**Universität Bielefeld**
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## Sequence Analysis 3
## Summer 2024

### Exercises

**Number 11, Discussion: 2024-July-11**

1. Given a rooted tree $T$ with $n$ leaves, let $LL(v)$ be the leaf-list of vertex $v$. Moreover, let $v'$ be a child of $v$ with the longest leaf-list among all children of $v$, and let $LL'(v) = LL(v) - LL(v')$. Show that $\sum_v |LL'(v)| \leq n \log_2 n$.

2. The *longest common extension* starting from two positions $i$ and $j$ in a string $x$ is the largest integer $\ell \geq 0$ such that $x[i..i + \ell] = x[j..j + \ell]$.

   Work out the details of the longest common extension query in constant time for any index pair $(i, j)$ after linear time preprocessing, e.g. using the KMP prefix table.