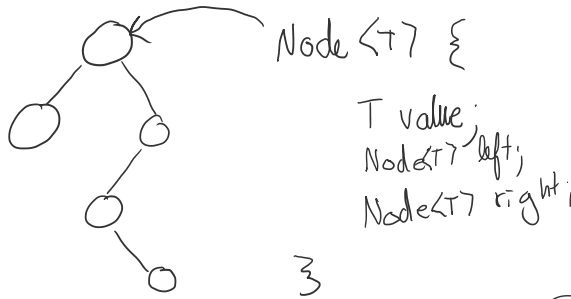


New e-mail rule: Only e-mail me at "benjones@cs.washington.edu"
Include "[CSE 373]" somewhere in the title.

BST:

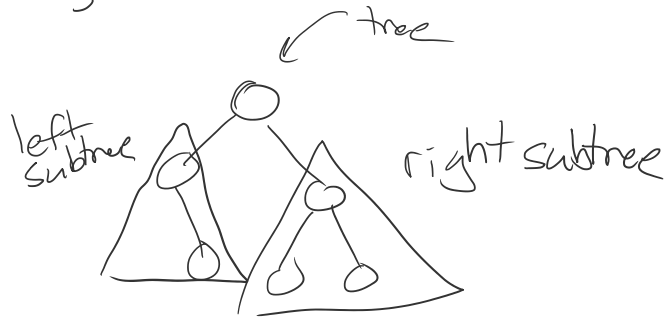
Node root;

insert (3)

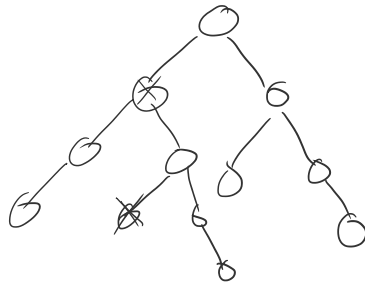


root
↓
③

insert(value)
remove(value)



```
tree.left = helperFunction(tree.left, ...)
```



Find Mat

void m (int[] data, BinaryMinHeap heap):

for ($i = 0; i < \text{data.length}; i++$) $\leftarrow n \leftarrow \log n$
 heap.insert(data[i]); $\log n$
 $\leftarrow O(n)$

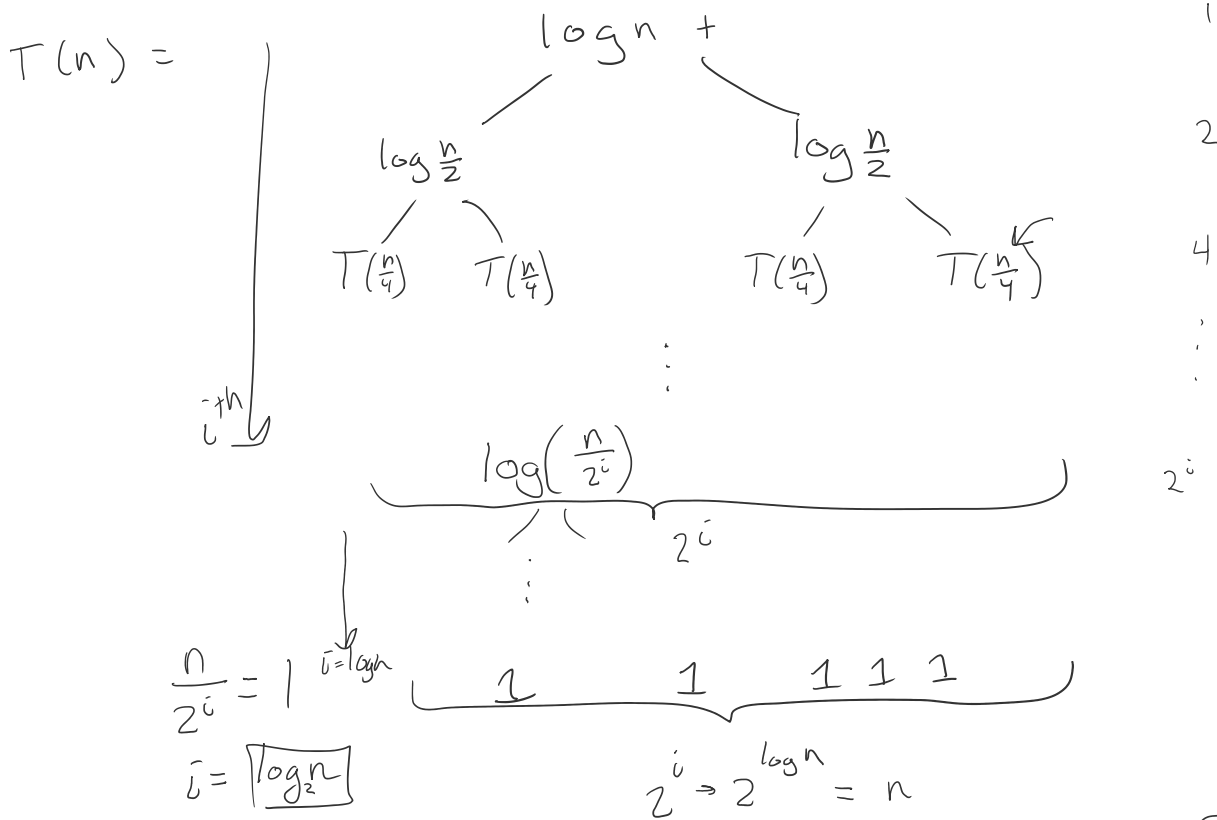
while (!heap.isEmpty()): n
 print(heap.deleteMin()) $\log n$ } $n \log n$

