union

heap

heap1

heap2

\[
\frac{m \log(n+m)}{n \log(n+m)} = \log(n)
\]

2 steps + combine 2 array

\[
O(n)
\]

build the heap for the new array.

\[n = \sum_{j=1}^{k} \frac{2^j}{2^j} = \sum_{j=1}^{k} 1\]

\[l_{\infty}\]

\[
\text{any one way to represent } n \text{ in this way at most } l_{\infty} \text{ terms in this sum at most } l_{\infty} \text{ trees}
\]