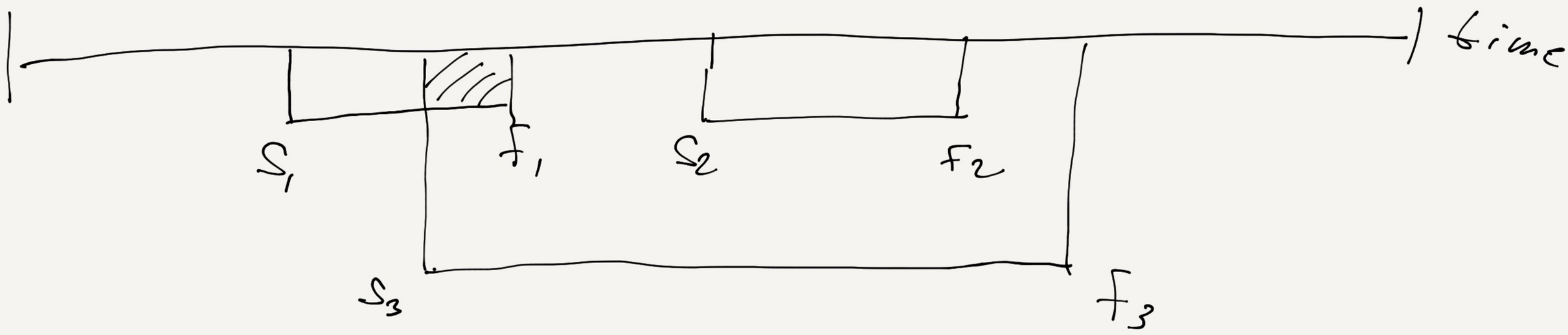
Кормен, гл. 16



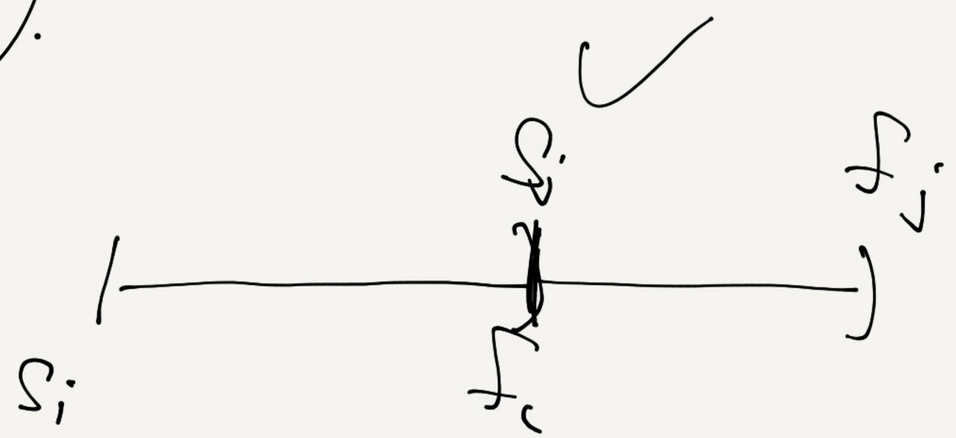
$S_3 F_3$

$S_1 F_1$, $S_2 F_2$

$[s_i ; f_i)$

S_i , F_i $\quad S_j ; F_j$

$f_i = S_j$



$$0 = f_0 \le f_1 \le f_2 \le f_3 \dots \le f_n < s_{n+1} = +\infty$$

$$a_0 \quad a_1 \quad a_2 \quad a_3 \qquad a_n \quad a_{n+1}$$

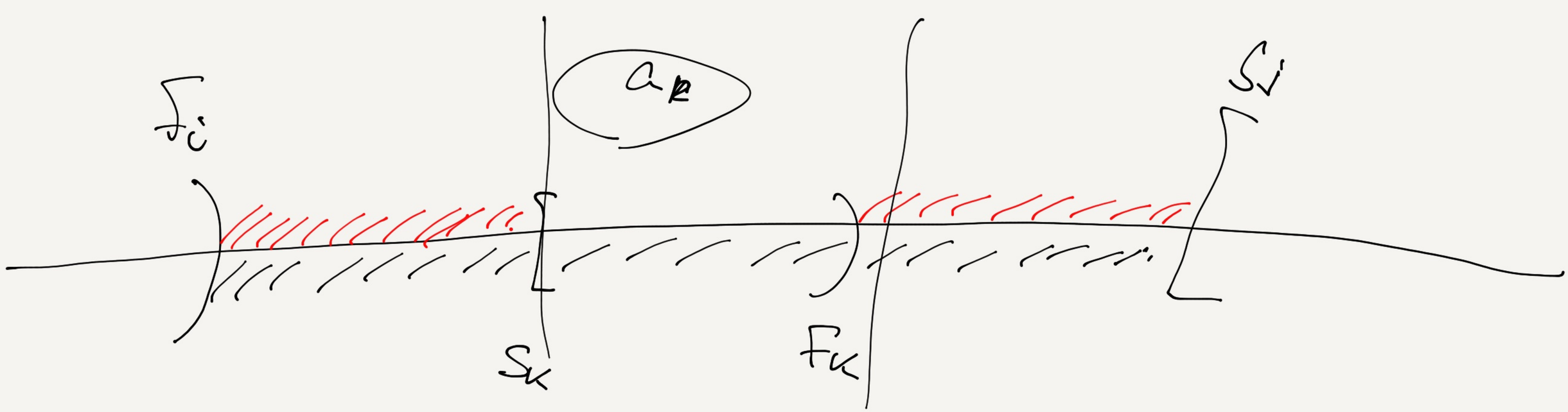
$$\{a_i\} : \quad s_i \ge f_0 \qquad\qquad S_{i,j}$$

$$f_i < s_{n+1}$$

$$S_{0,n+1} = \{ a_i : s_i \ge f_0, \; f_i < s_{n+1}, \;$$

$$\forall a_i, a_j \in S_{0,n+1} : \{ s_j \ge f_i \;\; s_i \ge f_j \} \}$$

$$S_{0,n+1} \to \max$$



$S_{i,j} \ni a_k$

$S_{i,j} \to S_{i,k} + S_{k,j} + 1$

a_k

$S_{i,j} = \{a_{k_1}, a_{k_2}, \ldots, a_{k_t}\}$.

