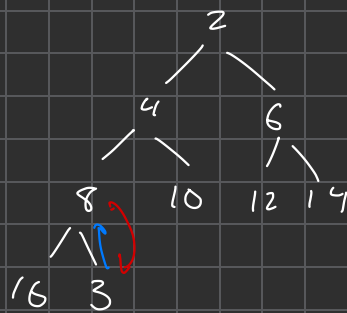
$$\begin{aligned} \text{start} &= (\text{size} - 1) / 2 \\ &= (7 - 1) / 2 \\ &= 3 \end{aligned}$$

1b)

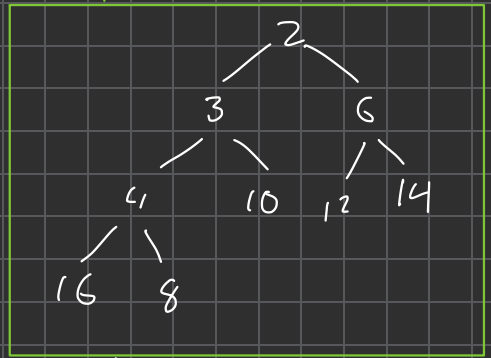
initial heap



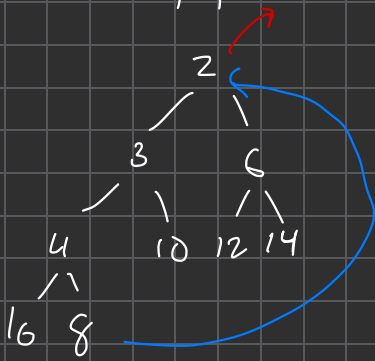
insert 3



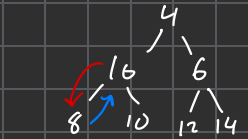
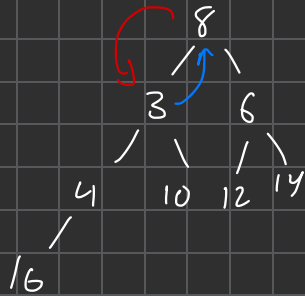
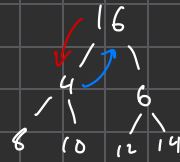
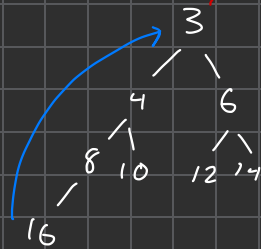
final answer for 'insert 3'



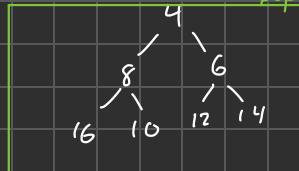
1st pop



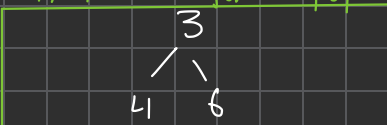
2nd pop

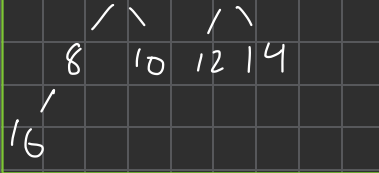


final answer for 2nd pop

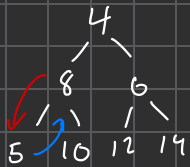
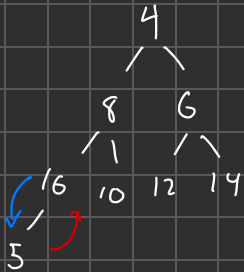


final answer for 1st pop





insert 5



16
final answer for insert 5