$$\approx \underbrace{2n \log n} \rightarrow O(n \log n)$$
$$(2 + (\frac{n}{2})) + \overbrace{\log n}^{\text{no master thm}} \quad \therefore \text{if } n > 1$$

$$T(n) = \begin{cases} 2 + (\frac{n}{2}) + \overbrace{\log n}^{\text{no master thm} \therefore} & \text{if } n > 1 \\ 1 & \text{otherwise} \end{cases}$$

$$\begin{aligned} T(n) &= \underbrace{\log n + 2T(\frac{n}{2})} \\ &= \log n + 2(\log \frac{n}{2} + 2T(\frac{n}{4})) \\ &= \log n + 2(\log \frac{n}{2} + 2(\log \frac{n}{4} + 2T(\frac{n}{8}))) \end{aligned}$$

$$\begin{aligned} aT(\frac{n}{b}) + n^c &\rightarrow \\ \log_b a &> c \\ \log_b a &= c \\ \log_b a &< c \end{aligned}$$

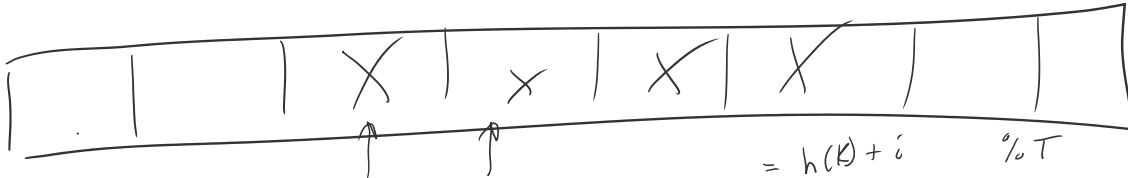


$$\begin{aligned} &\sum_{i=0}^{\log n - 1} \underbrace{2^i (\log(n) - i)}_{\text{recursive work}} + \underbrace{n}_{\text{base case work}} \end{aligned}$$

$\log(a^b) = b \log(a)$

$$\log\left(\frac{n}{2^i}\right) = \log n - \underbrace{\log 2^i}_i = \boxed{\log n - i}$$

Probing:



$$i^{\text{th}} \text{ element} = h(K) + i^2 \quad \% T$$

linear probing } capacity
quadratic probing } probe

double hashing: cap² probes

$$= \underbrace{h(K)} + \underbrace{ig(K)} \% T$$