$+ \max_{p=1} (S_{i,k_p} + S_{k_p,j} + 1)$

S_{12} S_{13}

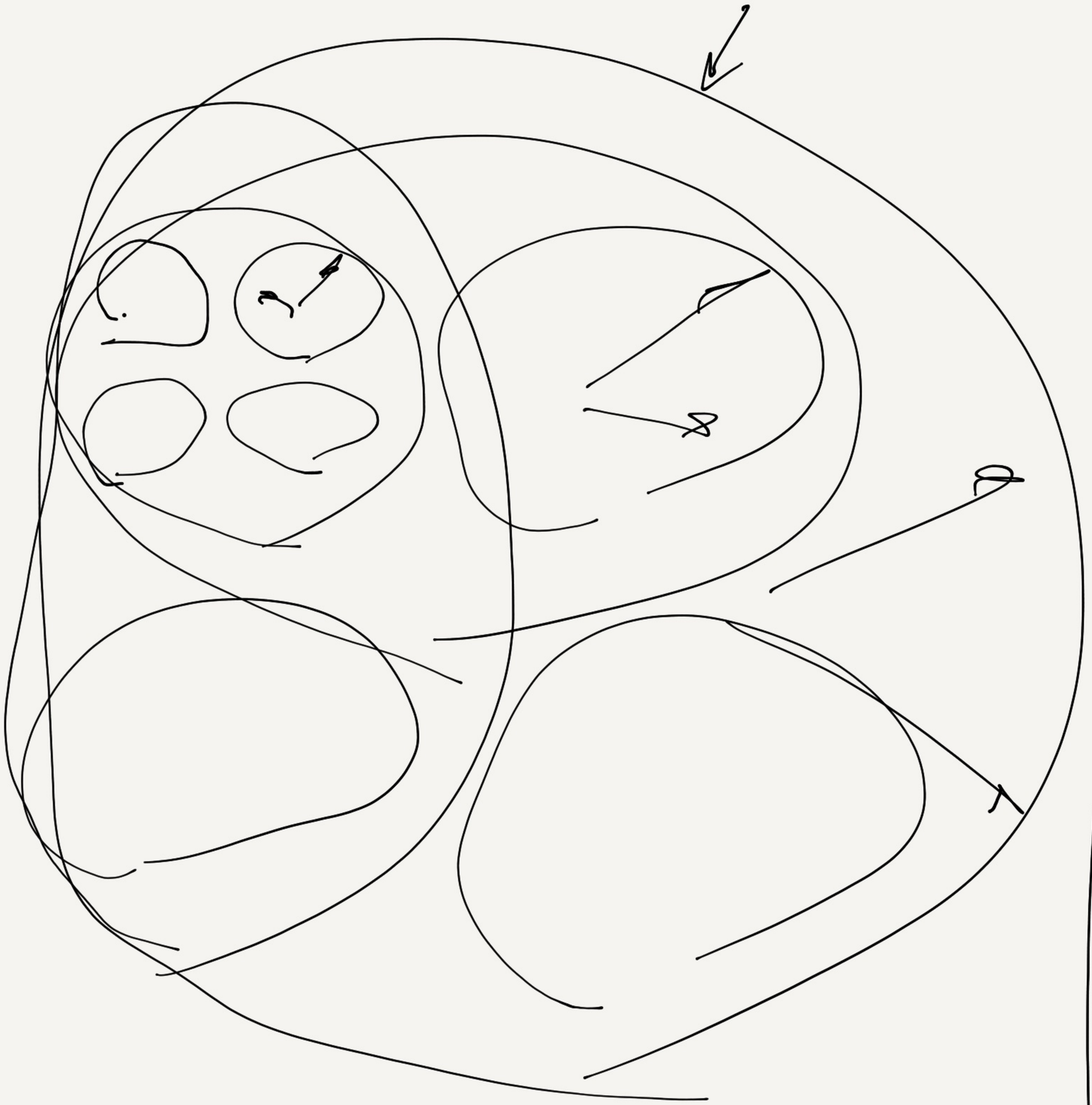
S_{23} S_{24}

S_{34} $\Rightarrow$ S_{35} $\Rightarrow$

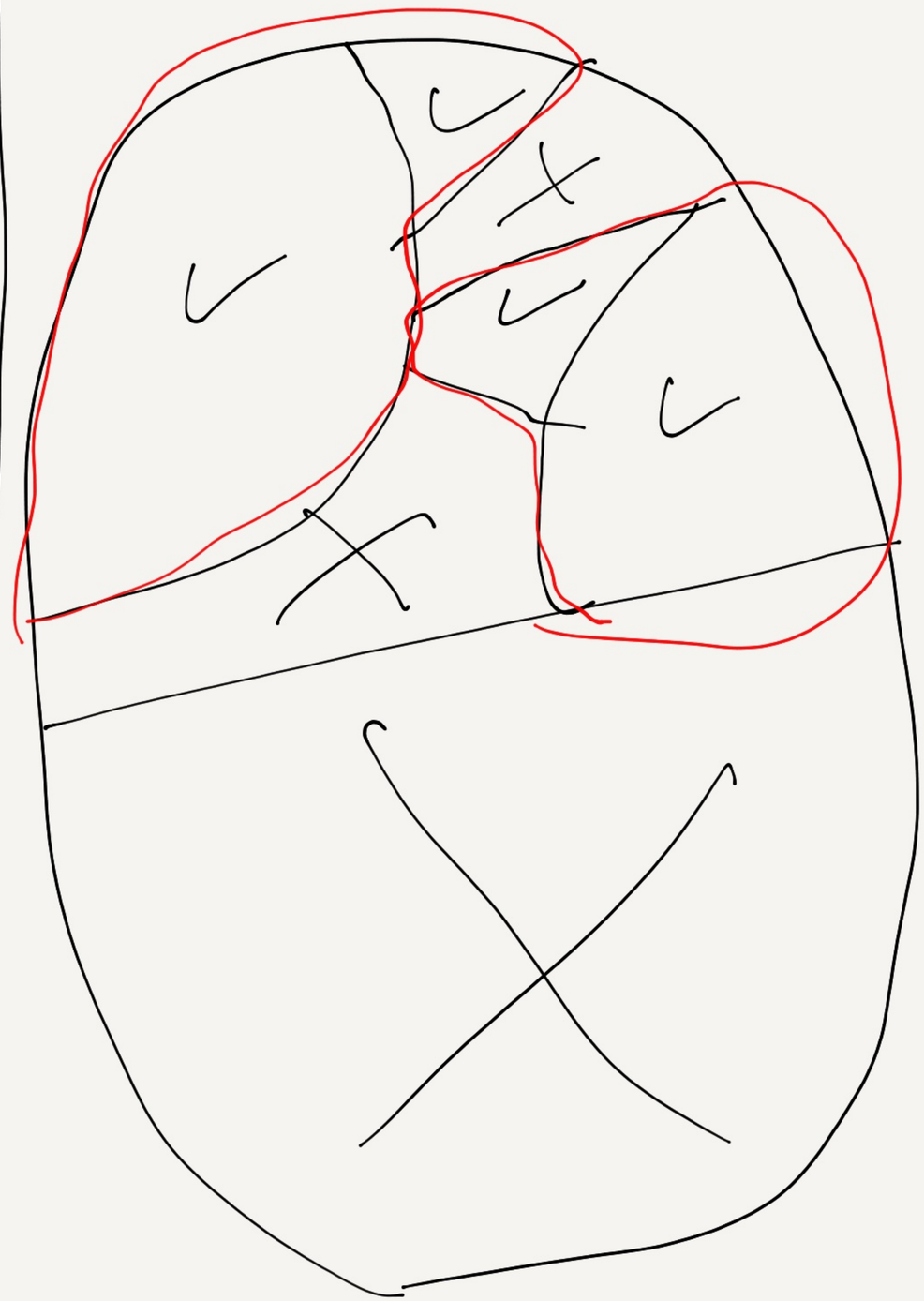
$\ldots$ $\vdots$

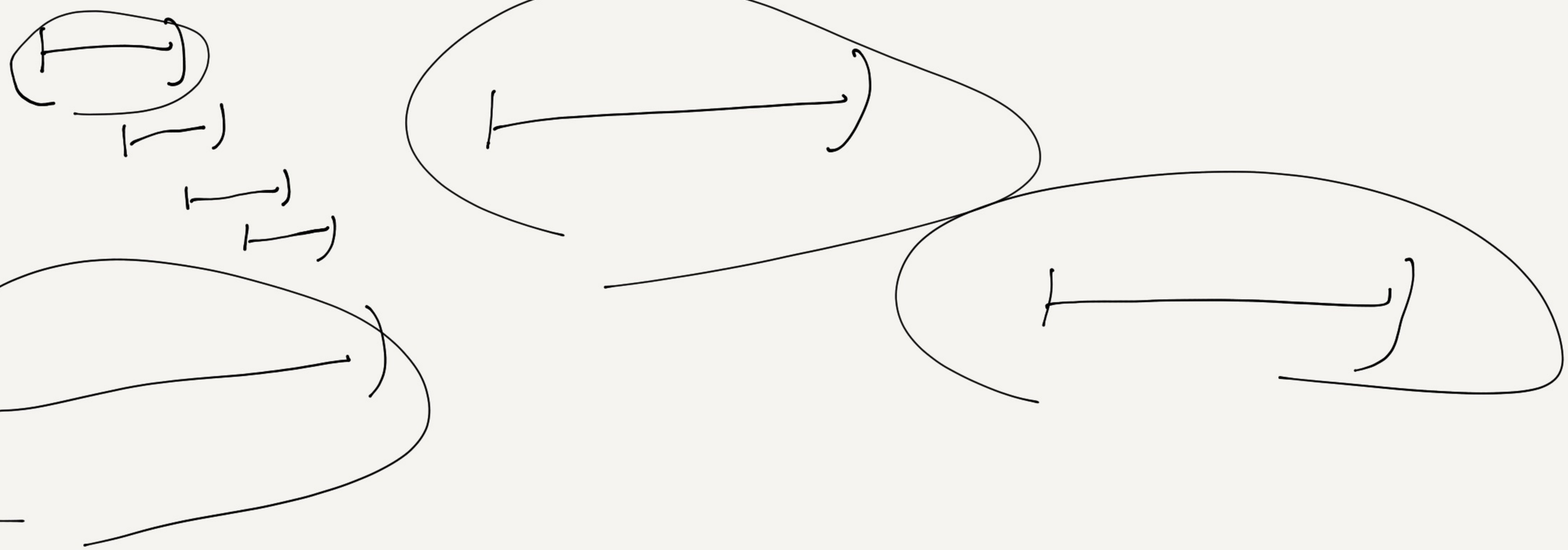
$S_{n-1,n}$

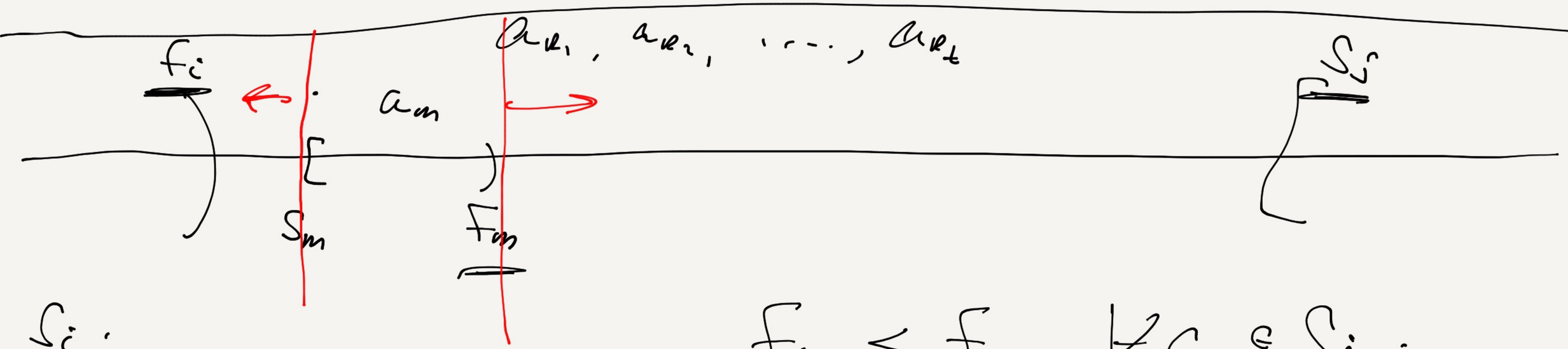
ДП



ЖА





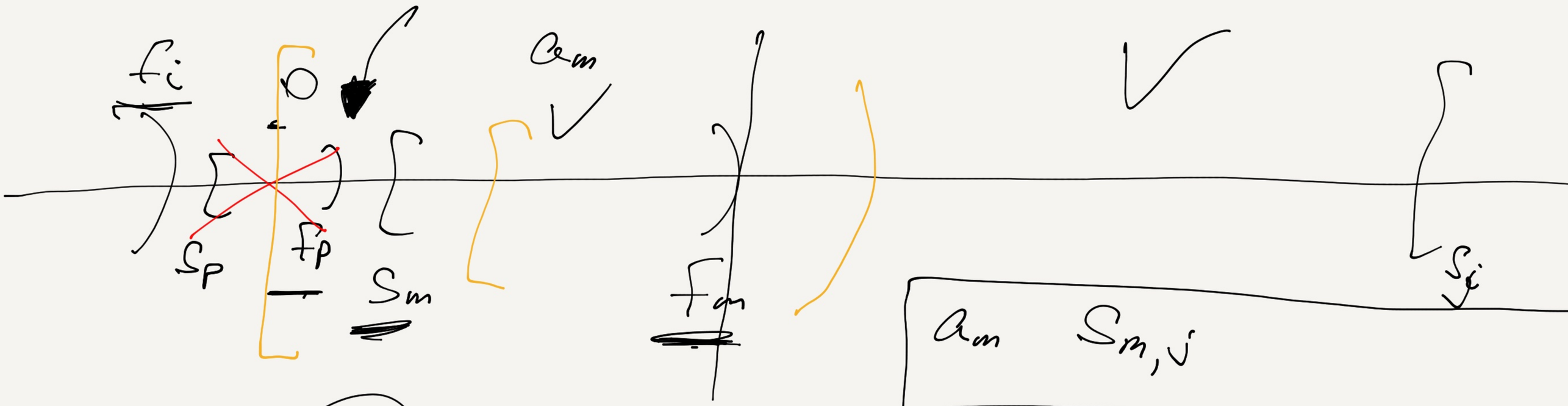


$S_{i,j}$

$$f_m < f_k, \quad \forall a_k \in S_{i,j}$$

a_m

$S_{i,m} + S_{m,j} + 1$



$f_p \leftarrow f_m$

$f_p \leq S_p < f_m$ $\quad S_{i,m} = 0.$

$S_{m,j}$

$a_m \quad S_{m,j}$

$S_{i,j} \rightarrow \{a_{k_1}, a_{k_2}, \dots, a_{k_t}\}$

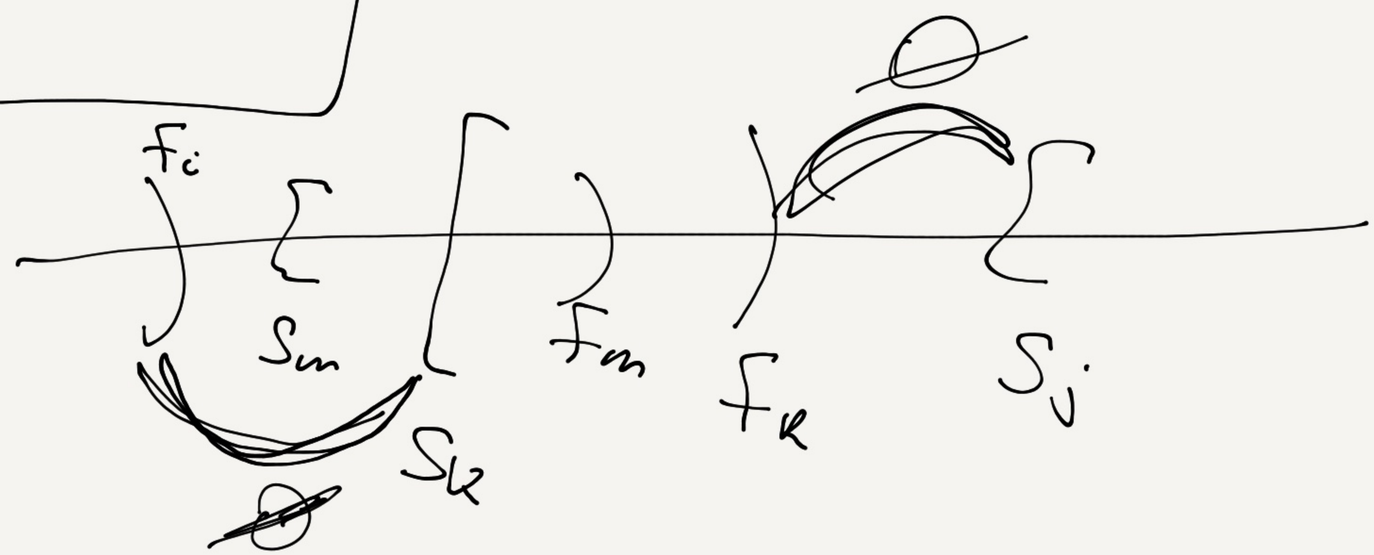
$\downarrow$ max

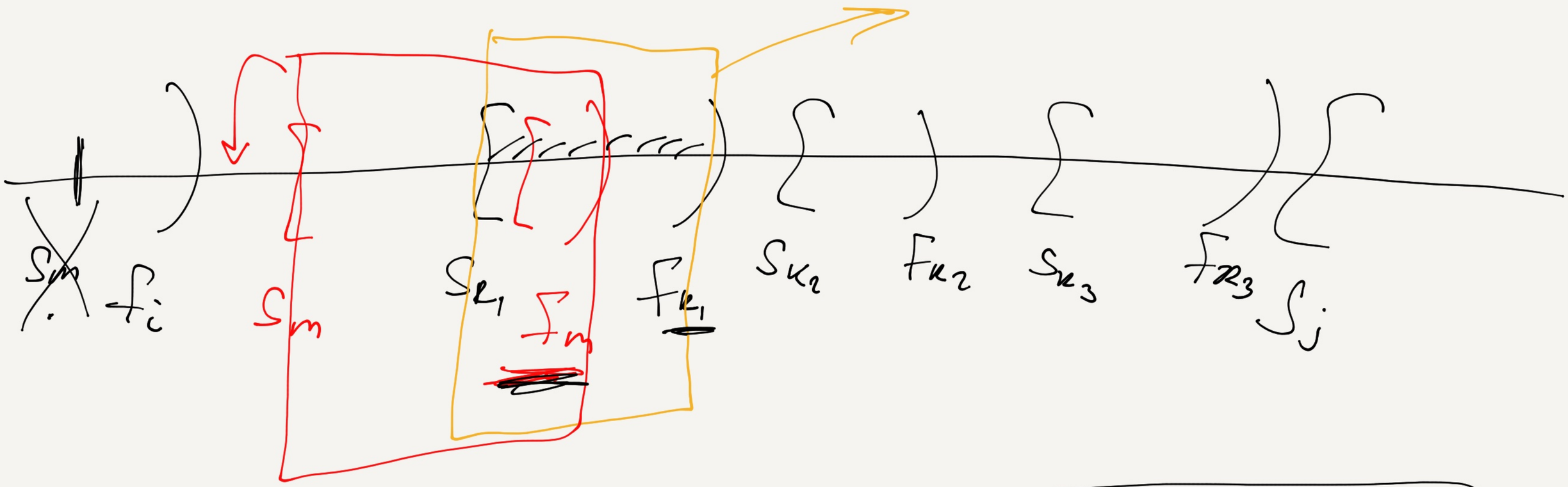
$a_m \in S_{i,j}$

