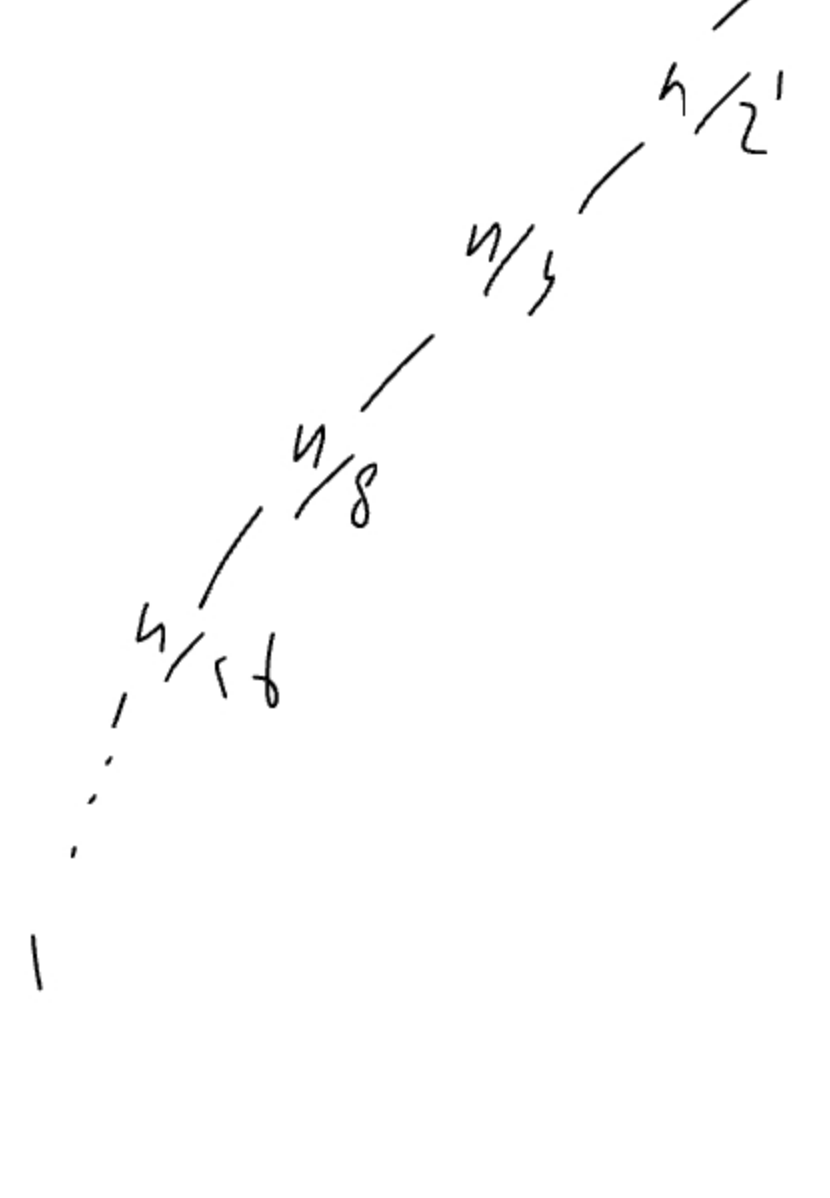
