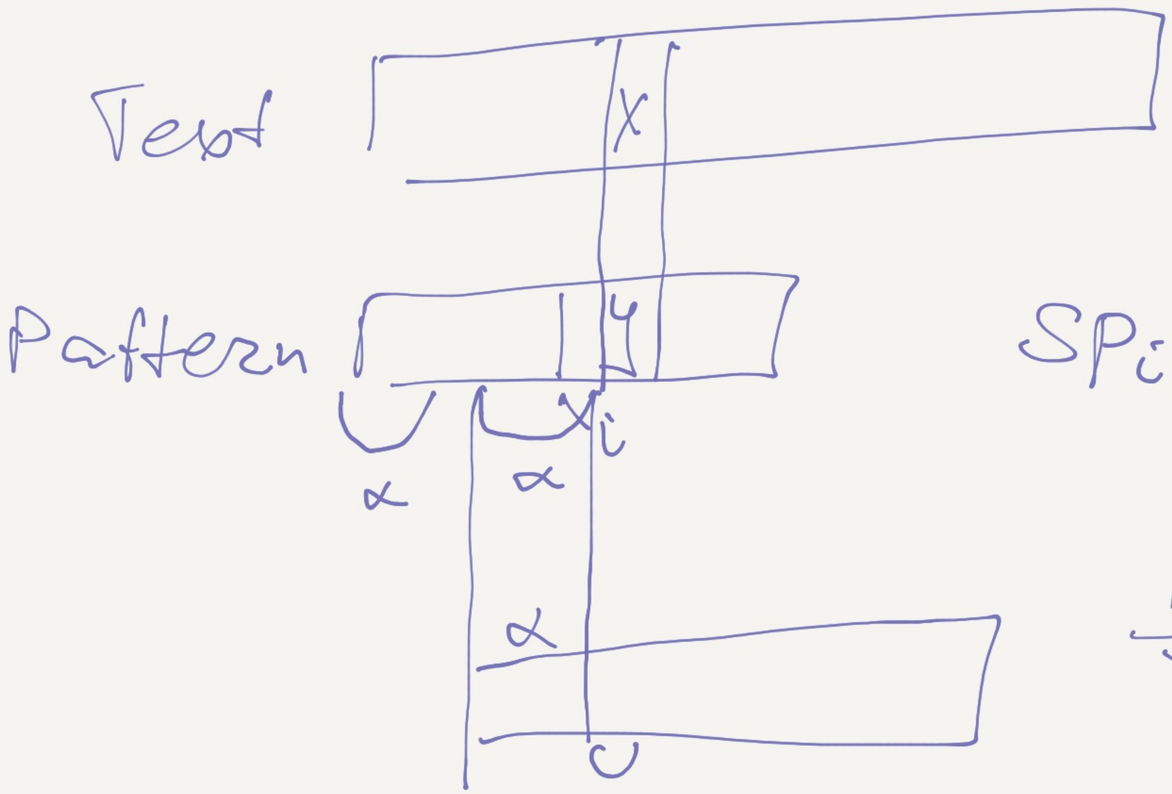
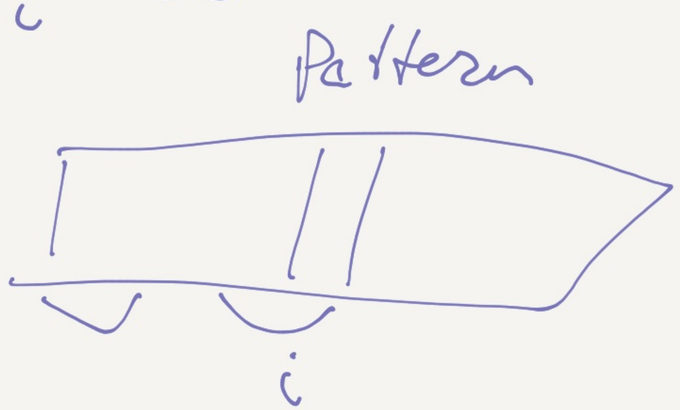
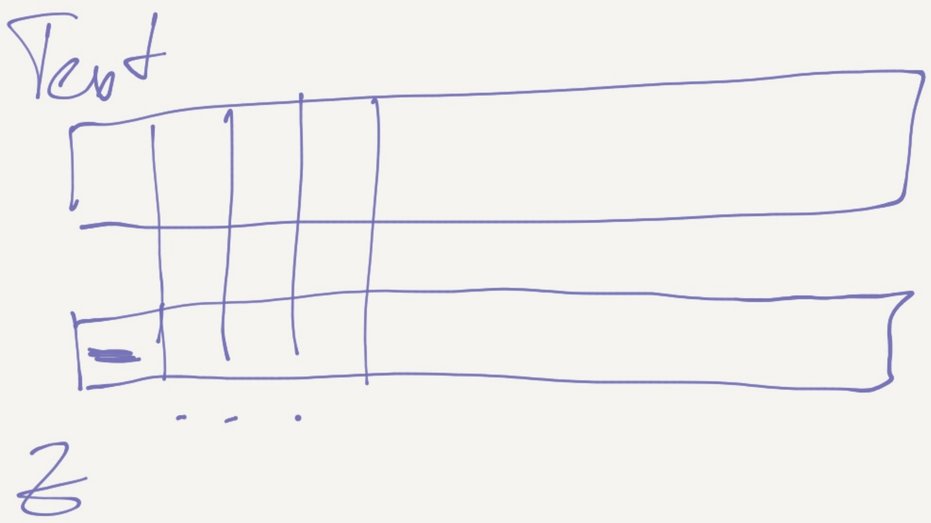
КМП

