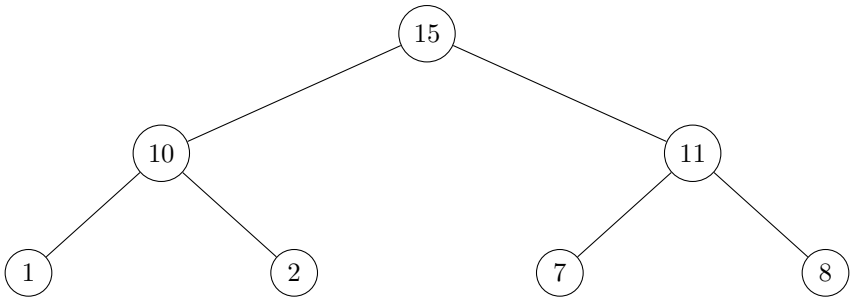
**CS 240: Data Structures and Data Management** **Spring 2020**

# Tutorial 2: June 1

**1.** Insert 27 and 9 into the following heap, and then perform a delete-max operation on the resulting heap.




**2.** Given a family $k$ sorted arrays $A_1, \ldots, A_k$, where the combination of the $k$ arrays has $n$ elements, give an $O(n \log k)$ time algorithm that produces a single sorted array containing all $n$ elements. Hint: use a priority queue.

**3.** Let $L$ denote a sorted array of $n$ distinct integers that are pairwise coprime. Given $L$ and an integer $k$ between 1 and $\frac{n(n-1)}{2}$, write a function that produces a pair $(i, j)$, with $i < j$, such that $\frac{L[i]}{L[j]}$ is the $k$-th smallest fraction that can be made from elements in $L$. The algorithm should run in $O(k \log k)$ time.