

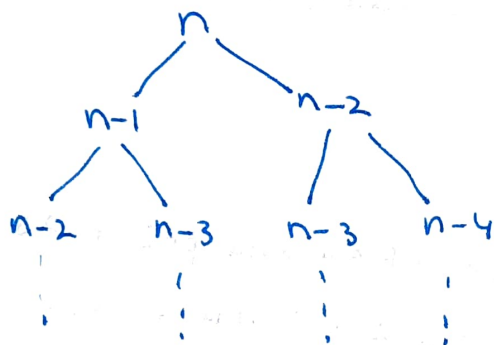
Tutorial 2

Ans 1. Here answer will be $O(\sqrt{n})$

Ans 2. \Rightarrow Recurrence relation is \Rightarrow

$$T(n) = T(n-1) + T(n-2) + 2$$

\Rightarrow making recurrence tree \downarrow



$$\Rightarrow 1 + 2 + 4 + \dots + 2^n$$

here, $a=1, r=2$

$$\Rightarrow \frac{1(2^{n+1} - 1)}{2 - 1} \Rightarrow 2^{n+1} - 1$$

$$O(2^{n+1}) = O(2 * 2^n)$$

$$\Rightarrow O(2^n)$$

$$\Rightarrow S.C = O(n)$$

Ans 3. ① $n \log n$

② n^3

③ $\log(\log(n))$

Ans 4. $\Rightarrow T(n) = T(n/4) + T(n/2) + cn^2$

Lets assume $\Rightarrow T(n/2) \Rightarrow T(n/4)$

$$\therefore T(n) = 2T(n/2) + cn^2$$

\Rightarrow applying master method \Rightarrow

$$a=2, b=2$$

$$\Rightarrow c = \log_b a \Rightarrow \log_2 3 = 1$$

$$n^c = n, f(n) = n^2$$

$$\therefore \Theta(n^2)$$

$$\text{as } T(n) \subset \Theta(n^2)$$

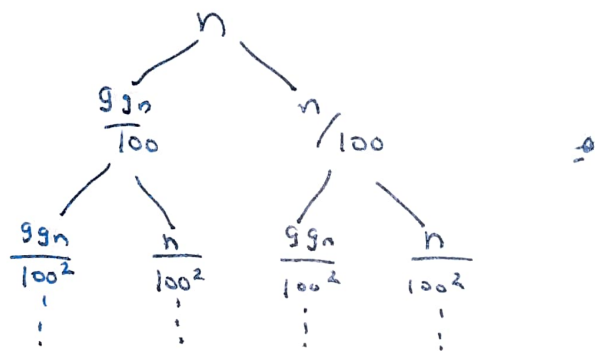
$$T(n) = \Theta(n^2)$$

Ans 5 $\Rightarrow \Theta(n \log n)$

Ans 6 \Rightarrow if k is const. greater than 1

$$\text{then T.C} = \Theta(\log \log n)$$

Ans 7 \Rightarrow here $T = T(99n/100) + T(n/100)$



\Rightarrow if we take longer branch

$$\text{i.e., } 99n/100$$

$$\Rightarrow \text{T.C.} \Rightarrow \log_{\frac{100}{99}} n \Rightarrow \log n.$$