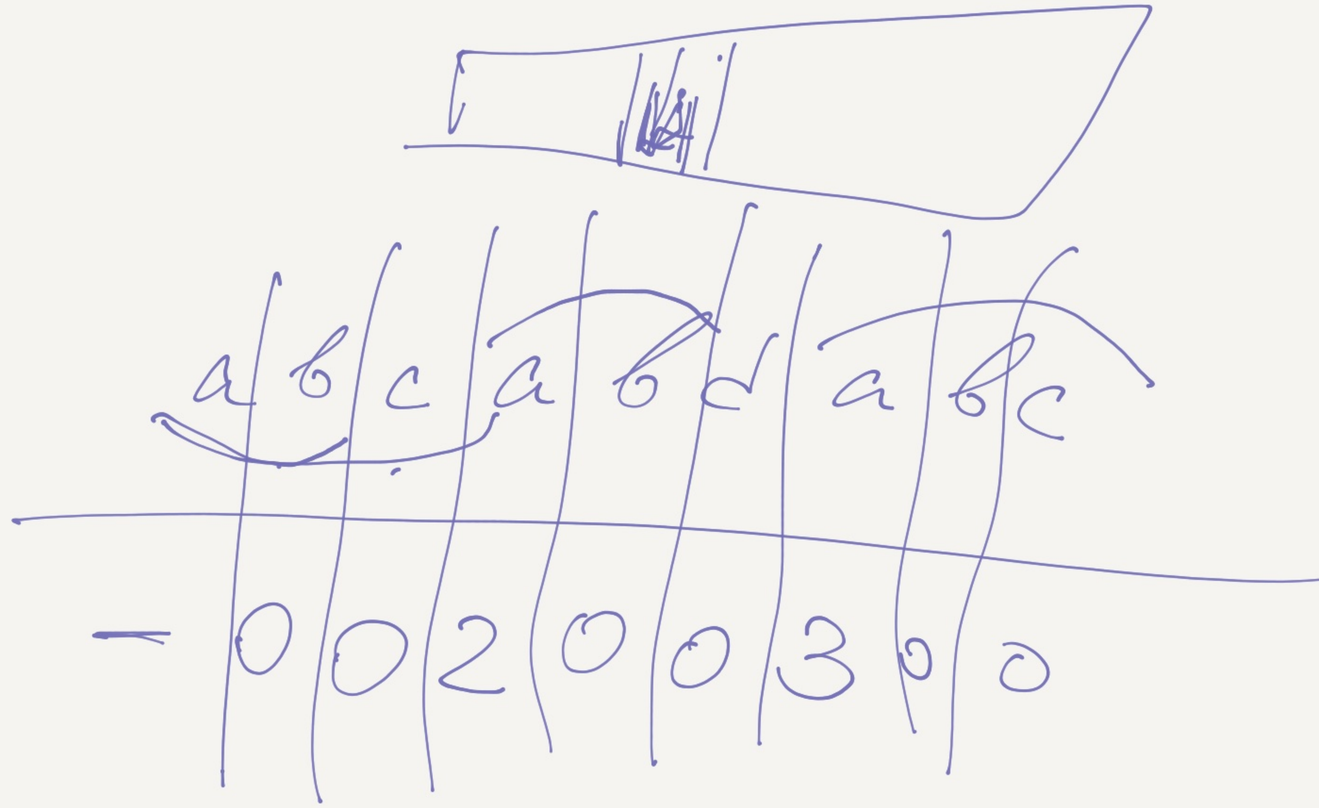
Z - ф-я

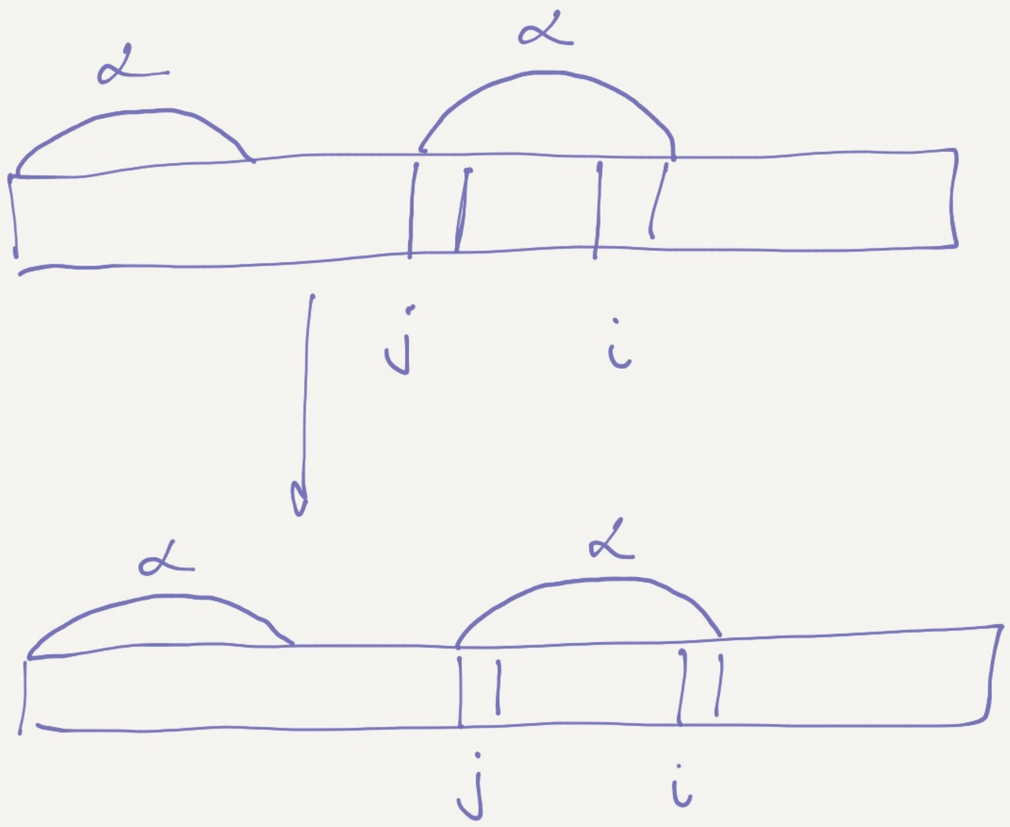


$SP_i = \alpha$





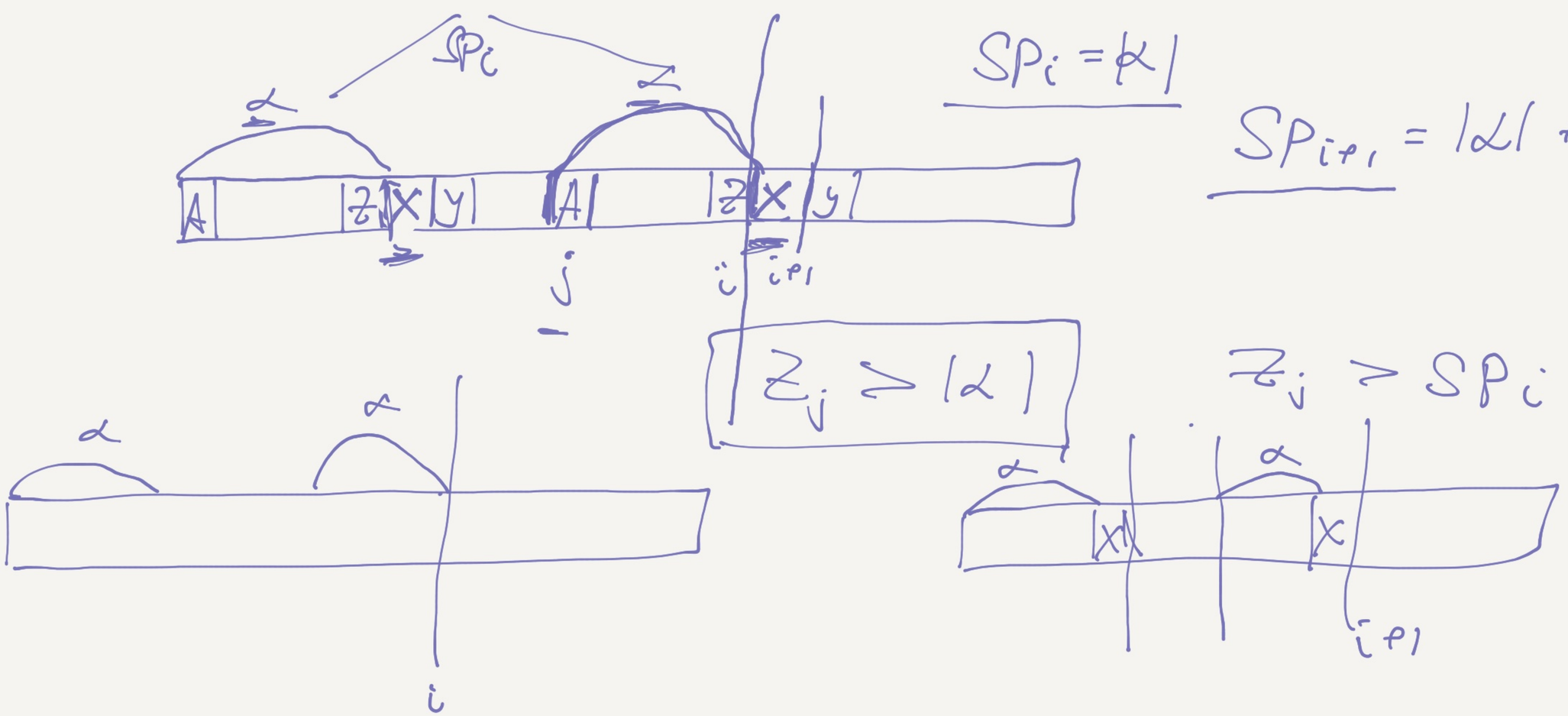




$SP_i = |\alpha|$

$Z_j = |\alpha|$

$Z_j \geq SP_i$