1) $a_m \in S_{i,j}$ $\quad S_{m,j}$

2) $a_m \notin S_{i,j}$

$(S_{i,j} \setminus a_e) \cup a_m$ $\quad f_m < f_k$





$$S_{ij} = \{ a_{k_1}, a_{k_2}, a_{k_3} \} \rightarrow \{ a_m, a_{k_2}, a_{k_3} \}$$

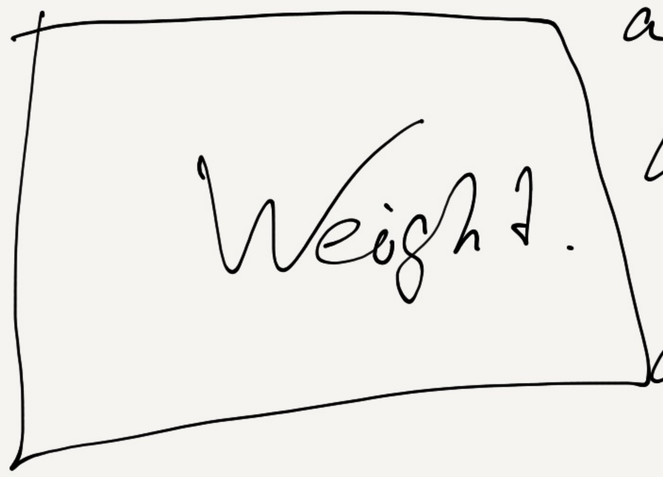
$$|S_{ij}| = 3.$$

S:	1	2	1	4	3	4	7	6	10
F:	10	3	5	6	9	5	10	8	12

S	2	1	4	4	6	3	1	7	10
F	3	5	5	6	8	9	10	10	12

1 2 3 4 5 6 7 8 9 10 12

4



$$S = \{a_{k_1}, a_{k_2}, \dots, a_{k_t}\}.$$

$$\sum_{i=1}^{t} w_i \le Weight$$

$$\sum_{i=1}^{t} S_i \to max$$

0-1

a_1 $10+60=30$

a_2 $60+100=160$

a_3 $20+30=70$

a_1 : S_1 w_1 $100+120=220$

0, 1, 2, ..., w_1-1, w_1

a_1 : $S_1 = 60$, $w_1 = 10$

a_2 : $S_2 = 100$, $w_2 = 20$

a_3 : $S_3 = 120$, $w_3 = 30$.

$W = 50$.