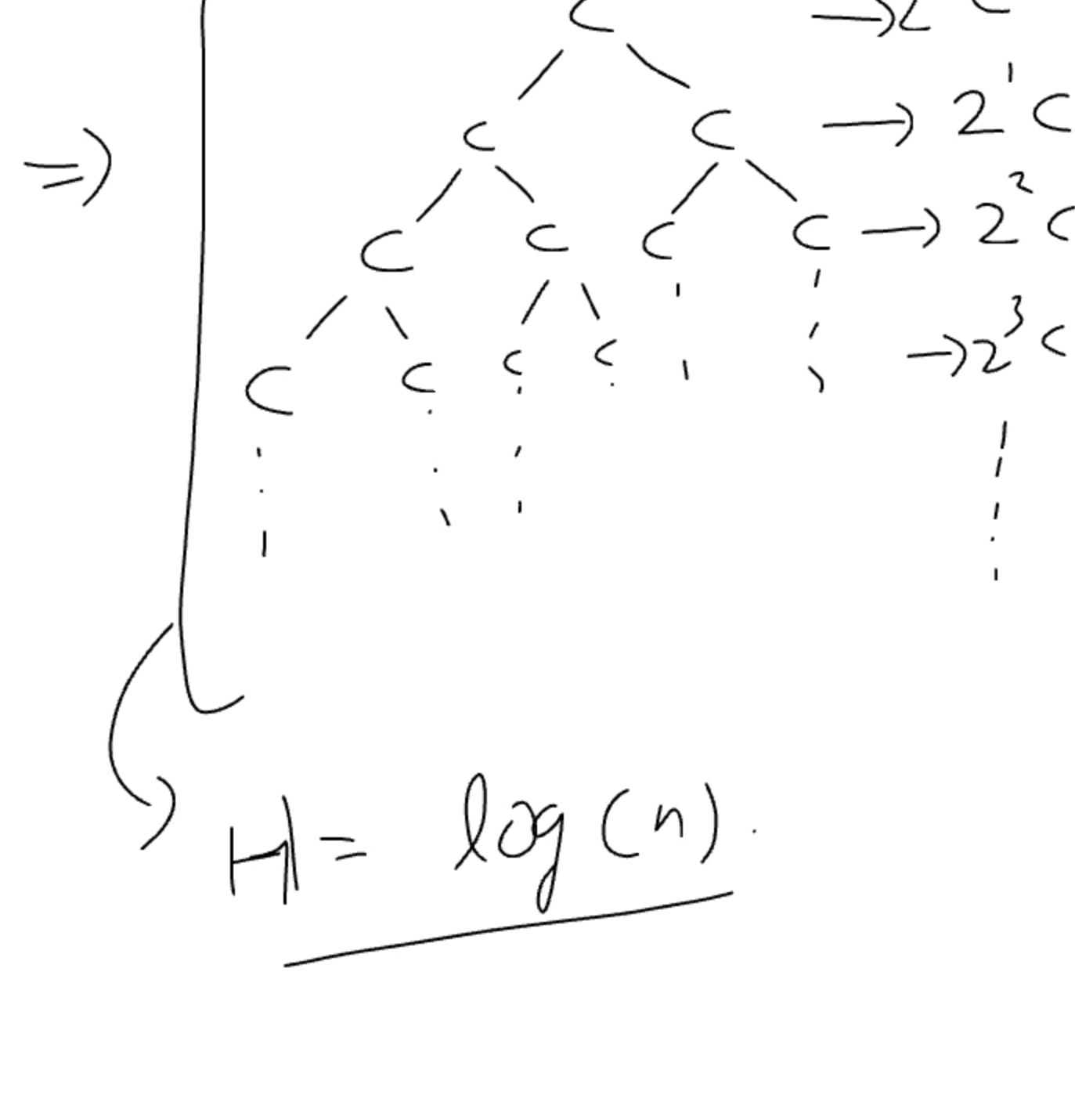
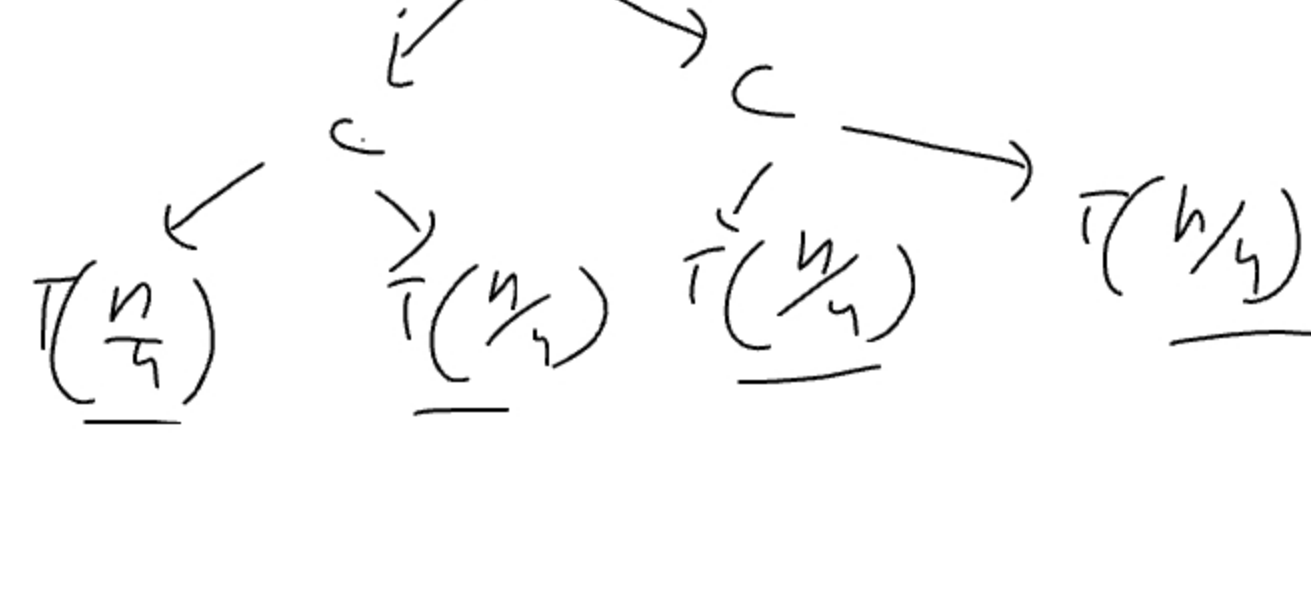