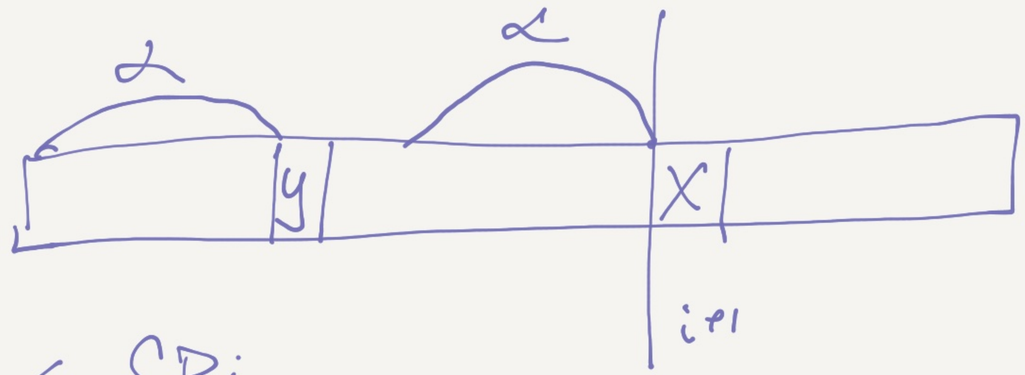
$SP_i = |\alpha|$

$SP_{i+1} = |\alpha| + 1$

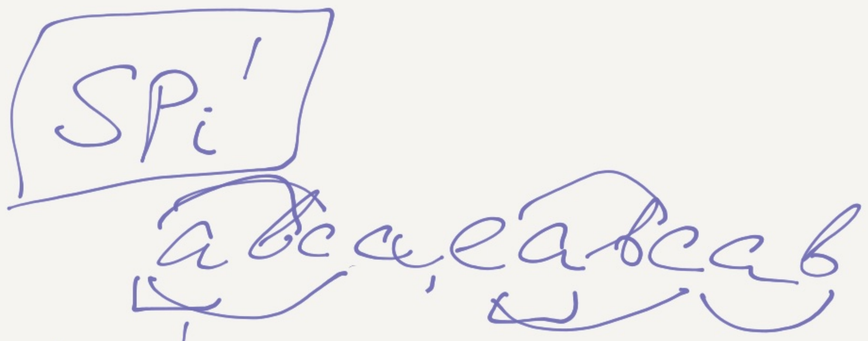
$Z_j \geq |\alpha|$

$Z_j > SP_i$

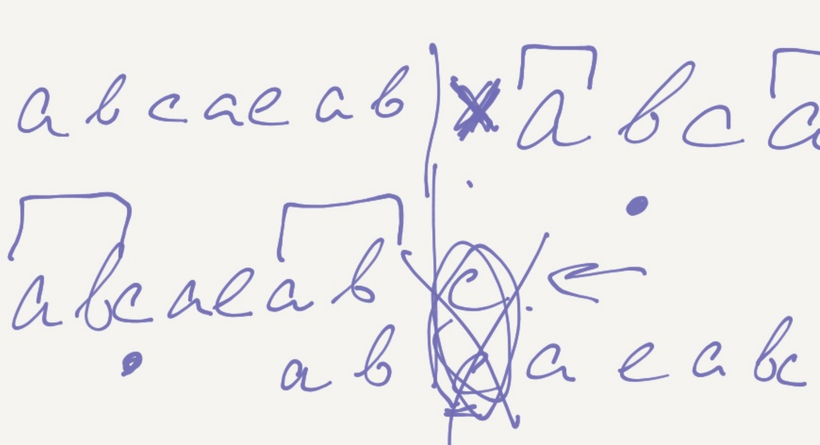
T

