Proof (Continued)

- there are at most $\frac{n}{2^k}$ nodes with rank in $\{k+1, \ldots, 2^k\}$
- each of them contributes at most 2^k
- the contribution of all the nodes with rank from this interval is at most $O(n)$
- the number of different intervals is $\log^* n$
- thus, the contribution of all nodes is $O(n \log^* n)$