Heap

percolate up
(insert)

insert 1

2 steps
1) insert node to maintain completeness (fill left to right) top to bottom
2) swap elements to enforce heap property
root is always the output percolate down dequeue/remote

This is the node that needs to go

\[ \times 3 \]

place 3 over 1 to preserve completeness

Swap with the smaller of the two children
if parent is at index i

left child:
2 * i + 1

right child
2 * i + 2

insert 1

if child is at index i
the parent is at:

\( (i - 1)/2 \)
1) completeness

output: 4
\[
\begin{align*}
5 & \quad 11x \\
6 & \quad 13 \\
9 & \quad 7 \quad 8 \\
16 & \\
5 & \quad 6 \\
9 & \quad 13 \\
16 & \\
\end{align*}
\]