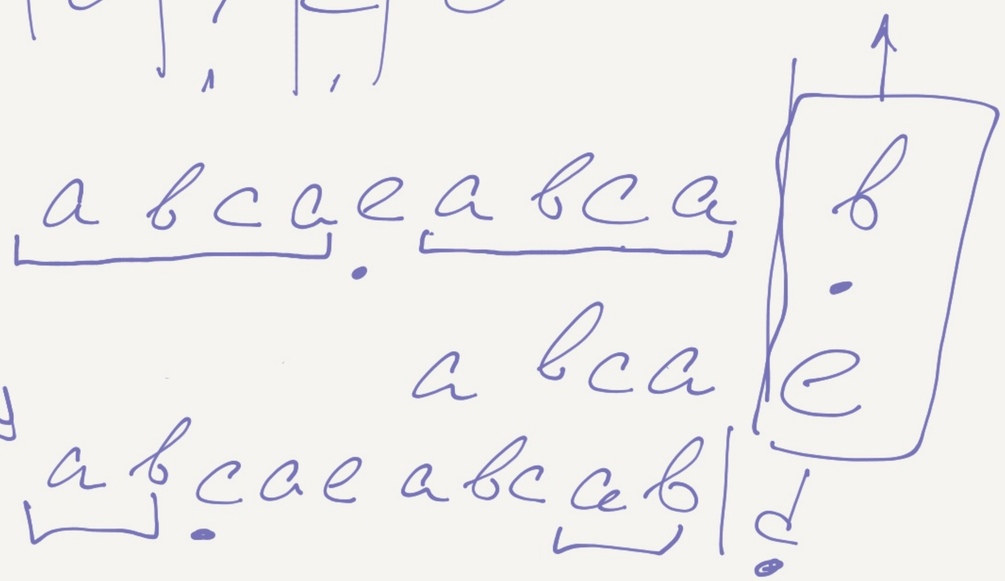


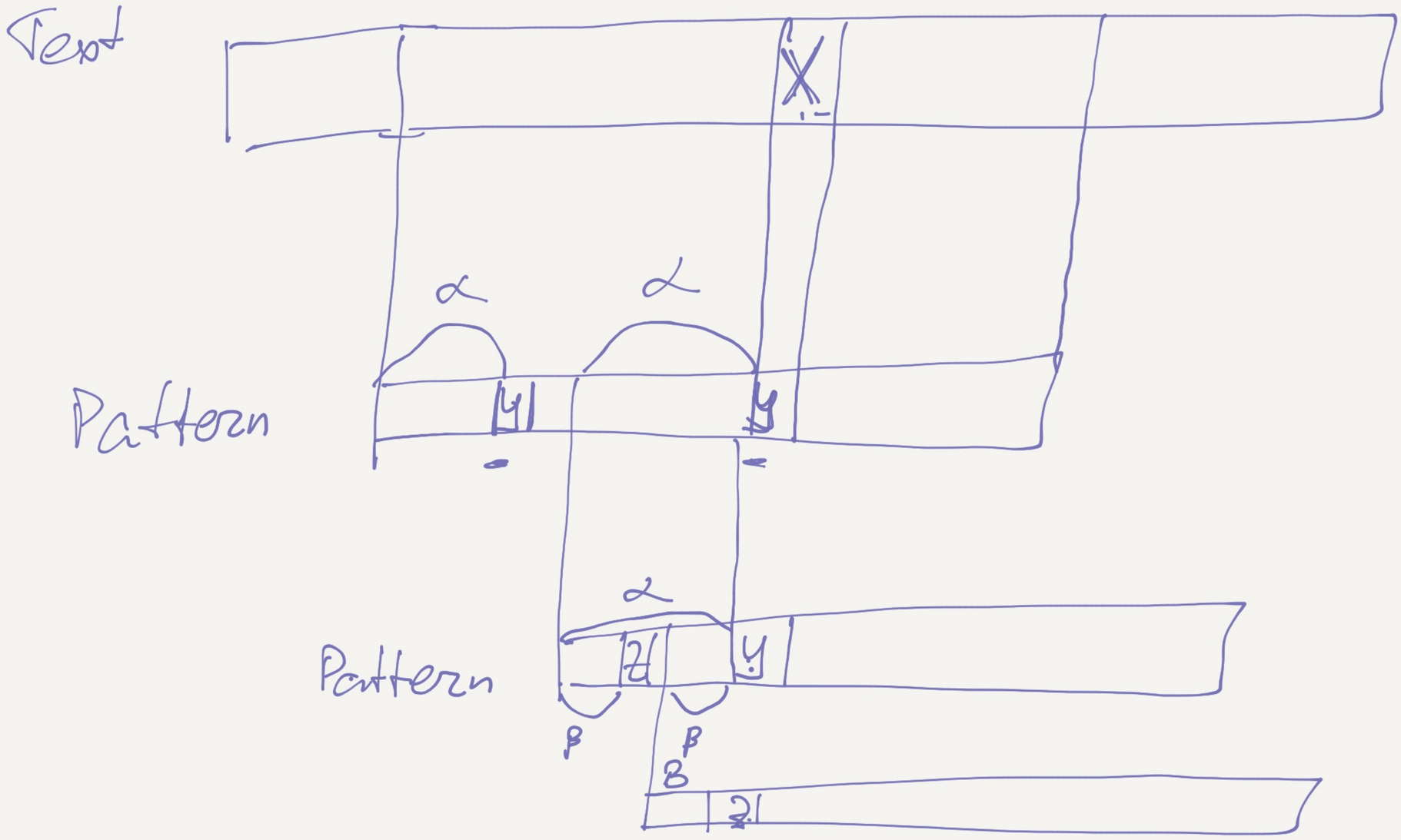
$SP_i' \leq SP_i$



		a	b	c	a	e	a	b	c	a	b	d
→	Z_i	–	0	0	1	0	4	0	0	2	0	0
	SP_i	0	0	0	1	0	1	2	3	4	2	0
	SP_i'	0	0	0	1	0	0	0	0	4	2	0







