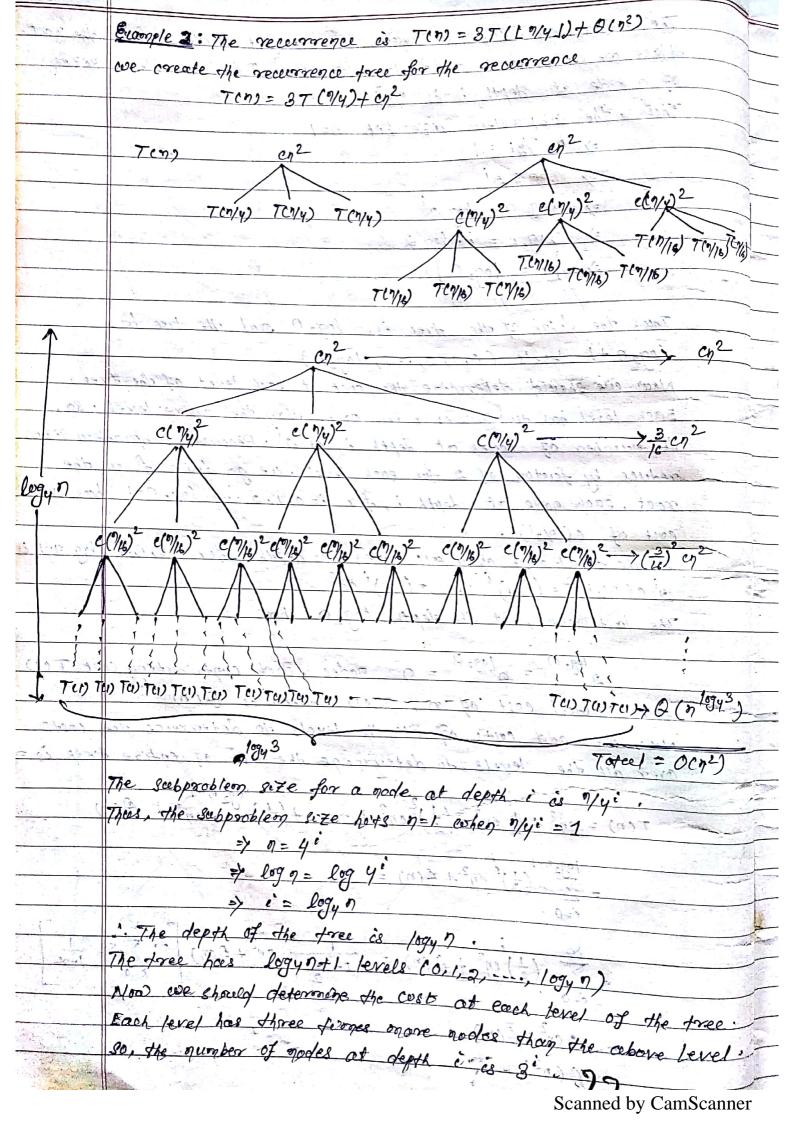
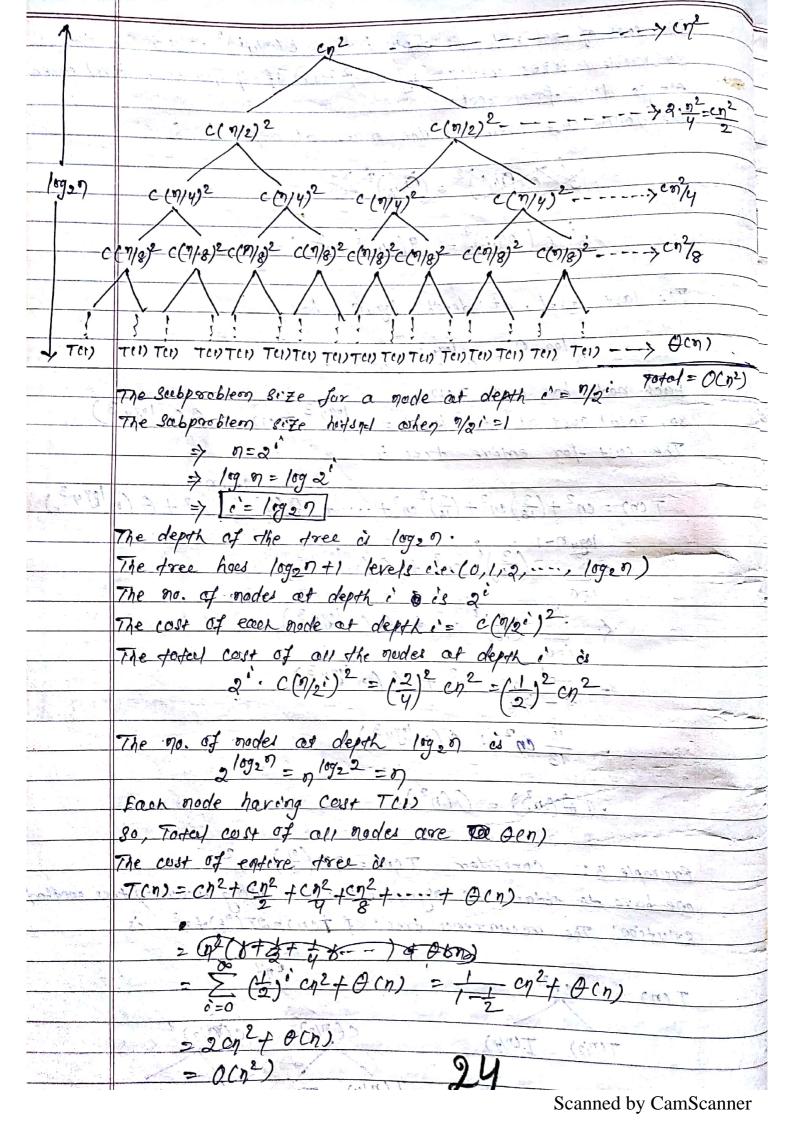


100	The subproblem lize decreases as we get further from the root.
	At last we must reach a boundary condition. The subproblem sizes
	of a node at depth i is % i.
-	Thees, the subproblem size hit n=1
	> 0 1/2; = 1
- 4	$= \begin{cases}                                    $
	$\Rightarrow \log_2 n = i \cdot \log 2$
15	=> [i = log_n]
4	
	Those the depth of the free is legged and the free has
5	log_n+1 levels (0,1,2,,-10g2n)
	Now we should determine the cost at each level of the tree.
	Each level has two times more godes than the above level . 30,
3	the number of nodes at depth is is 2'. Because subproblem sizes
	reduce by factor of 2 for each level . we go down from the
	root, each gode at depth i, for i=0,1,2, loge n-1 has a
-	$cost of c(\sqrt[q]{2})^2$ .
E.	30, the total cost over all nodes at depth i for o=0,1, log n-1 is
7	$2^{i} ((1/2)^{2} = (2/4)^{i} ch^{2} = (1/2)^{i} ch^{2}$
	The last level, at the depth logon has
- *	(og. 1) 100 )
4,-	$2^{\log_2 n} = n^{\log_2 2} = n  \text{nodes}  \text{, each contributing cost TCI)}$
Ō.	for a total cost of on, Tell workich is A(n)
	Now we cold costs of all the levels to deterroning the costs
	over all the levels to determine the cost of entire tree is =
-	The tally of less with a most of the second of the
	$T(n) = c\eta^2 + \frac{1}{2}e\eta^2 + (\frac{1}{2})^2c\eta^2 + \dots + (\frac{1}{2})^{\log_2 n} + c\eta^2 + O(n)$
	$= \sum_{n=0}^{\lfloor \log_2 n - 1 \rfloor} (\frac{1}{2})^{\frac{n}{2}} cn^2 + \beta(n) = \frac{1}{2}$
	c=0
	be in the state of