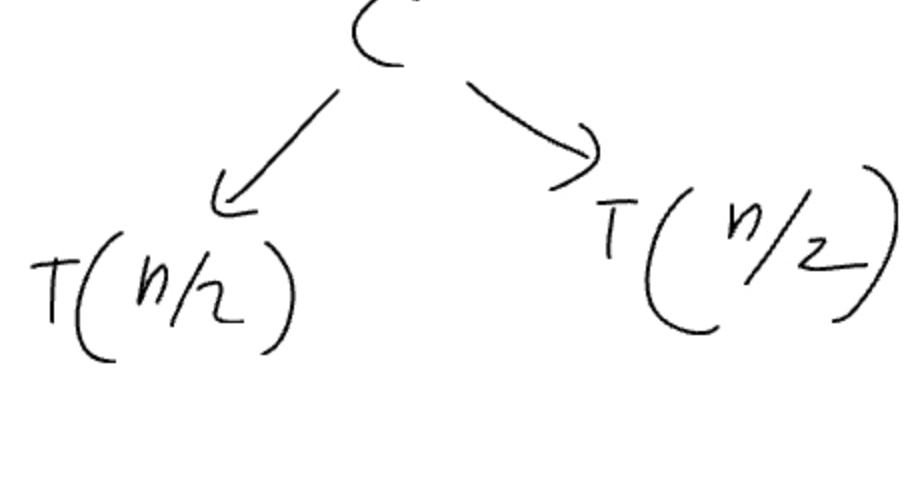


