| Universität Siegen | Algorithmics 1 |
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| Lehrstuhl Theoretische Informatik | WS 2018/19 |
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## Exercise 2b

## Task 1

Show that a binary tree with $N$ leaves has at least height $\log _{2}(N)$.
Task 2 (Lemma 5 on slide 32)
Let $A \subseteq\{0,1\}^{*}$ with $|A|=N$, and let $1 \leq n \leq \log _{2}(N)$. Then at least $\left(1-2^{-n+1}\right) N$ many words in $A$ have length at least $\log _{2}(N)-n$.

Task 3
Sort the array $[2,8,13,5,7,16,3,12]$ using Quicksort.