$$SP_{i+1} = SP_i + 1$$

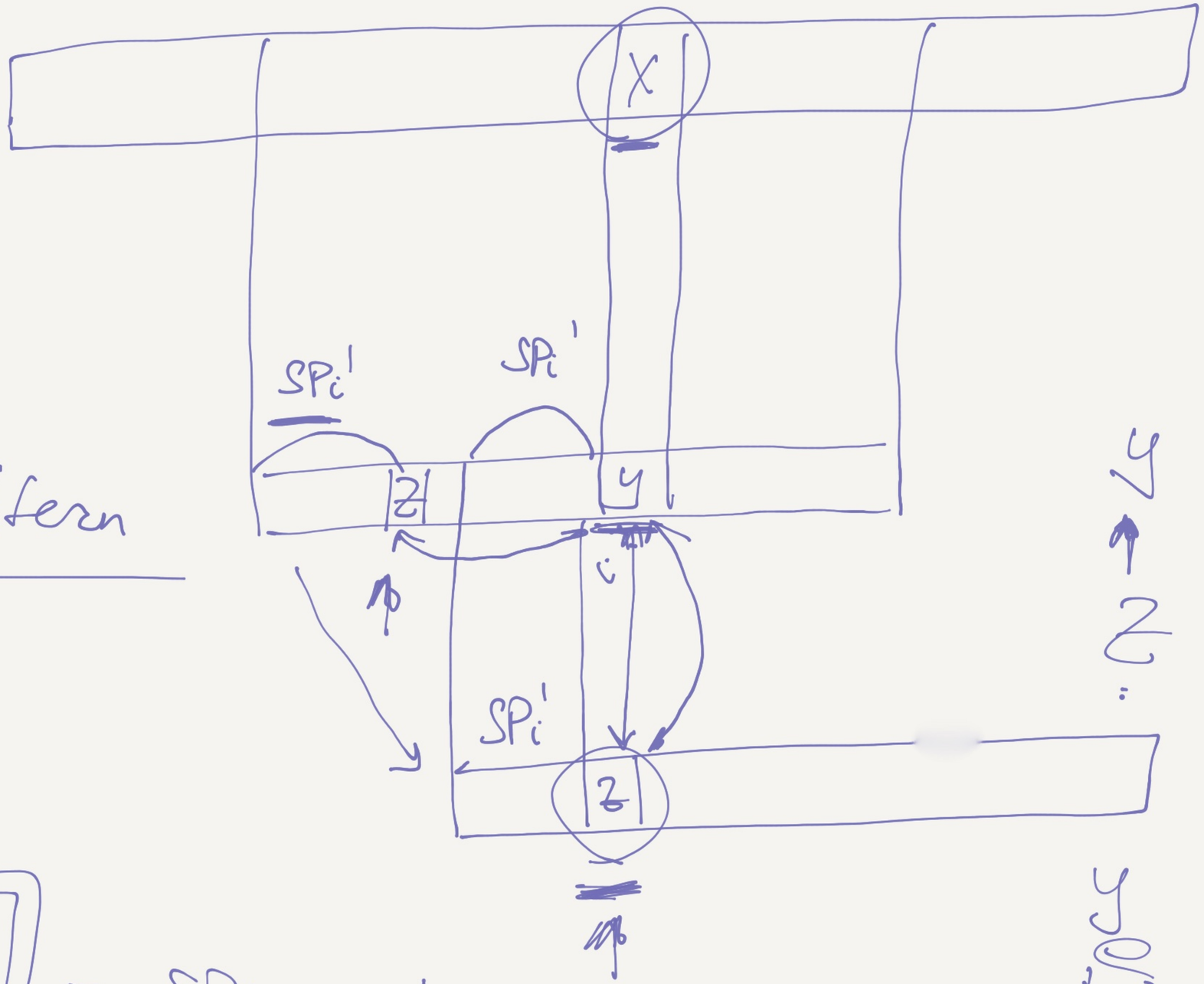
$$S[i+1] = S[SP_i + 1]$$

Test1

Test2

Test3

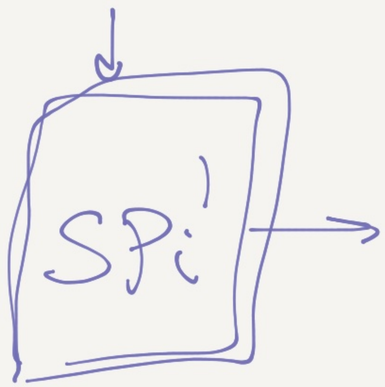
Pattern



Y vs. X

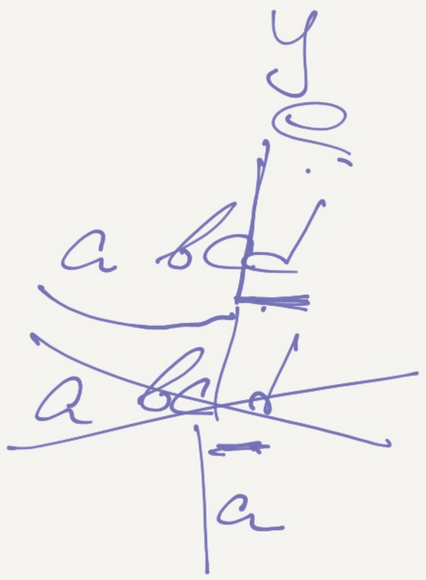
Z vs. X

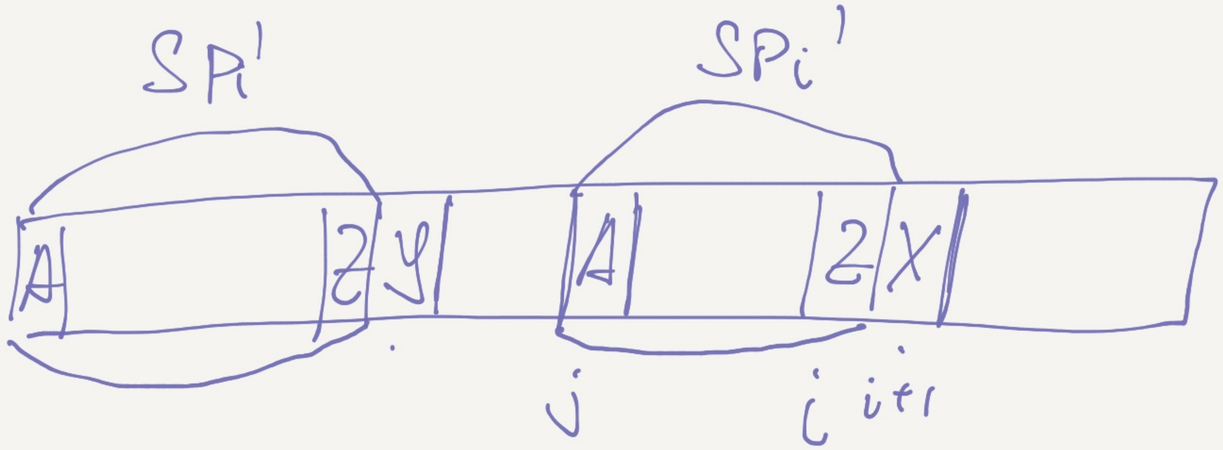
Zi



SPi

abcd .....





SPi SPi'