$50 = 10 + 20 + 20$

$240 = 60 + 100 + 80$

a_1 : $c_1 = \frac{S_1}{w_1} = 6$

a_2 : $c_2 = 5$

a_3 : $c_3 = 4$.

$a_1, a_2, \ldots, a_n$

$S_{k,W}$

$w_1 + w_2 + \ldots + w_n$

$S_{k,W}$

$a_1, a_2, \ldots, a_k.$

$S_{k,w}$ $O\left(\sum_{i=1}^{n} i \cdot w_i \cdot W\right)$ $O(n \log n)$

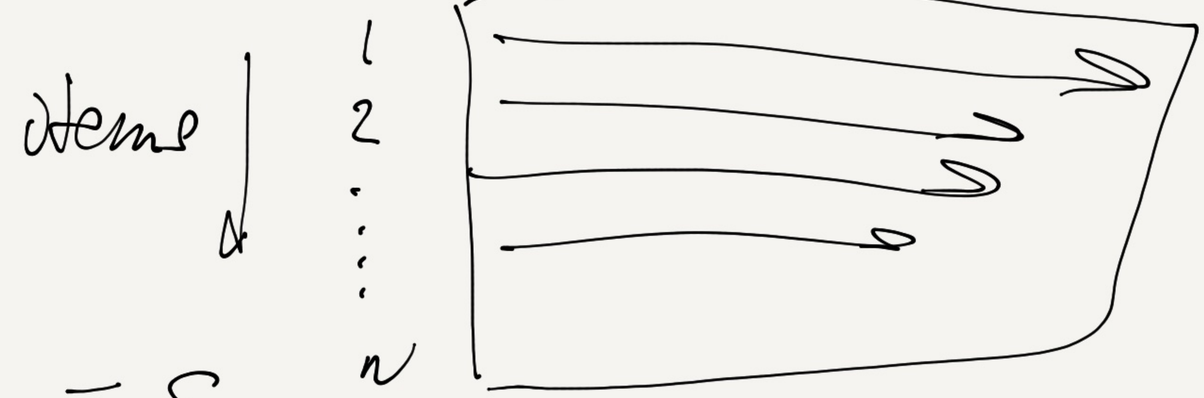
$w_1 \leq W$

$S_{k,w}$ $O(k \cdot w)$ W

0 1 2 . . . . . W

$S_{1\ldots k,w}$

w_1 W



- $w_1 \geq W \longrightarrow S_{1\ldots k,W} = S_{2\ldots k,W}$
- $w_1 \leq W \hookrightarrow S_{1\ldots k,W} = \max(S_1 + S_{2\ldots k,W-w_1}, S_{2\ldots k,W})$

$a_1 : S_1, w_1$ a_{11} c_1 1 a_{1W_1} c_1 1

a_{12} c_1 1

S_1/w_1

Код Хаффмана.

АБРАКАДАБРА

А	000
Б	001
Р	010
К	011
Д	100

А Б . . . .

