

20.1.11

$$A_1 \quad 5 \times 10$$

$$A_2 \quad 10 \times 2$$

$$A_3 \quad 2 \times 10$$

$$A_4 \quad 12 \times 5$$

$$A_5 \quad 5 \times 50$$

$$A_6 \quad 50 \times 6$$

$$\# \text{ operations} = m \cdot k \cdot n$$

$$400 / 5.2 \quad 190 = 220$$

$$(A_1 A_2) A_3 = A_{1..2} A_3$$

$$700 \quad 240$$

$$A_1 (A_2 A_3) = 940$$

$$10 \times 10$$

$$A_1 (A_{2..10} \cdot A_{10..m}) = A_1 \cdot A_{2..12}$$

$$m \quad 10$$

$$\begin{array}{c|c} 5 & 0 \quad 0 \quad 0 \quad 0 \end{array}$$

X

$$\begin{array}{c|c} m & 6 \\ 10 & 6 \\ & 6 \\ & 6 \\ & 6 \end{array}$$

$$A_{i..j} = A_i \cdot A_{i+1} \cdot \dots \cdot A_j$$

$$\left( (A_1 \cdot A_2) \cdot A_3 \right) \left( (A_4 A_5) A_6 \right)$$

$$k \quad 2 \quad A_{4..6}$$

$$\begin{array}{c|c} 5 & 6 \\ & 6 \\ & 6 \\ & 6 \\ & 6 \end{array}$$

$$(A_i A_{i+1} A_{i+2} \dots A_j)$$

$$A_1 A_2 A_3 A_4$$

↑

$$k \rightarrow f(A_{i..k}) + f(A_{k+1..j}) + P_{i-1} P_k P_j$$

<del>i \ j</del>	<del>1</del>	2	3	4	5	6
1	<del>0</del>	0				
2	<del>X</del>	<del>0</del>	0			
3	<del>X</del>	<del>X</del>	<del>0</del>	0		
4	<del>X</del>	<del>X</del>	<del>X</del>	<del>0</del>	0	
5	<del>X</del>	<del>X</del>	<del>X</del>	<del>X</del>	<del>0</del>	0
6	<del>X</del>	<del>X</del>	<del>X</del>	<del>X</del>	<del>X</del>	<del>0</del>

$$A_2(A_3 A_4)$$

$$(A_2 A_3) A_4$$

- 1  $5 \times 10$
- 2  $10 \times 2$
- 3  $2 \times 19$
- 4  $19 \times 5$
- 5  $5 \times 50$
- 6  $50 \times 6$

$$\begin{aligned}
 &1 \rightarrow A_1(A_2A_3) \\
 &0 + 250 + 100 = 350 \\
 &(A_1A_2)A_3 \\
 &100 + 0 + 190 = 290 \\
 &(2 \ 3) \ 5 \\
 &100 + 0 + 50 = 150 \\
 &2 \ (3 \ 5) \\
 &67 + 190 + 100 = 357
 \end{aligned}$$

$$\begin{aligned}
 &1(2 \ 3 \ 4) \\
 &0 + 250 + 250 = 500 \\
 &(1 \ 2) \ (3 \ 4) \\
 &100 + 190 + 50 = 340 \\
 &(1 \ 2 \ 3) \ 4 \\
 &250 + 0 + 100 = 350
 \end{aligned}$$

sampled

	1	2	3	4	5	6
1	0	100	240	170	1990	1380
2		0	210	230	1620	1340
3			0	190	620	1220
4				0	3000	1860
5					0	1500
6						0
1	1	1	2	2	2	2
2		2	2	2	2	2
3			3	3	4	5
4				4	4	5
5					5	5
6						6

$$(1 \ 2) ((3 \ 4 \ 5) \ 6)$$

$$(1 \ 2) (((3 \ 4) \ 5) \ 6)$$

$$A[i][j] = A_{i..j}$$

$$d=1 : (n-1) \cdot 1$$

$$d=2 : (n-2) \cdot 2$$

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

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$$2 \sum_{d=1}^{n-1} (n-d)d = 2 \sum_{d=1}^{n-1} (nd - d^2) = 2 \left( \sum_{d=1}^{n-1} nd - \sum_{d=1}^{n-1} d^2 \right)$$