	$ \underbrace{\left\{ \sum_{c=0}^{\infty} \left(\frac{1}{2}\right) e \eta^2 + \theta c n \right\}}_{c=0} = \underbrace{\frac{1}{1-1}}_{c=0} c \eta^2 + \theta c n \right\} \left[ \sum_{c=0}^{\infty} \sum_{l=0}^{\infty} \left( \frac{1}{2} \right) e \eta^2 + \theta c n \right] = \underbrace{\frac{1}{1-1}}_{c=0} \left[ \sum_{l=0}^{\infty} \left( \frac{1}{2} \right) e \eta^2 + \theta c n \right] = \underbrace{\frac{1}{1-1}}_{c=0} \left[ \sum_{l=0}^{\infty} \left( \frac{1}{2} \right) e \eta^2 + \theta c n \right] = \underbrace{\frac{1}{1-1}}_{c=0} \left[ \sum_{l=0}^{\infty} \left( \frac{1}{2} \right) e \eta^2 + \theta c n \right] = \underbrace{\frac{1}{1-1}}_{c=0} \left[ \sum_{l=0}^{\infty} \left( \frac{1}{2} \right) e \eta^2 + \theta c n \right] = \underbrace{\frac{1}{1-1}}_{c=0} \left[ \sum_{l=0}^{\infty} \left( \frac{1}{2} \right) e \eta^2 + \theta c n \right] = \underbrace{\frac{1}{1-1}}_{c=0} \left[ \sum_{l=0}^{\infty} \left( \frac{1}{2} \right) e \eta^2 + \theta c n \right] = \underbrace{\frac{1}{1-1}}_{c=0} \left[ \sum_{l=0}^{\infty} \left( \frac{1}{2} \right) e \eta^2 + \theta c n \right] = \underbrace{\frac{1}{1-1}}_{c=0} \left[ \sum_{l=0}^{\infty} \left( \frac{1}{2} \right) e \eta^2 + \theta c n \right] = \underbrace{\frac{1}{1-1}}_{c=0} \left[ \sum_{l=0}^{\infty} \left( \frac{1}{2} \right) e \eta^2 + \theta c n \right] = \underbrace{\frac{1}{1-1}}_{c=0} \left[ \sum_{l=0}^{\infty} \left( \frac{1}{2} \right) e \eta^2 + \theta c n \right] = \underbrace{\frac{1}{1-1}}_{c=0} \left[ \sum_{l=0}^{\infty} \left( \frac{1}{2} \right) e \eta^2 + \theta c n \right] = \underbrace{\frac{1}{1-1}}_{c=0} \left[ \sum_{l=0}^{\infty} \left( \frac{1}{2} \right) e \eta^2 + \theta c n \right] = \underbrace{\frac{1}{1-1}}_{c=0} \left[ \sum_{l=0}^{\infty} \left( \frac{1}{2} \right) e \eta^2 + \theta c n \right] = \underbrace{\frac{1}{1-1}}_{c=0} \left[ \sum_{l=0}^{\infty} \left( \frac{1}{2} \right) e \eta^2 + \theta c n \right] = \underbrace{\frac{1}{1-1}}_{c=0} \left[ \sum_{l=0}^{\infty} \left( \frac{1}{2} \right) e \eta^2 + \theta c n \right] = \underbrace{\frac{1}{1-1}}_{c=0} \left[ \sum_{l=0}^{\infty} \left( \frac{1}{2} \right) e \eta^2 + \theta c n \right] = \underbrace{\frac{1}{1-1}}_{c=0} \left[ \sum_{l=0}^{\infty} \left( \frac{1}{2} \right) e \eta^2 + \theta c n \right] = \underbrace{\frac{1}{1-1}}_{c=0} \left[ \sum_{l=0}^{\infty} \left( \frac{1}{2} \right) e \eta^2 + \theta c n \right] = \underbrace{\frac{1}{1-1}}_{c=0} \left[ \sum_{l=0}^{\infty} \left( \frac{1}{2} \right) e \eta^2 + \theta c n \right] = \underbrace{\frac{1}{1-1}}_{c=0} \left[ \sum_{l=0}^{\infty} \left( \frac{1}{2} \right) e \eta^2 + \theta c n \right] = \underbrace{\frac{1}{1-1}}_{c=0} \left[ \sum_{l=0}^{\infty} \left( \frac{1}{2} \right) e \eta^2 + \theta c n \right] = \underbrace{\frac{1}{1-1}}_{c=0} \left[ \sum_{l=0}^{\infty} \left( \frac{1}{2} \right) e \eta^2 + \theta c n \right] = \underbrace{\frac{1}{1-1}}_{c=0} \left[ \sum_{l=0}^{\infty} \left( \frac{1}{2} \right) e \eta^2 + \theta c n \right] = \underbrace{\frac{1}{1-1}}_{c=0} \left[ \sum_{l=0}^{\infty} \left( \frac{1}{2} \right) e \eta^2 + \theta c n \right] = \underbrace{\frac{1}{1-1}}_{c=0} \left[ \sum_{l=0}^{\infty} \left( \frac{1}{2} \right) e \eta^2 + \theta c n \right] = \underbrace{\frac{1}{1-1}}_{c=0} \left[ \sum_{l=0}^{\infty} \left( \frac{1}{2} \right) e \eta^2 + \theta c n \right] = \underbrace{\frac{1}{1-1}}_{c=0} \left[ \sum_{l=0}^{\infty} \left( \frac{1}{2} \right) e \eta^2 + \theta c n \right] = \underbrace{\frac{1}{1-1}}_{c=0} \left[ \sum_{l=0}^{\infty} \left( \frac{1}{2} \right) e \eta^2 + \theta c n \right] = \underbrace{\frac{1}{1-1}}_{c=$
e.	2
5	$=2c\eta^2+\beta(\eta)$
	$= O(\eta^2)$
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Scanned by CamScanner



	The cost of each node at depth i is $c(\eta/yi)^2$ because the
	supproblem sizes reduce by a factor of 4 for each level eithen
	are go down from root.