000 001 100 000 011 000 010 000 001 100 000

33 бита

101

А Б Р А К

0 100 111 0 110 0 001 0 100 111 0

23 бита

А	0
Б	100
Р	101
К	110
Д	111

Б

А	0
Б	01

01

А

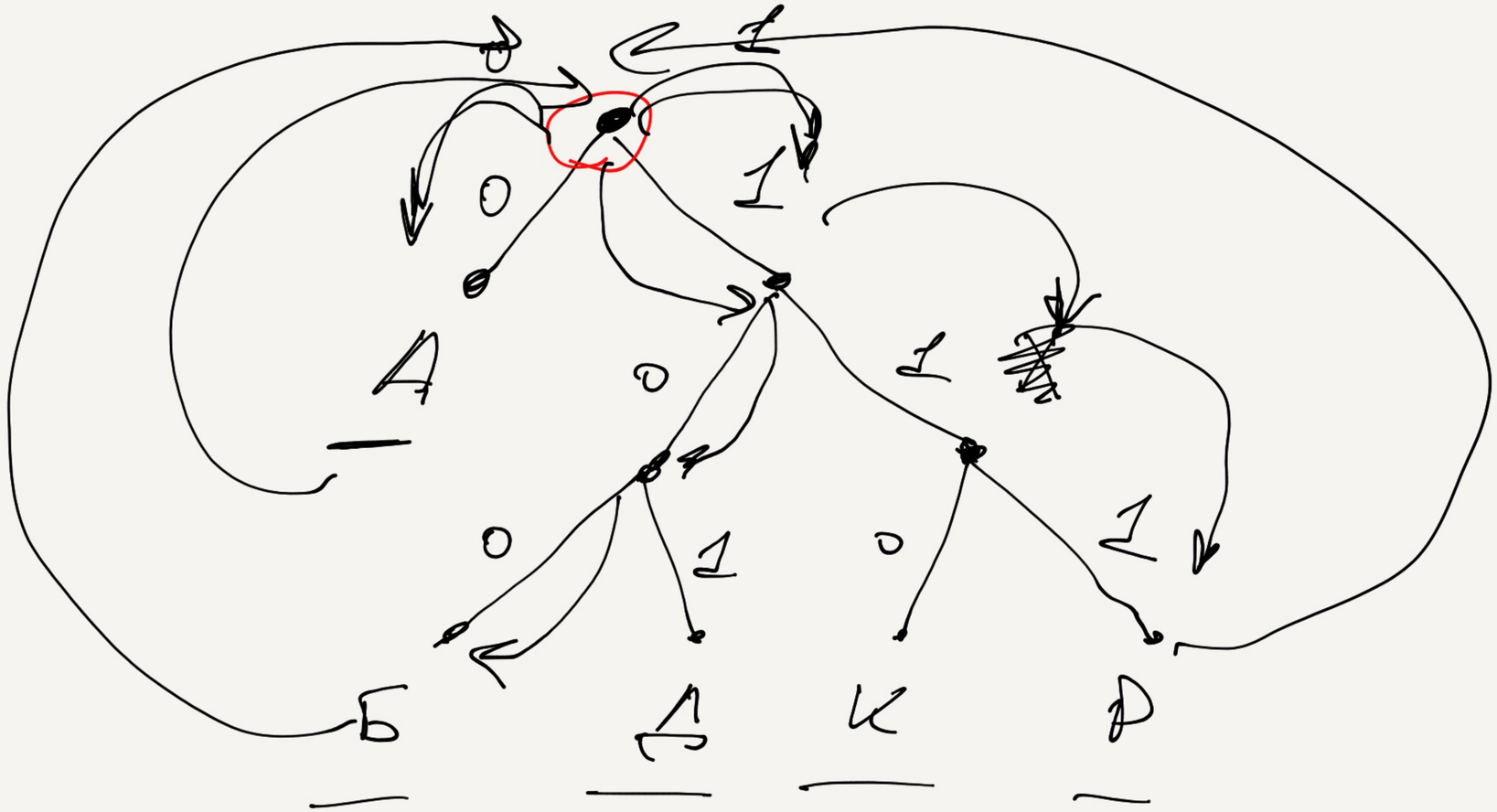
А - 0

Б - 100

Д - 101

К - 110

Р - 111



0 100 111 0

А Б Р

АБРАКАДАБРА

А – 5

Б – 2

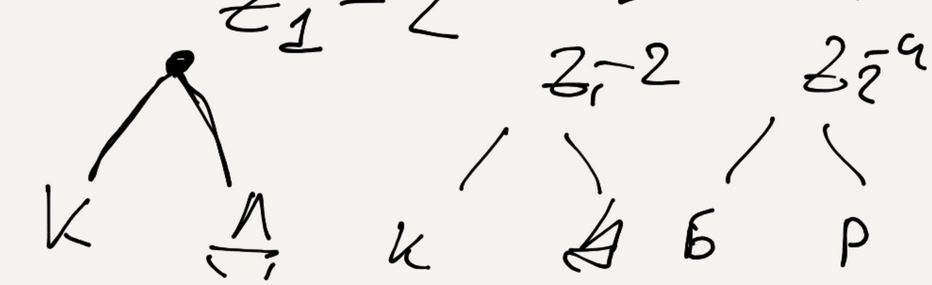
Р – 2

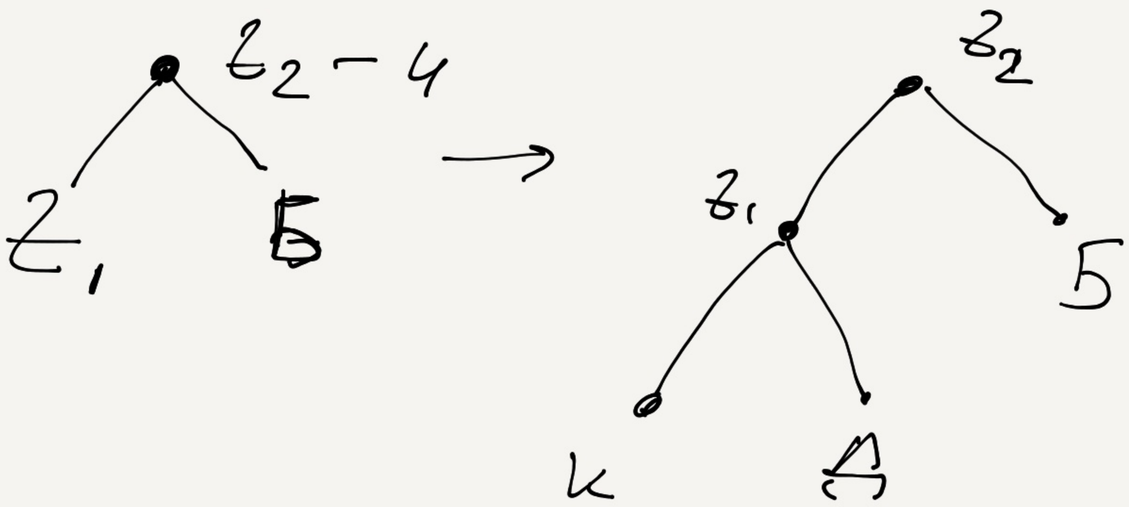
К – 1

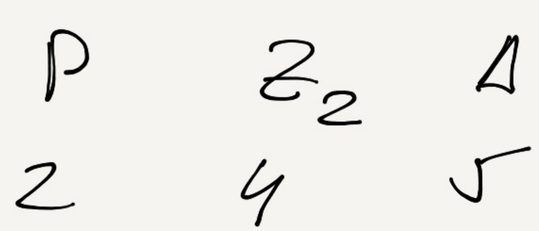