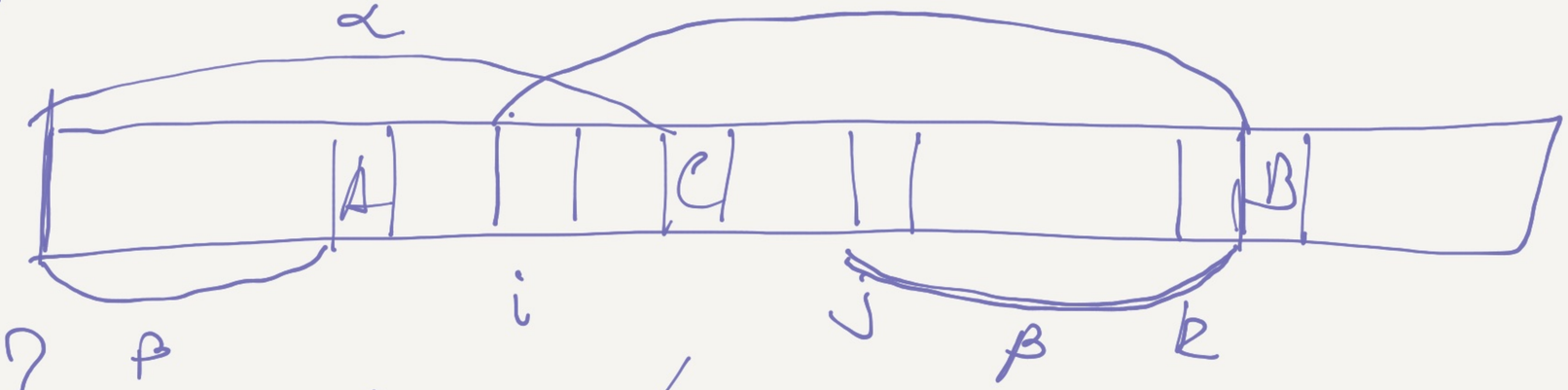
$S[SP_i' + 1] = y$

$S[i+1] = x$

$Z_j = SP_i'$

Z_i, Z_j

$k = i + Z_i - 1 = j + Z_j - 1$

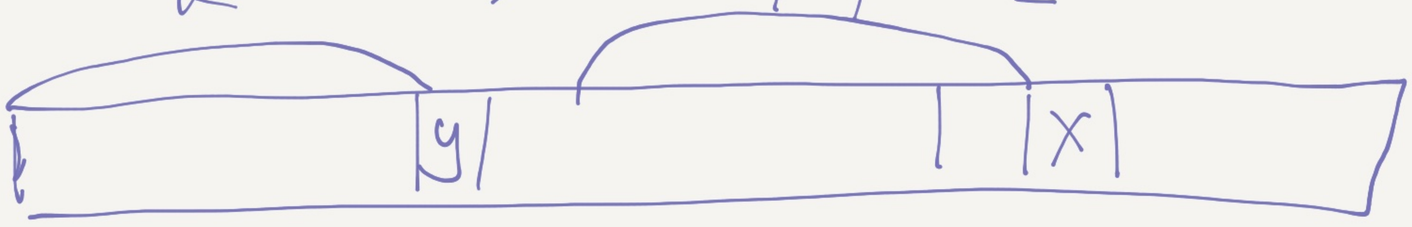


$SP_k' = ?$

