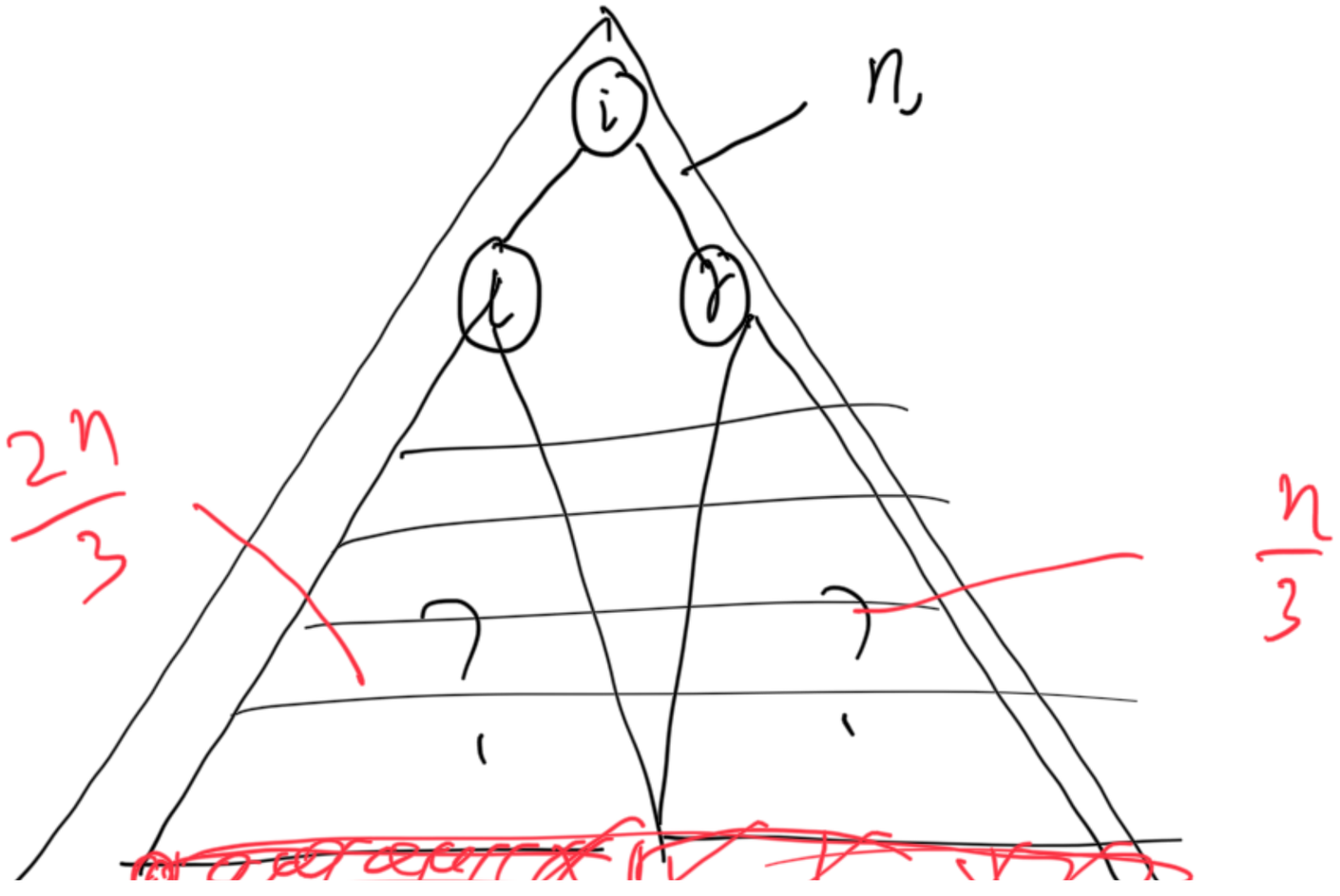
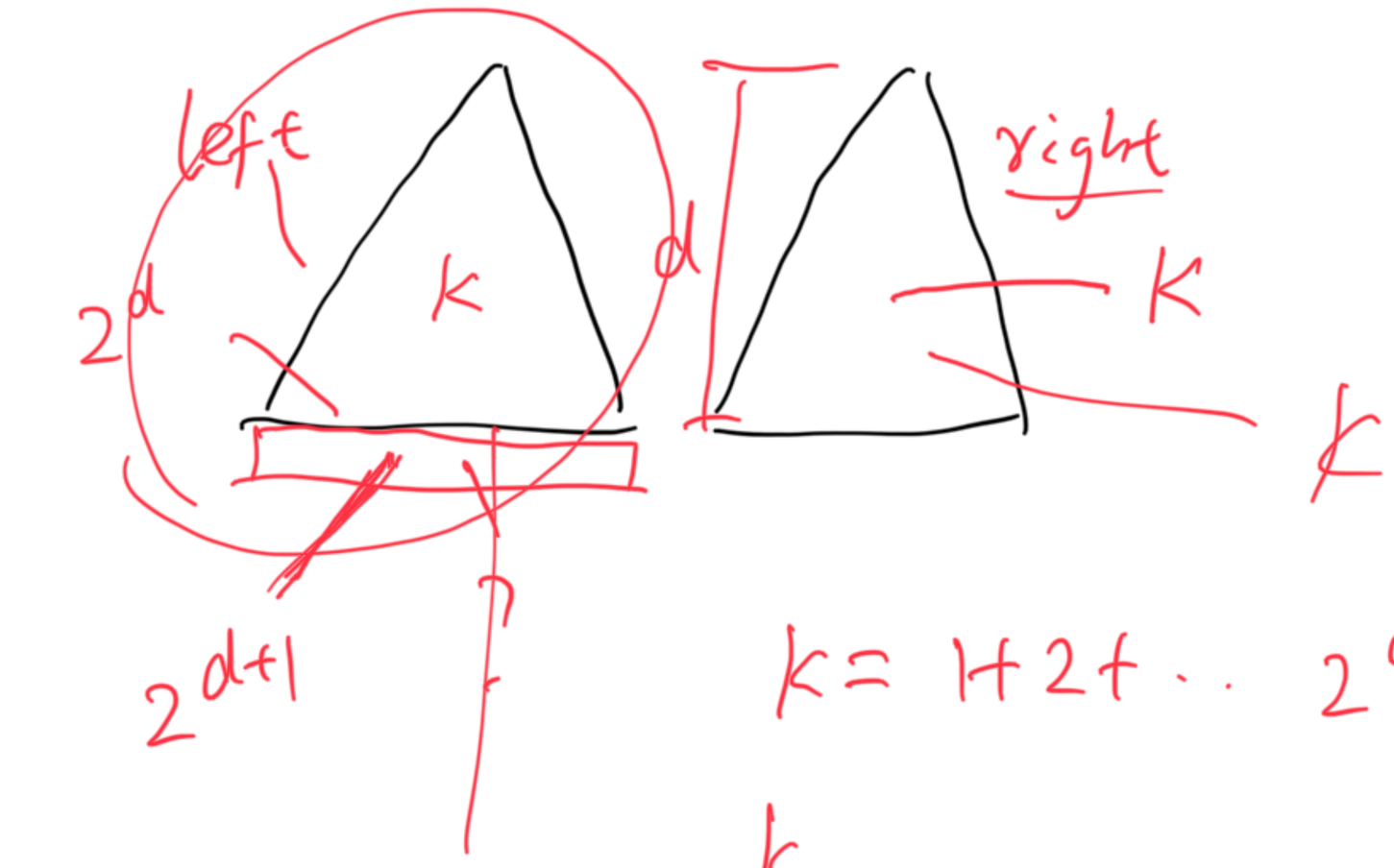
Lecture 4, Fall 2023

max

$\leq \frac{n}{2}$

2nd- max





$k = 1 + 2 + \dots 2^d = 2^{d+1} - 1$

k

2k

$$\sum_{k=0}^{\infty} \frac{k}{2^k} = S = \sum_{k=1}^{\infty} \frac{k}{2^k}$$

$$2S = \sum_{k=1}^{\infty} \frac{k}{2^{k-1}} \qquad k' = k-1$$

$$= \sum_{k'=0}^{\infty} \frac{|k'+1|}{2^{k'}}$$

$$= \sum_{k'=0}^{\infty} \frac{k'}{2^{k'}} + \sum_{k'=0}^{\infty} \frac{1}{2^{k'}}$$

$$S = \sum_{k'=0}^{\infty} \frac{1}{2^{k'}} = 2$$