Proof (Continued)

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