Д – 1

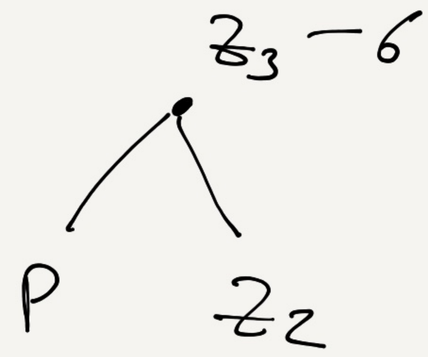
К	Д	Б	Р	А
1	1	2	2	5

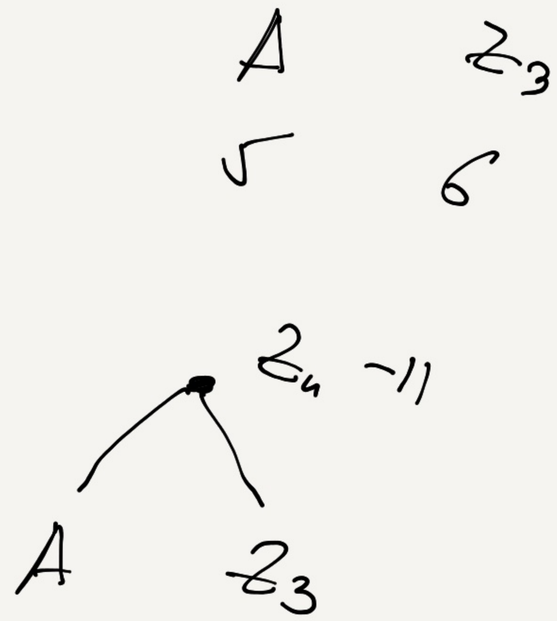
Z_1	Б	Р	А	Z_4
2	2	2	5	11

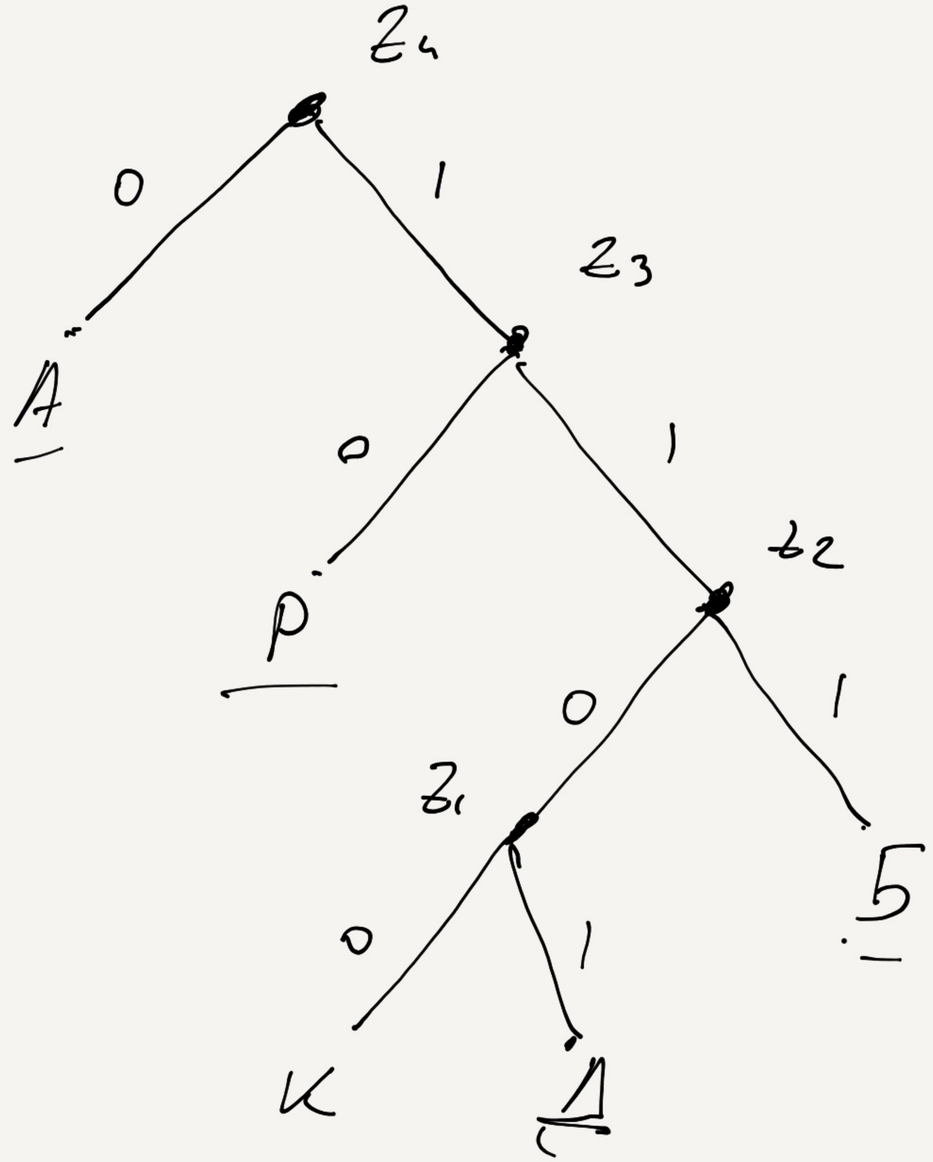












A - 0

Р - 10

Б - 111

К - 1100

Д - 1101

$|\Sigma'| - 4$

$\Omega(n \log n)$

АБРА

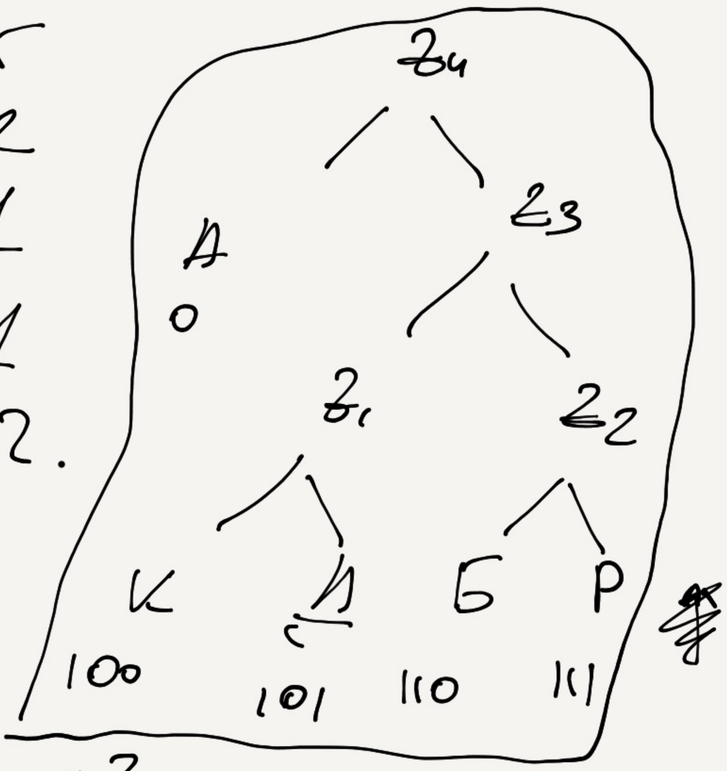
АБРАКАДАБРА

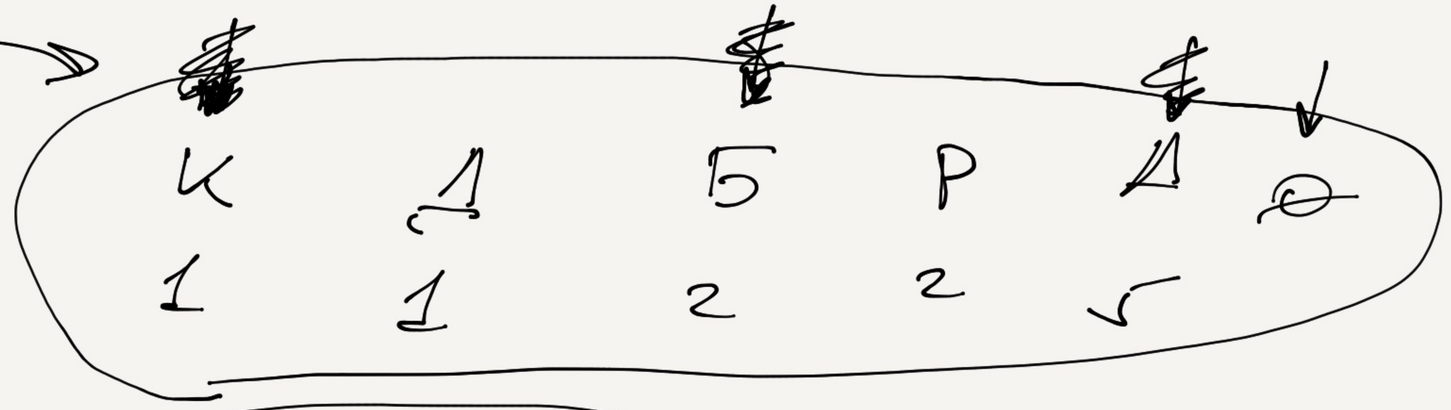
0'111'10'0'1100 110 10 111 00

