

## Claim

$$\begin{aligned} \#(i \rightarrow j: \log^*(\text{rank}[i]) < \log^*(\text{rank}[j])) \\ \leq O(m \log^* n) \end{aligned}$$

## Proof

There are at most  $\log^* n$  different values for  $\log^*(\text{rank})$ . □