20.11

A_1 5×10

A_2 10×2

A_3 2×12

A_4 12×5

A_5 5×50

A_6 50×6

$\#\text{mod}_{im} = m \cdot k \cdot n$

$100 \cdot 5 \cdot 2 \quad 100 \cdot 2 \cdot 10 = 2000$

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

$100 \cdot 2 \cdot 10 \quad 100 \cdot 10 \cdot 12 = 120000$

$A_1 (A_2 A_3) = 940$

10×12

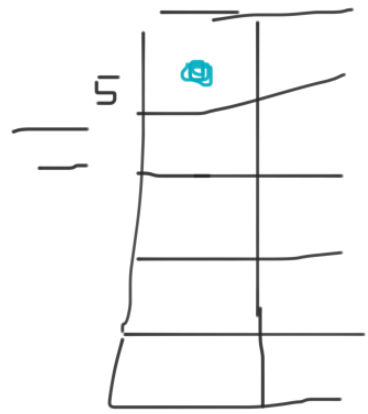
$A_{i..j} = A_i \cdot A_{i+1} \cdot \ldots \cdot A_j$

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

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

$m \quad 10 \quad k \quad 2 \quad A_{4..6} \quad 2$

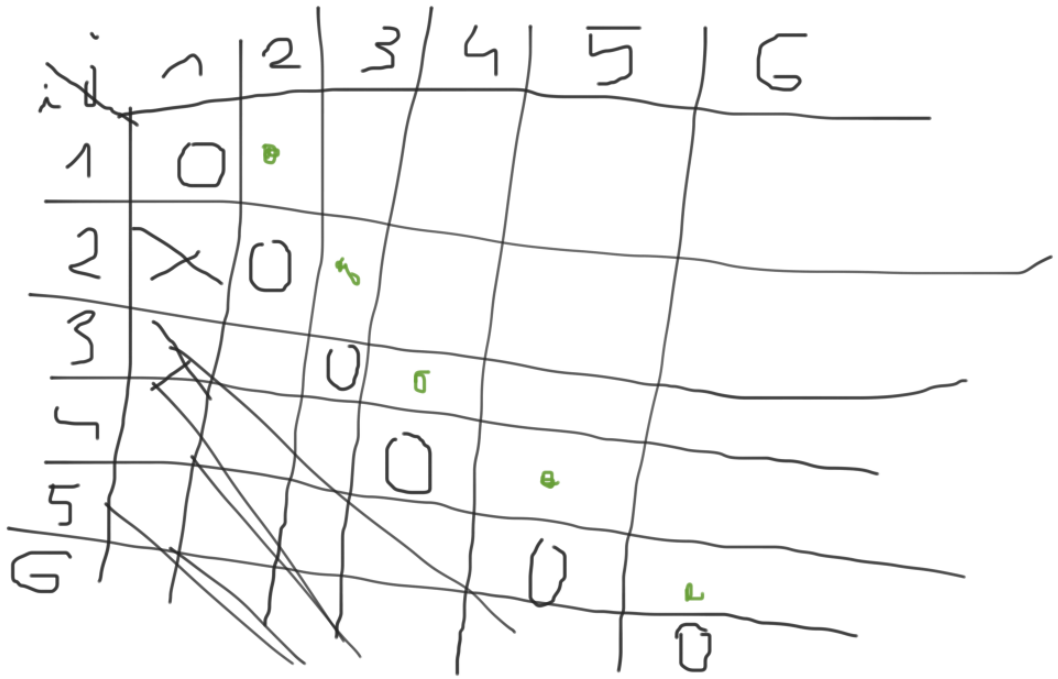
$5 \times 10 \times 6 = 5$



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

$A_1 A_2 A_3 A_4$

$k \rightarrow$ $f(A_{i..k}) + f(A_{k+1..j}) + p_{i-1} p_k p_j$



$A_2(A_3 A_4)$

$(A_2 A_3)A_4$

1	5 × 10
2	10 × 2
3	2 × 19
4	19 × 5
5	5 × 50
6	50 × 6

	1	2	3	4	5	6
1	0	100	240	270	1990	1380
2		0	210	220	1690	1340
3			0	190	690	1220
4				0	3000	1860
5					0	1500
6						0

	1	2	3	4	5	6
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

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

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

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

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

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

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

3/

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

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

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

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

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

$$= n(n-1)\,\frac{3n - n - 1}{3} = \boxed{n(n-1)\,\frac{2n-1}{3}} \qquad \boxed{O(n^3)}$$

n

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

1
1 1
1 2 1
1 3 3 1
1 4 6 4 1

2 · 2 · 2 · 2

5

4

n

n-1

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

1 + 4 + 6 + 4 + 1

$$(a+b)^n = \binom{n}{0}a^n + \binom{n}{1}a^{n-1}b^1 + \binom{n}{2}a^{n-2}b^2 + \binom{n}{3}b^3$$

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

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

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

Zad 5.