$$T(n) = T(n/2) + T(n/2) + c$$

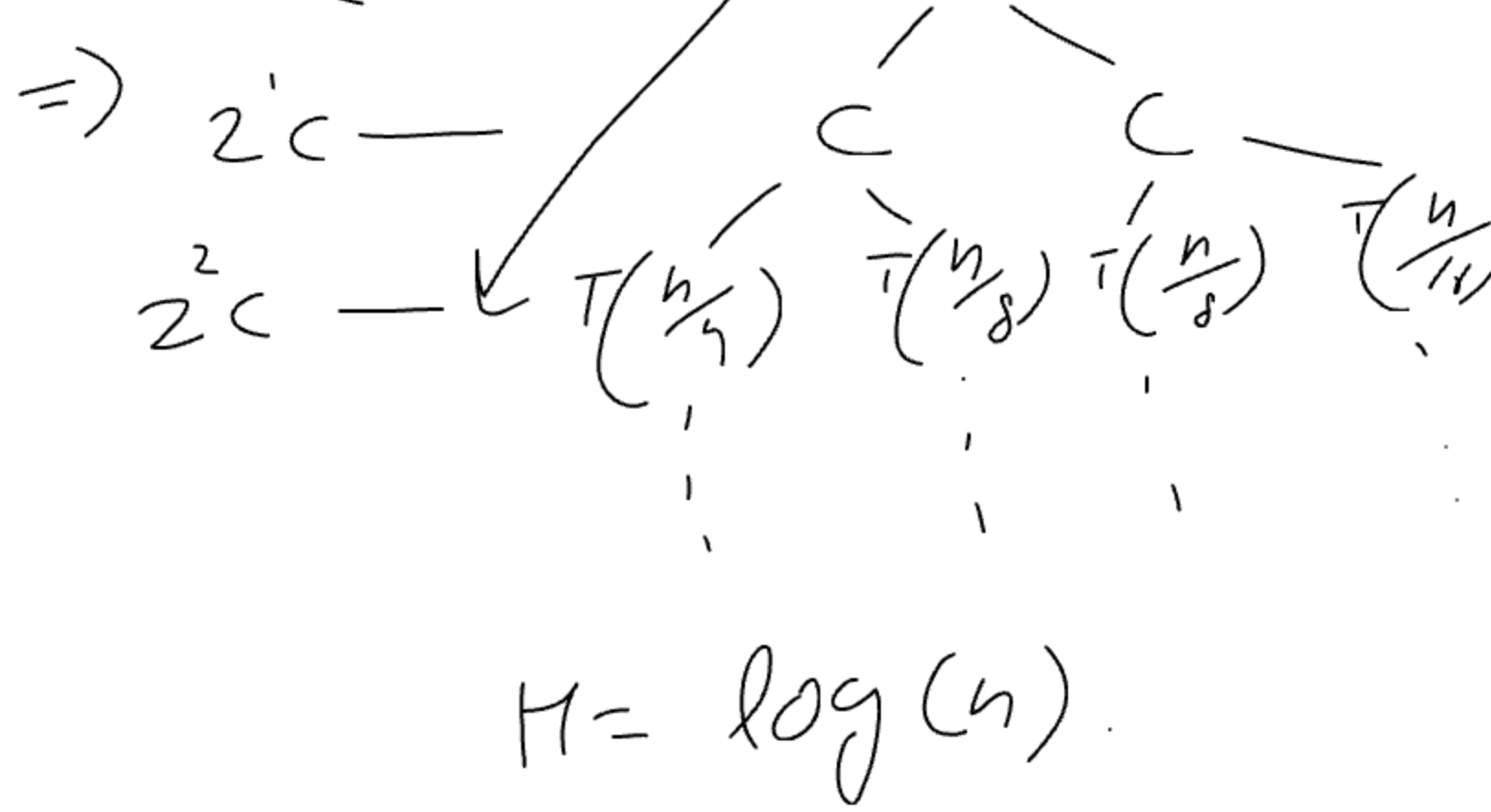
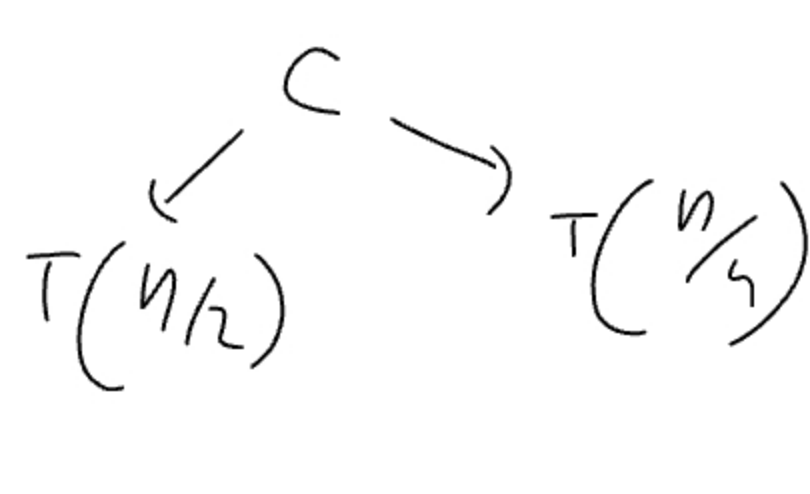


