Tutorial 2.

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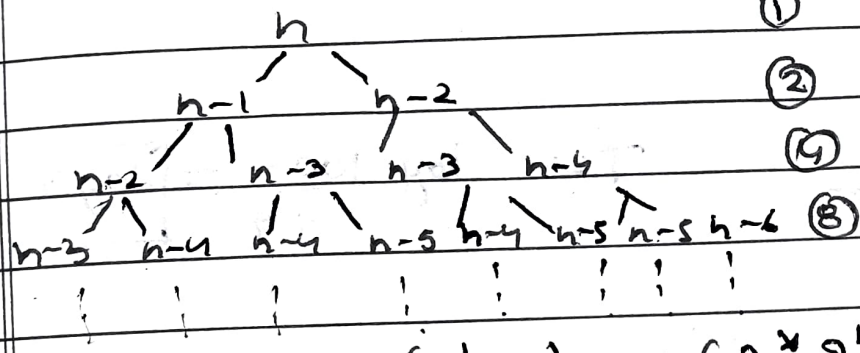
Ans 1. $O(\sqrt{n})$

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



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

$a = 1, \quad r = 2$

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

$= 2^{n+1} - 1$

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

$= O(2^n)$.

Space complexity $= O(n)$.

Ans 3. 1. $n \log n$

2. n^3

3. $\log(\log(n))$

Ans 4. $T(n) = T(n/4) + T(n/2) + e^{n^2}$

lets assume $\Rightarrow T(n/2) \Rightarrow T(n/4)$.

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

Applying master's theorem

$a = 2, \quad b = 2, \quad f(n) = cn^2$

$c = \log_b a = \log_2 2 = 1$

$n^2 > 1$.

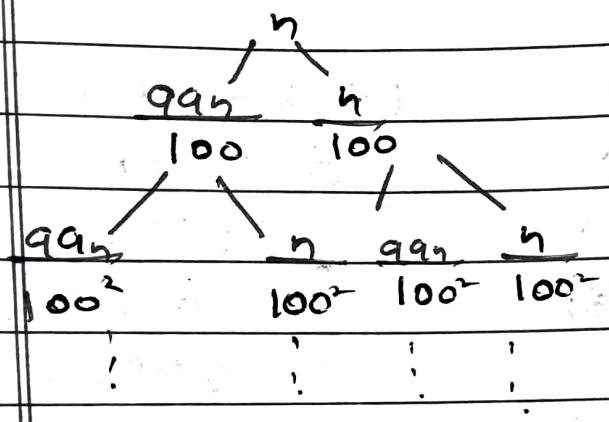
$\therefore f(n) > n^c$.

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

Ans 5 $O(n \log n)$

Ans 6 If K is const. or greater than 1
then T.C = O(log log n).

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



$$TC = \log \frac{100n}{99} \approx \boxed{\log n}$$