0 1 2 3 4 5

cena : [0, 1, 3, 5, 8, 1]

n = 5

w(0) = 0

w(1) = max { } = 1

w(2) = max { ; w(1)+w(1) } = 2

w(3) = max [1+1, 2+1, 3+0]

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

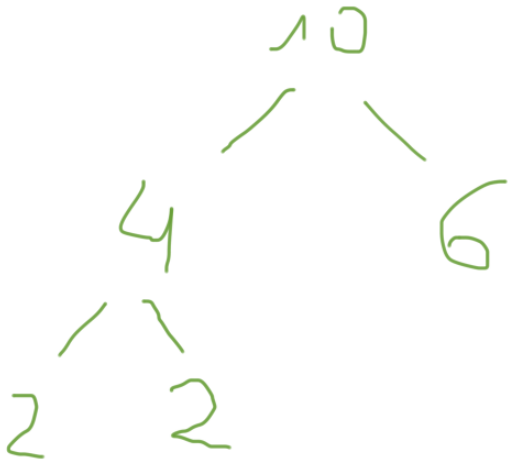
$$W(n) = \begin{cases} 0 & n = 0 \\ \max\left\{ \max_{0<r<n} W(r) + W(n-r) \; ; \; cena[n] \right\} \end{cases}$$

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

2.a) [0, -1, -1, -1, 2, 2, -1, 1, 2, 3, 4]

n = 10

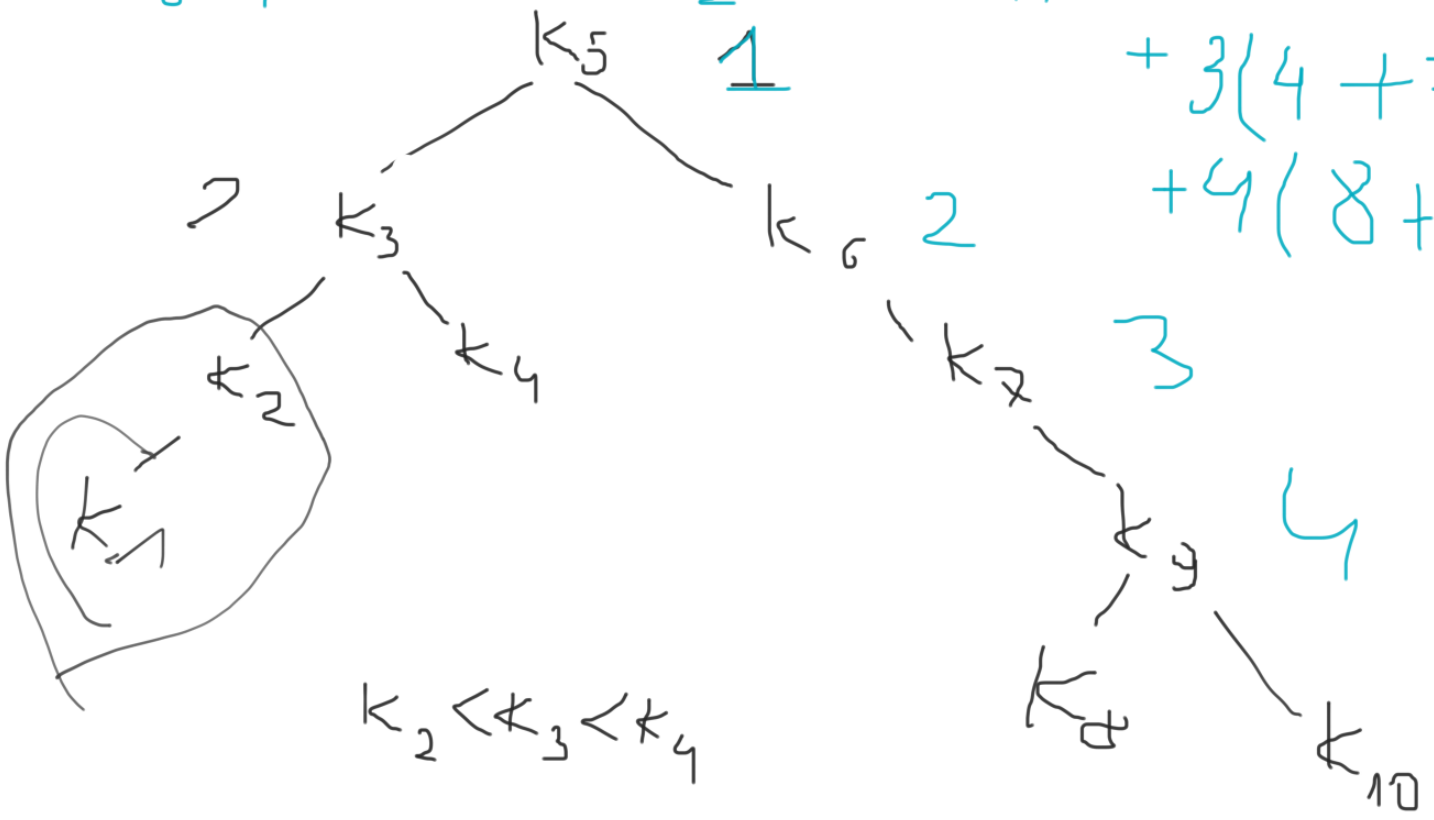
[0, 1, 5, 8, 9, 10, 17, 17, 20, 24, 30]



7.

$k_1 < k_2 < \dots < k_n$ — n kluczy

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



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