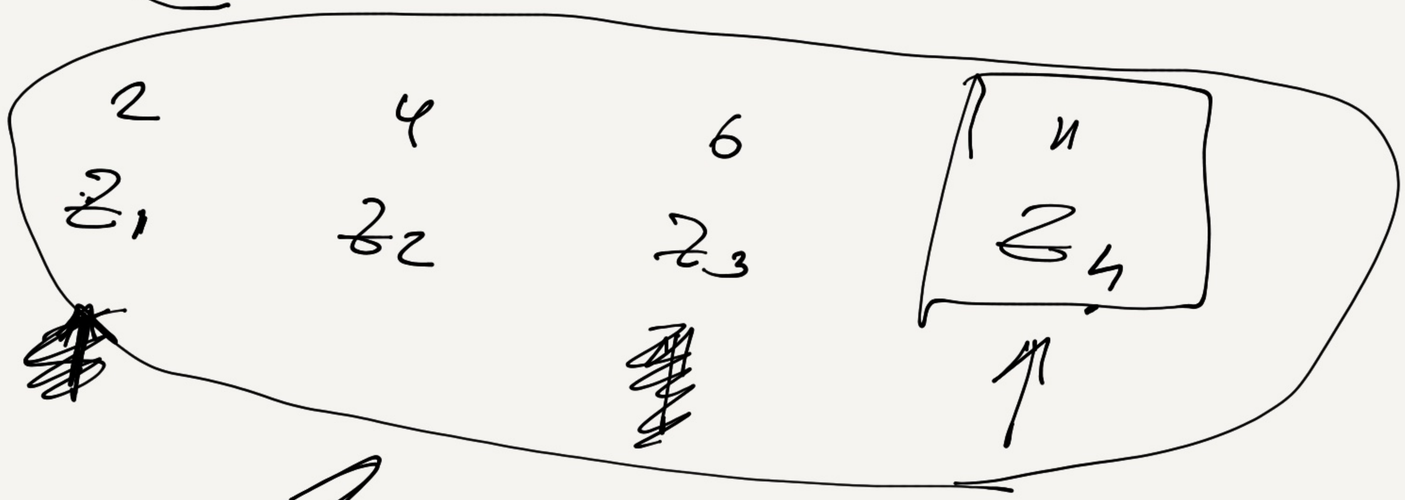
23 бита

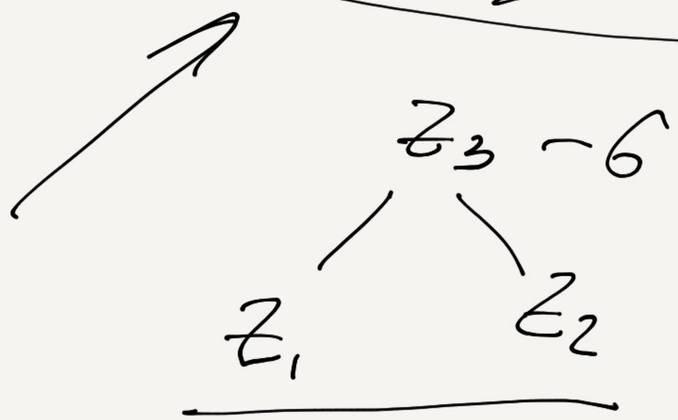
АБРАКАДАБРА

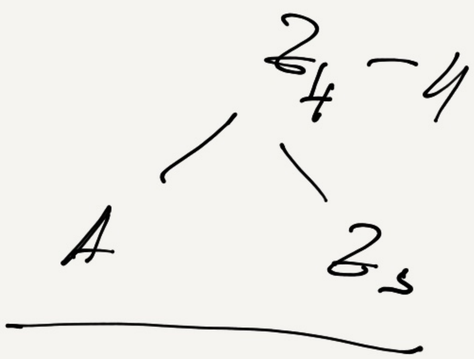
А - 5
Б - 2
К - 1
Л - 1
Д - 1
Р - 2.











Б, Р - 4

Б, z1 - 4.

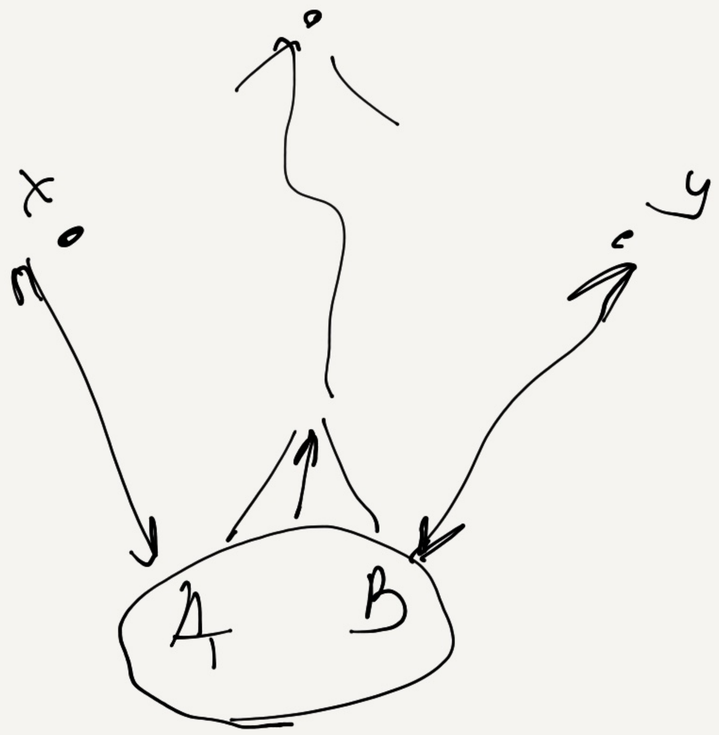
А, z1 - 2

z1, z2 - 6

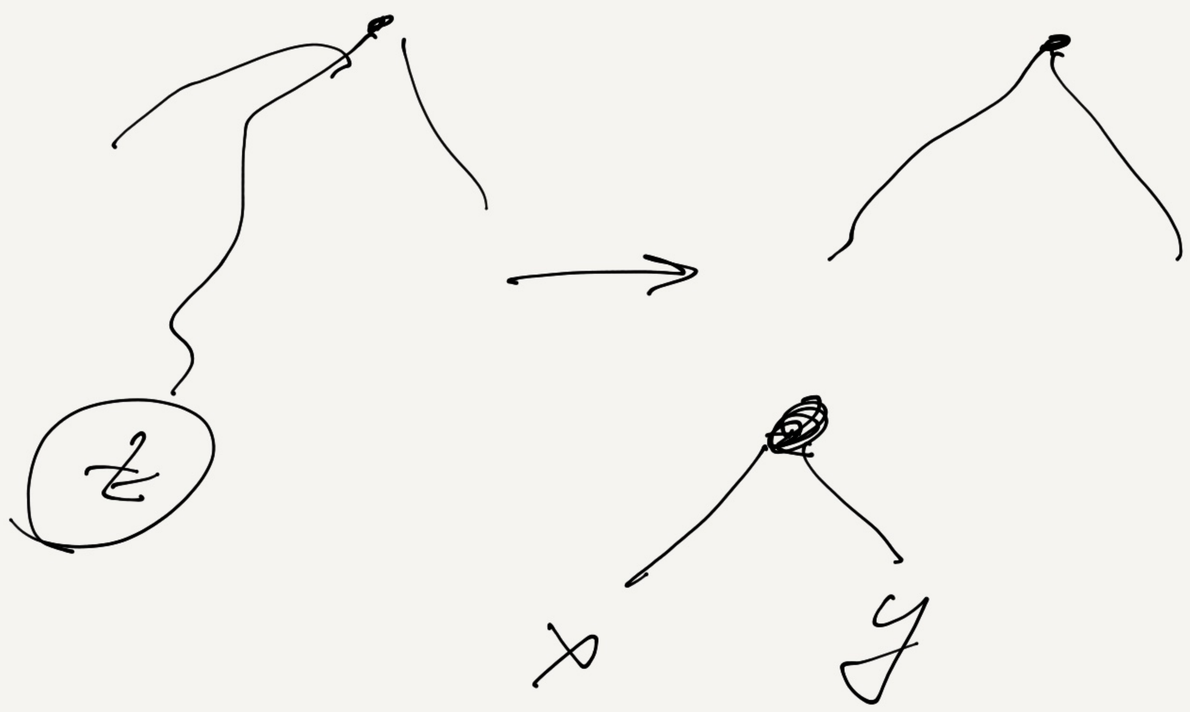
n + n - 1

2n - 1.

x, y



$(Z \setminus \{x, y\}) \cup z$



LCS (Longest Common Subsequence).