$SP_k = Z_j$

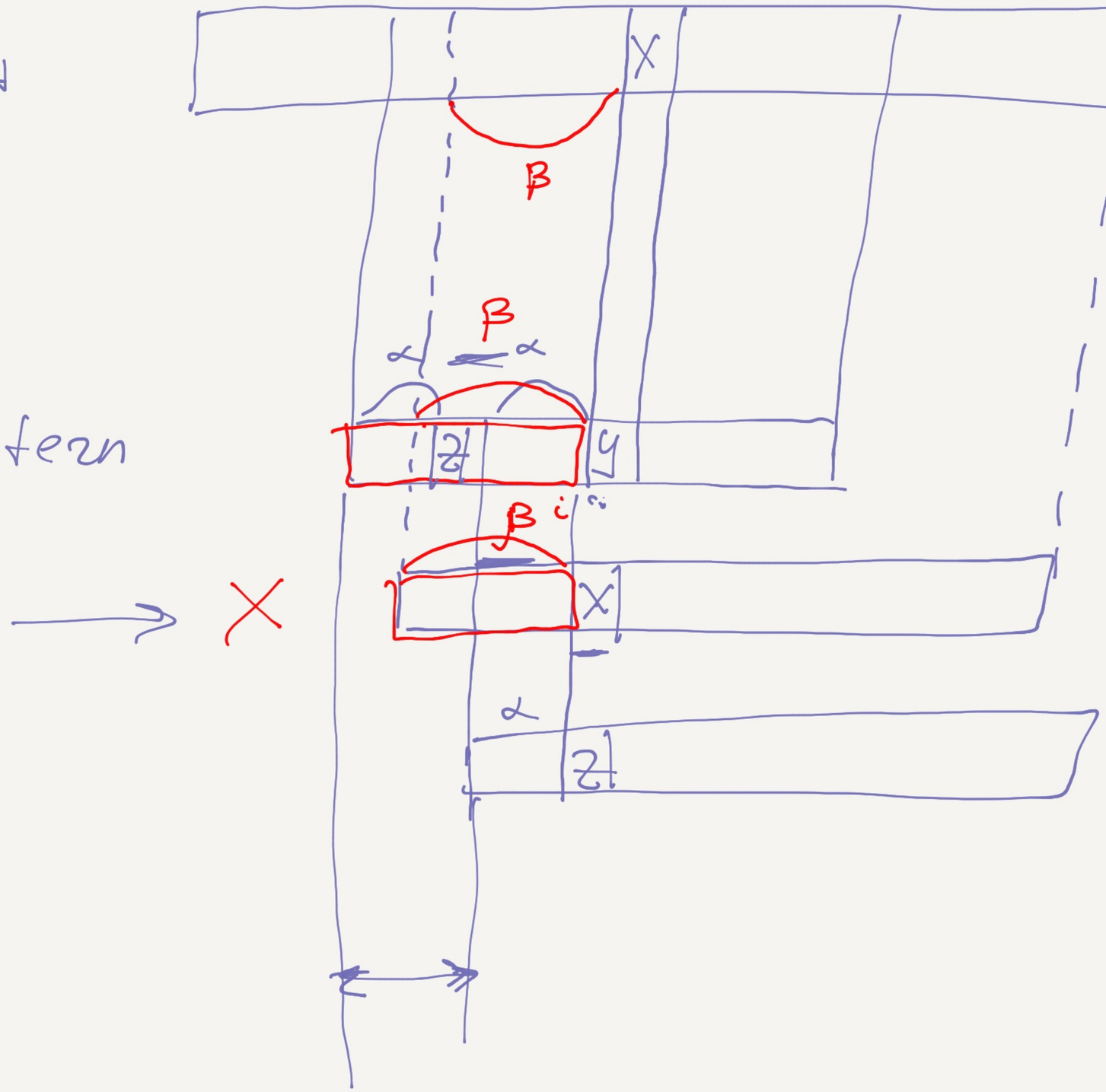
$SP_k' = Z_i$

$SP_k' = |\alpha|$



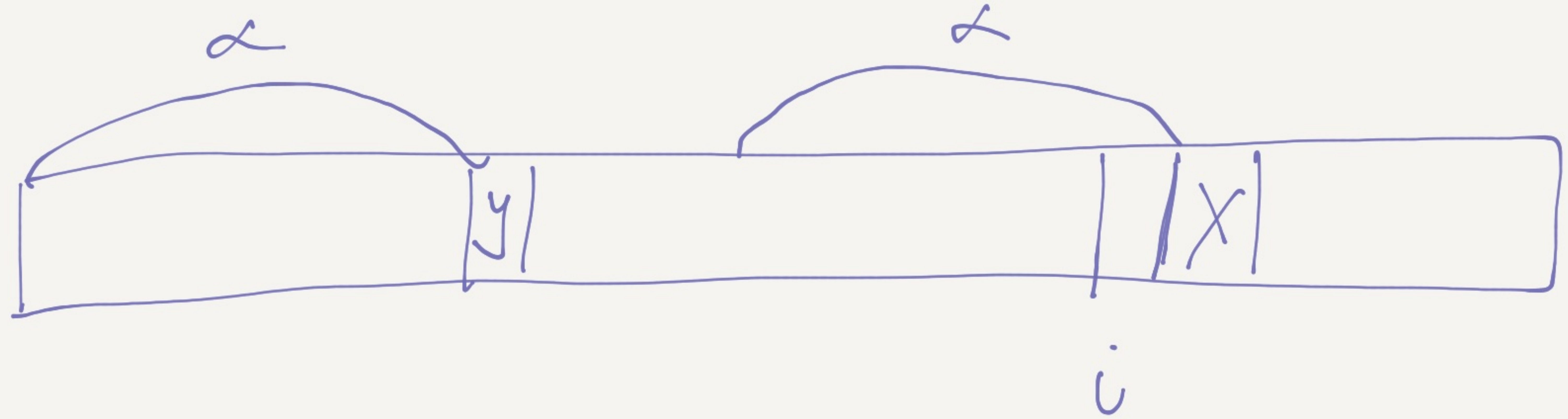
Text

Pattern



$|\beta| > |\alpha|$

$|\alpha| = SP_i$



SP_i'

