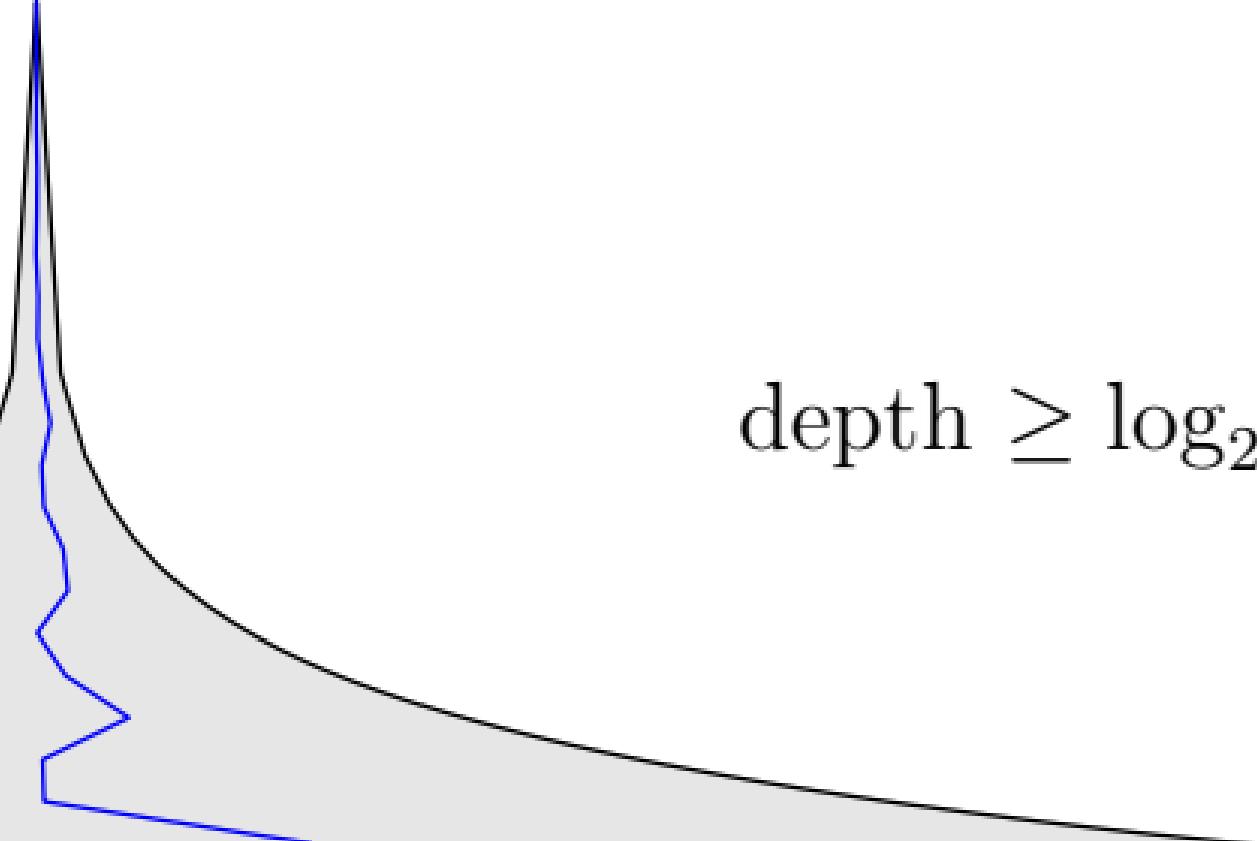Decision Tree

$\text{depth} \geq \log_2(n!) = \Theta(n \log(n))$

$n!$ outcomes