CS341

Lecture 4

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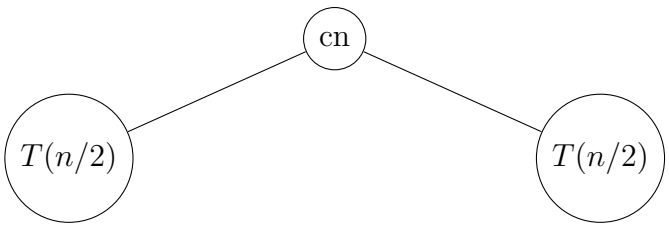
Loop Analysis Slide 50:

- each iteration of the while loop takes time $\Theta(1)$
- for a given value of i, how many iterations of the while loop are performed

$$\rightarrow \log i \text{ iterations}$$
$$\rightarrow \sum_{i=1}^{n} \log i$$
$$\rightarrow \text{via basic log rules } \log \prod_{i=1}^{n} i$$
$$\rightarrow \Theta(n!)$$
$$\rightarrow \Theta(n \log n)$$

Recursion Tree Method:

- Example: T(n) = 2T(n/2) + cn
- Create a tree with a root node of cn and 2 child nodes T(n/2)



- This is still equal to T(n)
- Keep Splitting up until you see a pattern
- simplifies to dn + clog nn
- So it is in $\Theta(n \log n)$