$$\frac{n}{2^k} = 1 \Rightarrow n = 2^k \Rightarrow k = \log(n)$$

Total work done = $\underbrace{c + 2^1c + 2^2c + 2^3c + \dots}_{\log(n) \text{ terms}}$

$$TC = O\left(\frac{2^{\log n} - 1}{2 - 1}\right) = O(n)$$

$$T(n) = T(n/2) + T(n/4) + c$$



Work done = $\underbrace{2^0c + 2^1c + 2^2c + \dots}_{\log(n) \text{ terms}}$

$$\Rightarrow TC = O(n)$$

level ✓

levels ✗

level

levels

"A-man: nama"
↓
"a-man: _nama"
↓
"aman nama"

check uppercase
(ch >= 'A' && ch <= 'Z')

check lowercase
ch >= 'a' && ch <= 'z'

check digits
ch >= '0' && ch <= '9'

lowercase to uppercase
ch - 'a' + 'A'

ch = 'a'
⇒ 'a' - 'a' + 'A' = 'A'
ch = 'c'
'c' - 'a' + 'A' = 2 + 'A' = 'c'

Uppercase to lowercase
ch - 'A' + 'a'

$$a^b$$

for i=0; i < b; i++
res = res * a

$$TC = O(b)$$

$$AS = O(1)$$

$$a^b = a * a^{(b-1)}$$

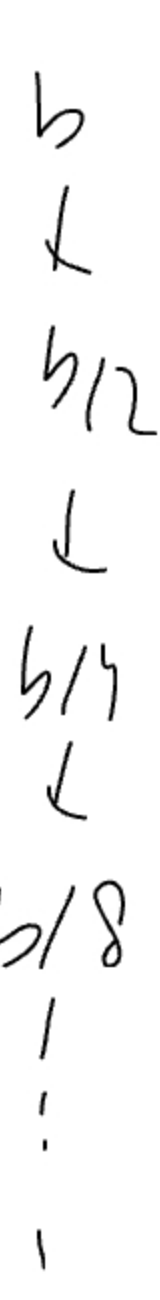
a=2 b=3
↓
a=2, b=2
↓
a=2, b=1

$$\left[\begin{aligned} a^b &= \frac{a^{(b/2)}}{a^{(b/2)}} \times \frac{a^{(b/2)}}{a^{(b/2)}} \quad \text{if } b \text{ is even} \\ &= a^{(b/2)} \times a^{(b/2)} \times a \quad \text{if } b \text{ is odd} \end{aligned} \right]$$

$$T(b) = T(b/2) + c$$

a=2 b=4
2⁴ = 2² × 2² = 4 × 4 = 16

a=2 b=5
2⁵ = 2² × 2² × 2



$$TC = O(c * \log(b)) = O(\log(b))$$

$$(1 \times a) \times (a) \times a^2$$

$$a^{20} = a^{32}$$

$$n = 1234313$$

$$TC = O(\log n)$$

$$\text{digits}(1234313) = 1 + \text{digits}(123431)$$

n = 123
12
1
0

Brute Force:

$$TC = O(n \log n) = \frac{n(n-1)}{2}$$

unit → n
tens → n-1
hundreds → n-2
thousands → n-3