$$\left\{ \begin{aligned} \sum_{i=1}^n i &= \frac{n(n+1)}{2} \\ \sum_{i=1}^n i^2 &= \frac{n(n+1)(n+2)}{6} \end{aligned} \right.$$

$$\sum_{d=1}^{n-1} nd = n \sum_{d=1}^{n-1} d = n(1+2+\dots+n-1) = n \cdot \frac{n}{2} \cdot (n-1) = \frac{n^2(n-1)}{2}$$

$$\sum_{d=1}^{n-1} d^2 = \frac{(n-1)n(n+1)}{6}$$

$$2 \left( \frac{n^2(n-1)}{2} - \frac{(n-1)n(n+1)}{6} \right) = \frac{3n^2(n-1) - (n-1)n(n+1)}{3} =$$

$$= n(n-1) \frac{3n - n - 1}{3} =$$

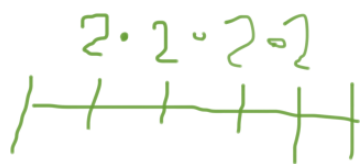
$$\boxed{n(n-1) \frac{2n-1}{3}} \quad \boxed{O(n^3)}$$



		1		
	1		1	
		2		1
1	3		3	1
	6		6	



$$\sum_{i=0}^{n-1} \binom{n-1}{i}$$



5  
 $n$

4  
 $n-1$

$$(a+b)^n = \binom{n}{0} a^n + \binom{n}{1} a^{n-1} b + \binom{n}{2} a^{n-2} b^2 + \dots + \binom{n}{n} b^n$$

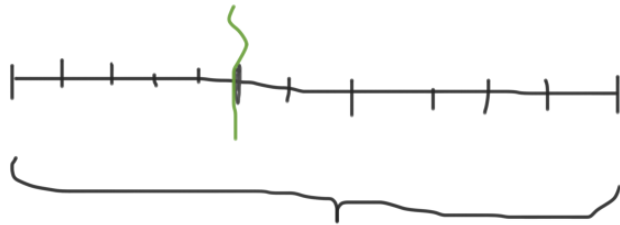
$$\sum_{i=0}^{n-1} \binom{n-1}{i} 1^{n-i} \cdot 1^i$$

$$= (1+1)^{n-1} = 2^{n-1}$$

$$\binom{4}{4} + \binom{4}{3} + \binom{4}{2} + \binom{4}{1} + \binom{4}{0}$$

$$(a+b)^n = \sum_{i=0}^n \binom{n}{i} a^{n-i} \cdot b^i$$

2nd 5)



$$n=5$$

$$w(0)=0$$

$$w(1)=1$$

$$\} = 1$$

$$w(2)=\max \{$$

$$; w(1)+w(1)\} = 3$$

$0 \quad 1 \quad 2 \quad 3 \quad 4 \quad 5$   
 $\text{Cena} : [0, 1, 3, 5, 8, \underline{1}]$   
 $\times$

$$w(3)=\max \{ \text{C}[3] + 1 + 9, \text{2} + 1, \text{3} + 0 \}$$

$$w(10) = w(4) + w(6)$$

$$W(n) = \begin{cases} 0 & n=0 \\ \max \left\{ \max_{0 \leq r < n} W(r) + W(n-r) ; \text{Cena}[n] \right\} \end{cases}$$

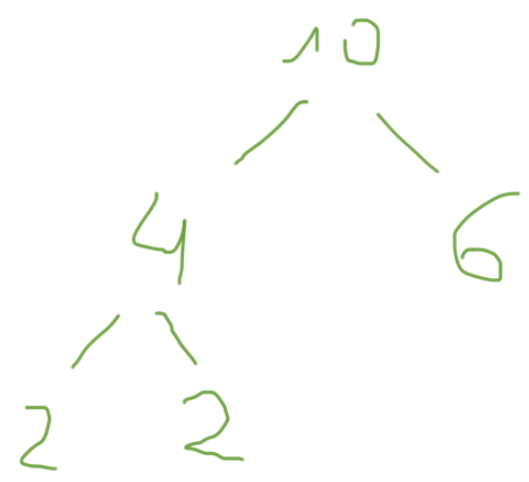
$$b) W(n) = \begin{cases} 0 & n=0 \\ \max \left\{ \max_{0 \leq r < n} W(r) + W(n-r) - c ; \text{Cena}[n] \right\} \end{cases}$$