٠	The total cost over all the nodes at depth i as
	3 C (0/4) 2 (0/4) 2 0
	$3^{i} c (3/yi)^{2} = (3/16)^{i} cn^{2}$
	The lost level, at depth logyon has
	- ***
( )	nodes inter at a
7	Each node how cost T.CI)
	30, Total cost at last level = 0 10943 Tell = 0 (n 10943)
	The cost for entire tree is
	Carl - Rock A
	$T(n) = cn^2 + (\frac{3}{16})en^2 + (\frac{3}{16})^2cn^2 + \dots + 2(\frac{3}{16})^{\frac{169}{16}}en^2 + O(n^{\frac{169}{16}}y^3)$
-	$\frac{\log_4 n - 1}{16} \cdot \frac{3}{16} \cdot \frac{1}{16} \cdot \frac{2}{16} + \frac{1}{16} \cdot \frac$
	TARA CARACTER STATE OF THE STAT
	1 2 1 1 (943)
	(=0 (n) (10) 100 100 100 100 100 100 100 100 100
	- 1 2 3 ch 1 19 43 )
	1-3/14 (n/343)
	14 2 00 /tg, 3 \
	$= \frac{16}{13} \operatorname{cn}^2 + \Theta(\eta^{1} g y^{3})$
	= ( (m) = O(n2) 17 100 person about 100
	so Todal rack of my docher ase 20 600
	Example 3: Consider T(1) = 27 (2) + 12
- 1,-	we have to obtain the asymptotic bound using recursing tree method
	Solution! The recurrence free of Ten) = 27 (%)+n2 is
	Land to the state of the state
	T(n) (a) = cn2 (a) = 15, 2n2
	$T(1/2)$ $T(1/2)$ $C(1/2)^2$ $C(1/2)^2$
	-3 Ten/4) Ten/4) Ten/4) Ten/4)



	4: Consider the following recurrence Ton = 4T([1])+0
	the asymptotic bound asing recursion tree method.
20/ctton	The recursion tree for the above recurrence is
T(n)	Co
To be and	2T(n/2) 2T(n/2)
	cn
- d3	
	$2(\sqrt{2})$ $(2(\sqrt{2}) \rightarrow 2 \cdot 2 \cdot \frac{\pi}{2} = 2\pi$
7	The second secon
(4(7/4)	c4(n/y) c4(n/y). c4(n/y)> 4ne
4	
(CO)	(GE) - (G
*	the state of the s
(1) —TCI)	Ter) Ter) Ter) Ter) Ter) - Ter) - 7 (Ocn)
- N. 19 18 19 19 19 19 19 19 19 19 19 19 19 19 19	7.1.21
	$Total = O(\eta^2)$
	robless lize for a ordered depth i= 1/2i
The sabp	O Lotol Totol O
The sabp	expless lize for a opdered depth i = 1/2i
The sabp	estables lize for a opdered depth i = 1/2i  estables - 1/2i = 1 = n = 2i  => 109 9 = 1092
The subp	Postbless lize for a gode of depth $i = \frac{1}{2}i$ estates $\frac{1}{2}i = 1 = \frac{1}{2}i$ $\frac{1}{2}i = \frac{1}{2}i$
The subp The subp	Post less lize for a gode of depth i = $\frac{1}{2}i$ estates $\frac{1}{2}i = 1 = \frac{1}{2}i$ $\frac{1}{2}i = \frac{1}{2}i$ $1$
The subp The subp The depo	Porbleso leze for a opeder of depth $i = 1/2i$ explose $0 = 1 = 1 = 1 = 2i$ $= 1 = 1 = 1 = 2i$ $= 1 = 1 = 1 = 2i$ $= 1 = 1 = 1 = 1 = 2i$ $= 1 = 1 = 1 = 1 = 1 = 1 = 1 = 1 = 1 = 1$
The subport of the tree	Problem lize for a mode at depth $i = \frac{9}{2}i$ $\Rightarrow \log \eta = \log 2$ $\Rightarrow \log \eta = \log 2$ $\Rightarrow \log \eta = \log 2$ the of the tree is $\log 2\eta$ .  That $\log_2 \eta + \log_2 \eta = i \cdot e \cdot (0,1,2),, \log_2 \eta$ of nodes at depth $i \in 2$
The subp The depo The free The go. co	problem lize for a gode of depth $i = \frac{9}{3}i$ $\Rightarrow \log \eta = \log 2^i$ $\Rightarrow \log \eta = \log 2^i$ $\Rightarrow \delta = \log_2 \eta$ That $\log_2 \eta + \log_2 s = i \cdot e \cdot (0,1,2),, \log_2 \eta$ of each node at depth $i = 2c(\frac{1}{2}i)^2$
