	Algorithms and Data Structure.	fa Hashin
	Problemset 5.	
	Problem 5.3 Decision Tree	
	A decision is binary and number of leaves > # possible answers = n!	
	height > (1911) which can be proven using Stirling's Formula, Taylort	- אסיונומר
	on a summation	44
	proving (Ign) = \(\text{O}\)(n\(\text{Ign}\)) using sums.	
	sameleng	rth
-	= lgn!	
	$= lg(n \cdot (n-1) \cdot (n-2) \dots 1)$	
	= lqn + lg(n-1) + + lg2 + lg1	1 1 1
	= n/2 lg i since we can ignore the first n/2 terms. i=1 i=n/2	
	i=1 i=n/2	
	= 2 lgi	
	i=n12	
	19 19 1/2 and since eachterm > 19 1/2	
-6-		
	: 2 eg (n-1)	
	1=n/2	
	$\frac{n}{2} \log n - \frac{n}{2}$	
	since the $(-n)$ is negative and relevant.	
	(lgnl) = Onlgn : proven	
-	(19n;) = 0-11sg-1	
-		
Total h	*note: this proof is also part of the MIT course 6006 that I took during	19
	under break before Spring 2019 started.	
	Miller Oreclin Colored States	

	Problem 5.2 Mody wel Quicksort.
	- forther standing star
	total de la contraction de la
	Assumed the prove the best by worst carefor the modified quicksout Algorithm.
	1455 mmny the modified version of QS, the best care time complexity
	would be achieved if an of input would doubte undo 3 equal paints
	would be achieved if an of input would doubte who 3 equal pairls and would lead to 0 (rlogn) time complexity by the following
	Frecumence
	T(n) = 3T(n/3) + O(n)
1971 1994 1975	partition
14.00	
	Solving this, our best care time complexely will be the most
Mark 19	efficient for quick fort a its iterestions.
	72(100)
John W. J. B.	
	The word care trive commended would be the to the form water
	The monst are and and many be one to an importance
	pivot selection in the quicksort which would require
. (617)	The monst care time complexity would be due to an importunate priot selection in the quicksort which would require all possible elements being indusdrally cheeled.
- BE	
	T(n) = T(n-2) + O(n)
689	sowing this would result in the worst case time complexity of $O(n^2)$ for quick sort.
	1-12 000 100 100 100 100 100 100 100 100 1
Helds.	time complexity of U(n) for Quick sort.
1000	O
100	
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