2.11

$$[0, -1, -1, -1, 2, 2, -1, 1, 2, 3, 4]$$

$$n = 10$$

$$C[0, 1, 5, 8, 9, 10, 17, 17, 20, 24, 30]$$



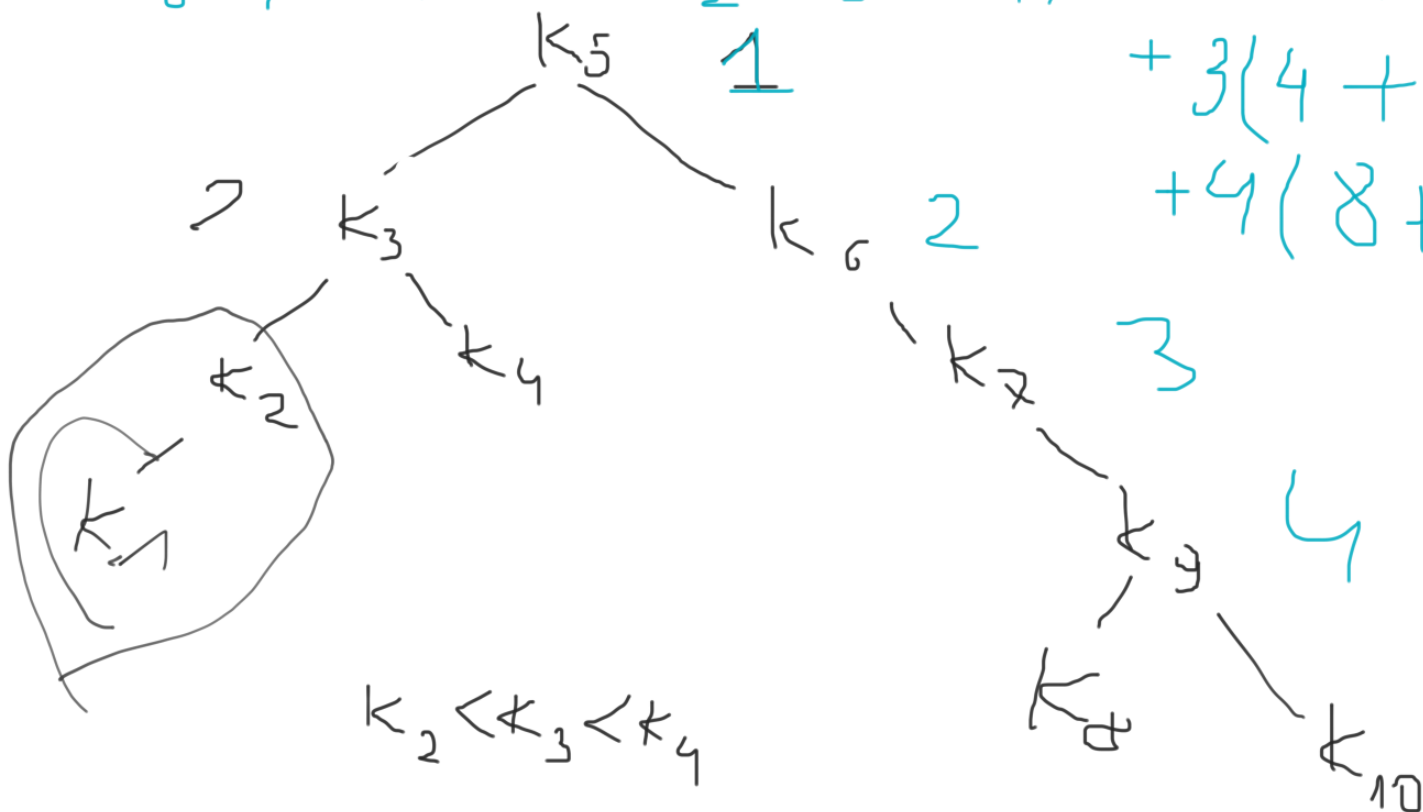
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$$k_1 < k_2 < \dots < k_n$$

$$n \text{ is } k \text{ lucy}$$

i/e

1	2	3	4	5	6	7	8	9	10
8	4	3	7	10	1	2	15	1	17



$$1 \cdot 10 + 2(3 + 1) + 3(4 + 7 + 2) + 4(8 + 1) + 5(15 + 17)$$

	1	2	3	4	5
1	8				
2	0	5			
3		0	3		
4			0	7	
5				0	10

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