

DESIGN AND ANALYSIS OF ALGORITHMS ASSIGNMENT 1

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Assign: Find space complexity of:
Alg test(n) {
 if (n > 0) {
 print n
 test(n-1)
 test(n-1)
 }
}

~~$T(n) = \begin{cases} 1 & n=0 \end{cases}$~~

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

$$T(n) = \begin{cases} 1 & n=0 \\ 2T(n-1)+1 & n>0 \end{cases}$$

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

$$a = 2$$

$$b = 1$$

$$f(n) = 1$$

Since $a > 1$;

~~$$T(n) = O(n^b)$$~~

$$T(n) = O(f(n) \cdot a^{\frac{n}{b}})$$

$$T(n) = O(1 \cdot 2^{\frac{n}{1}})$$

$$\underline{T(n) = O(2^n)}$$

Space complexity

assume $n=3$

size of stack

$$\underline{S(n) = O(n)}$$

