a) $\Theta(\log n)$

b) $a = 16$, $b = 4$, $c = 1$ $\Theta(n^2)$

c) $a = 8$, $b = 2$, $c = 2$ $\Theta(n^3)$

d) $a = 7$, $b = 2$, $c = 2$ $\Theta(n^{\log_2 7})$

e) $a = 7$, $b = 2$, $c = 3$ $\Theta(n^3)$

f) $a = 8$, $b = 2$, $c = 3$ $\Theta(n^3 \log n)$

g) $a = 9$, $b = 2$, $c = 3$ $\Theta(n^{\log_2 9})$

Master Thm:

$$T(n) = a \cdot T\left(\frac{n}{b}\right) + \Theta(n^c)$$

$$\forall n \leq b : T(n) = \Theta(1)$$

a) $\frac{a}{b^c} = 1 \Rightarrow T(n) = \Theta(n^c \log n)$

b) $\frac{a}{b^c} < 1 \Rightarrow T(n) = \Theta(n^c)$

c) $\frac{a}{b^c} > 1 \Rightarrow T(n) = \Theta(n^{\log_b a})$

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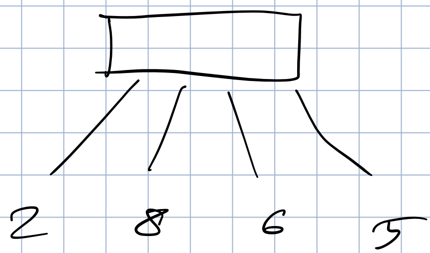


Nekuchařkové rekurence

a) $\Theta(2^n)$

\# hladin = n

\# uzlů = 2^n

T na uzel = $O(1)$

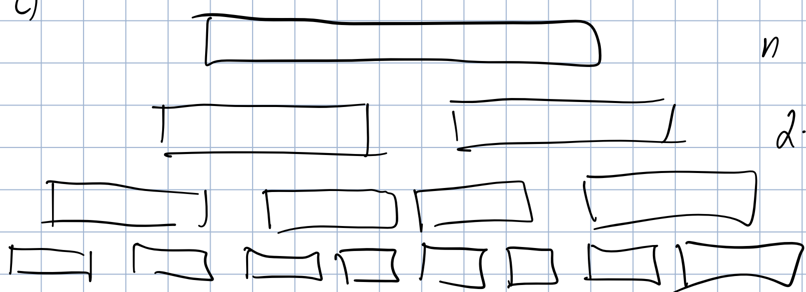
Celkový čas = $\Theta(2^n)$

$\Theta(n + (n-1) + (n-2) + \dots + 1) = \Theta(n^2)$

b)

$T(1) = 1$	1	$O(n^2)$
$T(2) = 1 + 2$	3	
$T(3) = 3 + 3$	6	
$T(4) = 6 + 4$	10	
$T(5) = 10 + 5$	15	
$T(6) = 15 + 6$	21	

c)



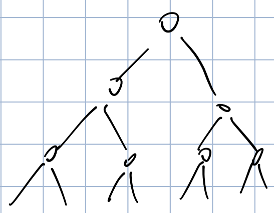
$n \log n$

$2 \cdot \frac{n}{2} \log \frac{n}{2} = n \log \frac{n}{2}$

$4 \cdot \frac{n}{4} \log \frac{n}{4} = n \log \frac{n}{4}$

$8 \cdot \frac{n}{8} \log \frac{n}{8} = n \log \frac{n}{8}$

$\sum_{i=1}^{n} n \log \frac{n}{2^i}$



i

1	n	$n \log n$	$\to n \log n$
2	$\frac{n}{2}$	$\frac{n}{2} \log \frac{n}{2}$	$\to n \log \frac{n}{2}$
$\vdots$	$\vdots$		
2^i	$\frac{n}{2^i}$	$\frac{n}{2^i} \cdot \log \frac{n}{2^i}$	$\to n \log \frac{n}{2^i} = n(\log n - \log 2^i)$

$\log 2^i = i$

$l = \log_2 n$

$\sum_{i=1}^{n} n \cdot (l - i) = n \cdot l^2 =$

$n \cdot \log^2 n$