

## Complessità BuildMaxHeap

$h$  = altezza alberi ad un certo punto  
 $h_T$  = altezza intero albero <sup>radice</sup>  
 $n_h \leq 2^{h_T-h}$ ,  $h_T \leq \log_2 n$ ,  $n_h = n^{\circ}$  nodi <sup>sotto</sup> alberi.  
 $n_h \leq \frac{2^{\log_2 n}}{2^h} = \frac{n}{2^h}$  <sup>altezza  $h$</sup>   $\rightarrow$  MaxHeapify

$$\begin{aligned}
 T(n) &= \sum_{h=1}^{\log_2 n} n_h O(h) \leq \sum_{h=1}^{\log_2 n} \frac{n}{2^h} O(h) = O\left(\sum_{h=1}^{\log_2 n} n \cdot \frac{h}{2^h}\right) \\
 &= O\left(n \sum_{h=1}^{\log_2 n} \frac{h}{2^h}\right) \leq O(n \cdot 2) = O(n)
 \end{aligned}$$

poiché  $\sum_{h=1}^{\infty} \frac{h}{2^h} = 2$