

## A. P. SHAH INSTRUCTED OF TRECHNOLOGY

(Approved by AICTE New Delhi & Govt. of Maharashtra, Affiliated to University of Mumbai)
(Religious Jain Minority)

Subject :- ADSAA

Substitution Method
The substitution method for solving recurrences consists of two steps:
consists of two steps:
@ Guess the form of the solution
2 Use the modhematical induction to find
constants in the form & show that
constants in the form & show that the solution works.
- The inductive hypothesis is applied to smaller values similar like recursive calls bring us closer to the base case.
similar like recursive calls bring us closer to
30 the base case.
- The substitution method is powerful to establish
- The substitution method is powerful to establish lower or upper bound on a recurrence.
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+	All the problems of recurrence relation can be
-	50 ved using substitution method which is
	All the problems of recurrence relation can be solved using substitution method which is not possible using Master's method.
10	-Substitution method always gives correct
	answer but the disadvantage is that the
	-Substitution method always gives correct answer but the disadvantage is that the mathematical calculations are more compared to recursive tree & master's method.
	recursive tree & master's method.
1.1	

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to.	
	The substitution method.
	1100 3003771001011 1.150111000
	The recurrence relation for Binary
	The recurrence relation for binary
50	Search is
	T(n) = 3T(n/2) + C for $n > 1$
	$T(n) = \frac{5}{5}T(n/2) + C$ for $n > 1$
25	T(n) = T(n/2) + C
	The funt is decreasing by division in the
	The fun's is decreasing by division i.e. 12
	T(n) = T(n/2) + C - 0
	T(n/2) = T(n/4) + C - 0
30	T(n 4) = T(n/8) + C - 3
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SEM -V (I.T)

Let's back substitute the values of equation 2 to equation 1

$$T(n) = T(n|4) + C + C$$

$$= T(\frac{n}{2^2}) + 2C$$

Now again put values of equation 3

$$= T\left(\frac{n}{8}\right) + C + 2C$$

$$= T \begin{pmatrix} h \\ 2^3 \end{pmatrix} + 3C \qquad Again put values of equation 4 in this equation)$$

$$= T \begin{pmatrix} h \\ 2^4 \end{pmatrix} + 4C \qquad (this equation)$$

50 from first iteration we have  $T(\frac{n}{2^2})$ 

from Second iteration we have T(n) + 3C

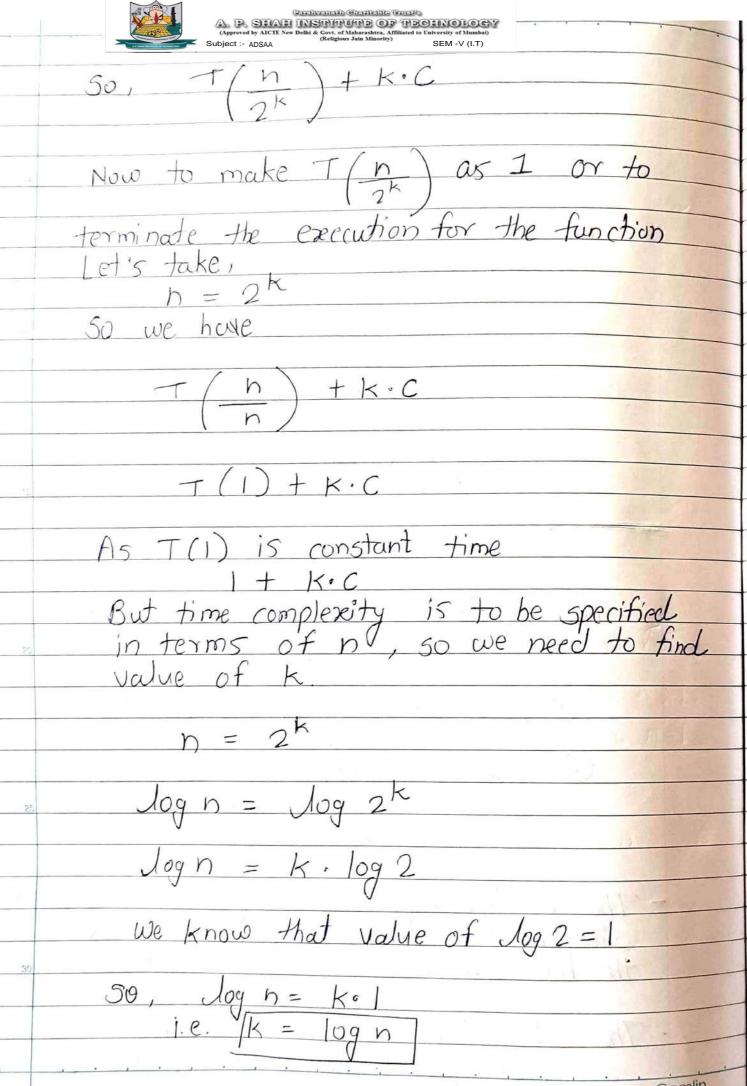
from third iteration we have T(n) + 4C

If we go till k iterations we get

 $T(n) + k \cdot c$ 

we have observed that 2 & see of for 22 we have 20. C constant statements.

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		Page : Dafe :
Let	's put	Value of k in our equation  1 + KC
12.00	Con C	1 + Jogn·C
As os	180	are constant we can write it
	io the recurre Binony	time complexity of given ince relation or time complexity Search algorithm is
		O (log n)