A B C B A

C B C A

B A

B C A

C B A

$|T_1| = N$

$|T_2| = M$

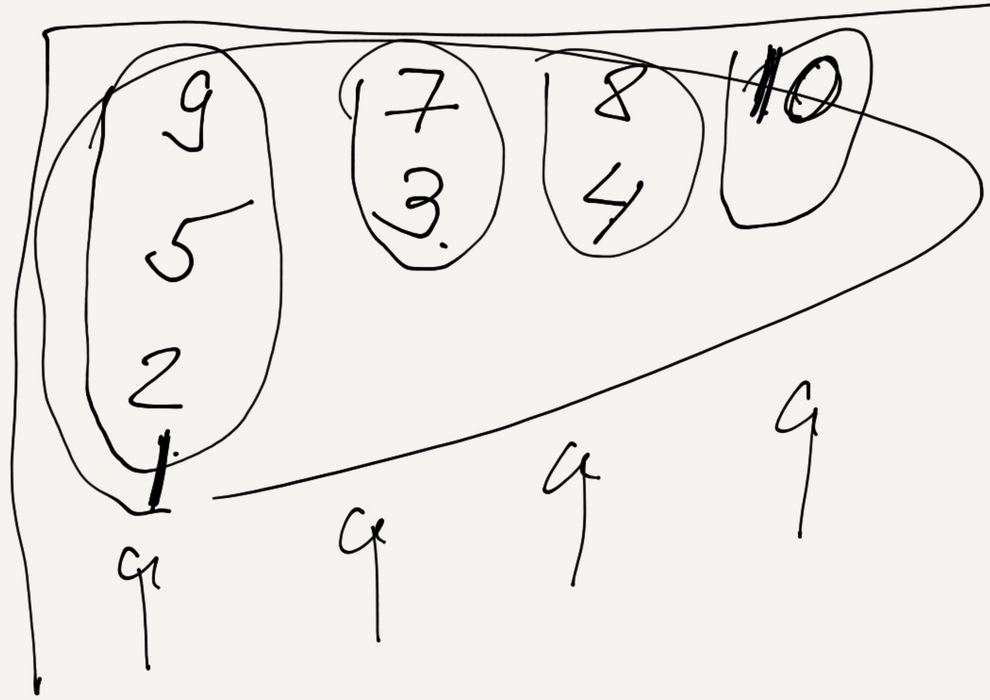
$O(N \cdot M)$

Тасфина, гл. 12.5.

9 5 7 2 8 10 3 1 4

9 10

5 7 8 10



9 5 7 2 8 10 3 1 4

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

O(n2)

9 7 8 10

5 3 4

1

2

1

5 7 8 10

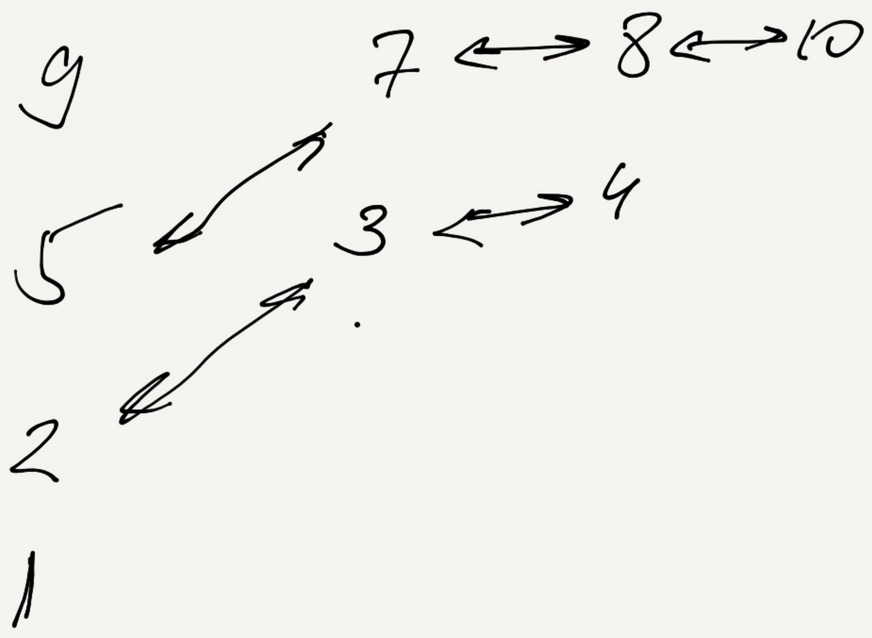
9 8 7 6 5 7 2 8 10 3 1 4 5

2 3 4 5

O(n log n)

9 5 7 2 8 10 3 1 4

$O(n \log n)$



$T_1 =$ A B C B A

0 1 2 3 4

$T_2 =$ C B C A X A

2 3 1 2 4 0

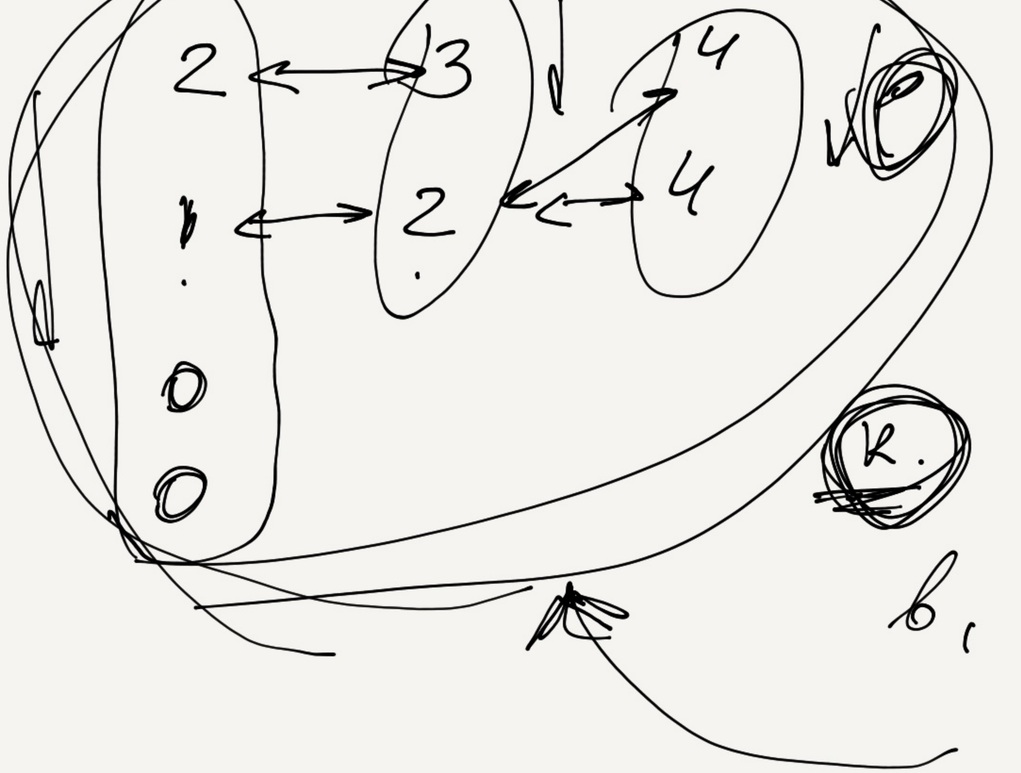
A : 4, 0

B : 3, 1

C : 2

$O(R_c \log R)$

$O(M \cdot N \log MN)$



B C A

1 2 4

$a_1 < a_2 < \dots < a_K.$

$b_1 \quad b_2 \quad \dots \quad b_N.$

$A_1 : a_k^1, a_{k-1}^1, \ldots a_1^1$

$A_2 : a_m^2, a_{m-1}^2, \ldots, a_1^2$

$A_n : a_p^n, a_{q-1}^p, \ldots) a_1^p$

$T_1 = 0 \ldots \ldots n-1$

$0 \quad 1 \quad \ldots$

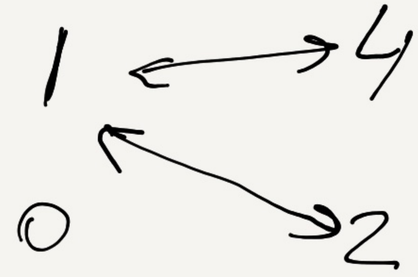
$A_2 \longrightarrow \{a_m^2, a_{m-1}^2, \ldots, a_1^2\}$

< 1

$\ldots\ldots [a_m^2 \; a_{m-1}^2, \ldots, a_1^2]$

$\geq$

$\overline{1}\ 4\ \overline{2}\ 0$



1 2 3 4

$T_1 = A\ \overline{C}\ \overline{A}\ \overline{B}$

0 1 2 3

$T_2 = X\ \overline{C}\ \overline{B}\ \overline{A}$

1 3 2 0

1 4

1 2

3 1

A : 2, 0

B : 3 4

C : 1. 2

1 3

1 2

CB

CA

2 4 3 1

2 3 CA

2 4 CB.