The subp The subp The depo The free The cost	orbless size for a gode of depth i= 1/2i  estates 1/2i=1 => n=2i  => log n = log 2i  the of the tree is log 2n.  That log n+1 levels = i.e. (0,1,2,, log 2n)  of each node at depth i = 2c(1/2i) <sup>2</sup> of each node at depth i = 2c(1/2i) <sup>2</sup> of out of all nodes of depth i is
The subp The subp The depo The free The cost The cost	problem size for a mode of depth i = 1/2i  problem 1/2i = 1 => n = 2  > 100 9 = 100 2  > 100 9 = 100 2   The free is 100 2 n  That 100 n+1 levels = i.e. (0,1,2),, 100 n)  of each mode at depth i = 2c(1/2i) <sup>2</sup> of each mode at depth i = 2c(1/2i) <sup>2</sup> of cost of all modes at depth i is
The subp The depo The tree The go. of The cost The text	orbless size for a gode of depth i= 1/2i  estates 1/2i=1 => n=2i  => log n = log 2i  the of the tree is log 2n.  That log n+1 levels = i.e. (0,1,2,, log 2n)  of each node at depth i = 2c(1/2i) <sup>2</sup> of each node at depth i = 2c(1/2i) <sup>2</sup> of out of all nodes of depth i is
The subp The subp The depo The free The cost The cost The forter 2	problem lete for a node as depth i= 1/2i  => log n = log 2'  => log n = log 2'  -> log n = log 2 n  -> log n+1 levels = i.e. (0,1,2,, log 2 n)  -> log nodes at depth i = 2c(1/2i) <sup>2</sup> of each node at depth i = 2c(1/2i) <sup>2</sup> of nodes at depth log 2 n es  2c(1/2i) <sup>2</sup> = 100   100   2   2   2   2   2   2   2   2   2
The subp The depo The free The cost The cost The op.	explain size for a opeder of depth i = 1/2i  explain 1/2   > n-2'  => 109 n = 1092'  => 1092 n   1092 n    the of the tree is 1092 n    that 1092 n +1 1 levels = i.e. (0,1,2,, 1092 n)  of each opeder at depth i = 2c(1/2i) <sup>2</sup> of owder at depth i = 2c(1/2i) <sup>2</sup> of owder at depth 1092 n is  2(9/2) <sup>2</sup> = 4  of owders at depth 1092 n is  21092 n = n 1092 = n  de horrory cost T(1)
The subp The depo The free The op. of The cost The op. The op. Each mode So, Total	orthern size for a gode of depth i = 1/2i  enthern 1/2i = 1 => n=2'    log n = log 2'    i = log 2      hat log n+1 levels = i.e. (0,1,2,, log 2n)    nodes at depth i = 2c(1/2i) <sup>2</sup> of each mode at depth i = 2c(1/2i) <sup>2</sup> of modes at depth log 2n is  2c(1/2i) <sup>2</sup> = 4  of modes at depth log 2n is  2log 2n = nlog 22 = n  de haveny cast T(1)  2  cost of all godes are B(n)
The scalp  The deport  The free  The cost  The op. co  The cost  The op.  The cost  The op.  The op.  The cost  The op.	explicitly size for a operal depth i = 1/2i  explicitly of the dree is logon.  That logon+1 levels = i.e. (0,1,2,, logon)  of each opede at depth i = 2c(1/2i) <sup>2</sup> of order at depth i = 2c(1/2i) <sup>2</sup> of order at depth logon is  2((1/2i) <sup>2</sup> = 4  of order at depth logon is  2(9/2n = n log22 = 8)  de having cast T(1)