~~$SP_i' = 1$~~

~~$SP_i' = 4$~~

$SP_i' = 7$

abcabcad ⟷ abcabcade

SP_i'

abcabcadabcabcade

$SP_i' = 7$

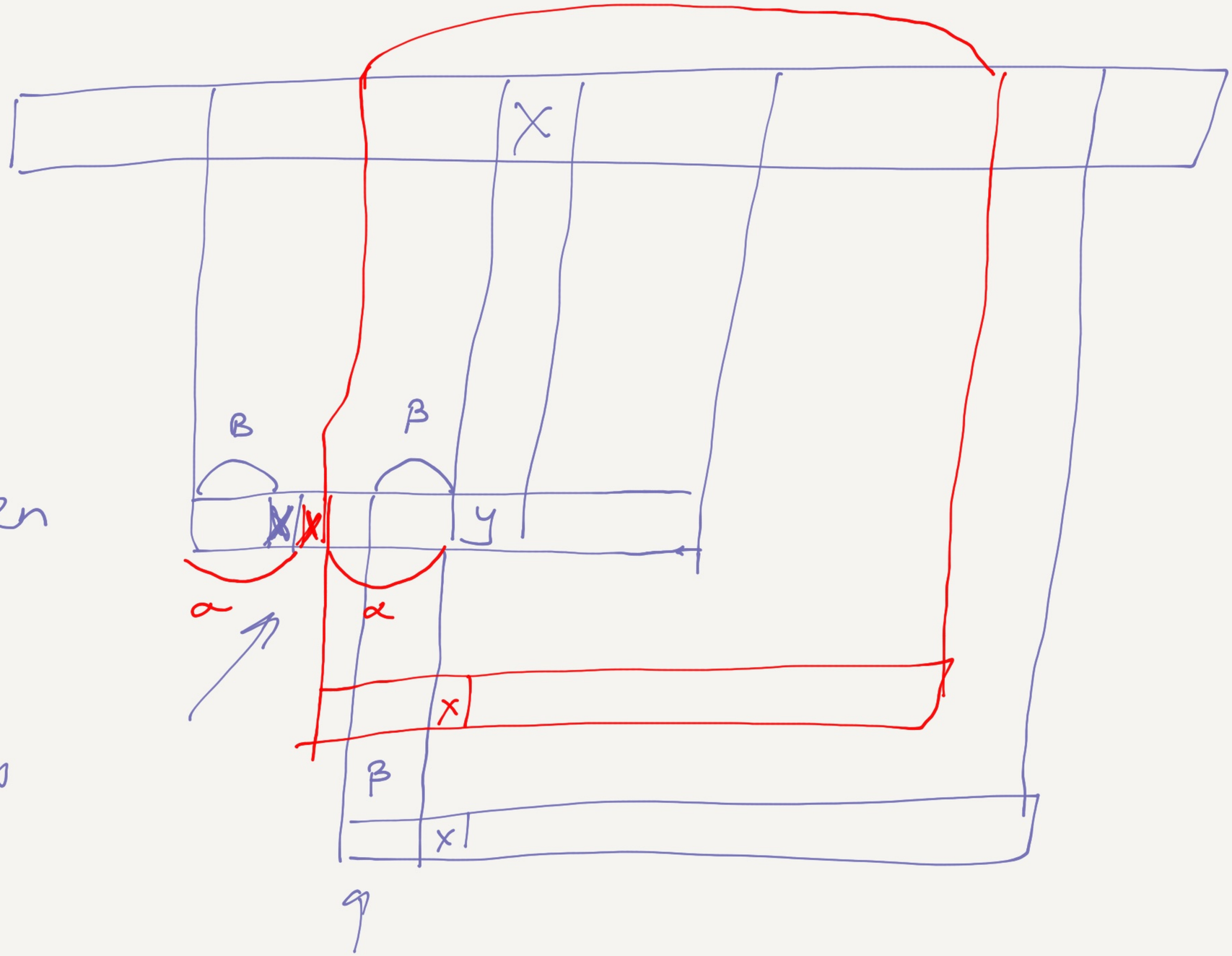
$z = 4$

abcabcadabcabcade

$z = 1$

$z = 7$

Text



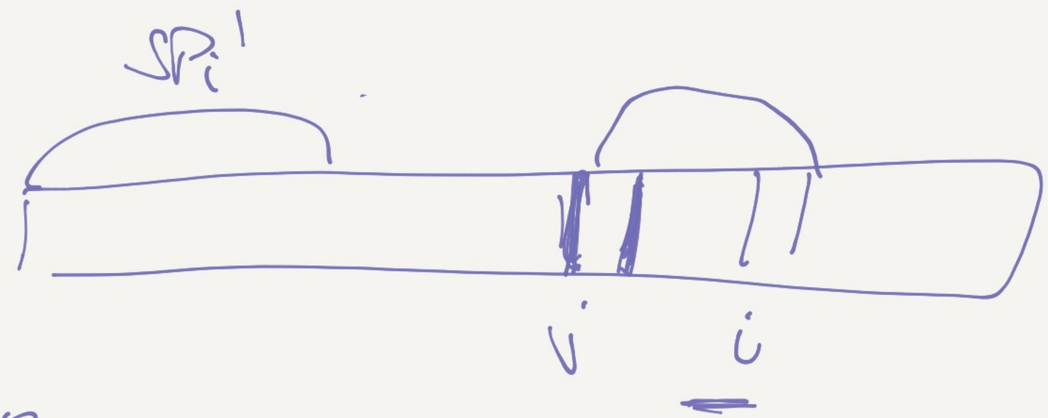
Pattern

$|B|$ — ее мощ

$|\alpha| > |B|$

	a	b	c	a	e	a	b	c	a	b	d	←
Z	-	0	0	1	0	4	0	0	2	0	0	
SP'	0	0	0	1	0	0	0	0	4	2	0	
idx	1	2	3	4	5	6	7	8	9	10	11	

$6 + 4 - 1 = 9$

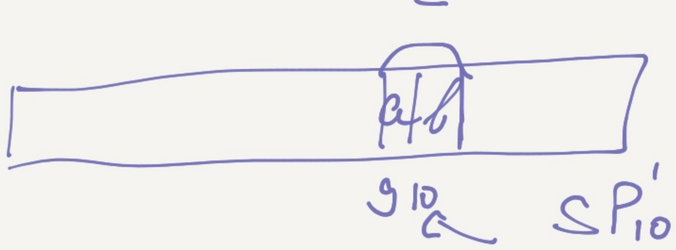


$4 + 1 - 1 = 4$

$$j + z_j - 1 = i$$

$$SP_i' = z_j$$

$9 + 2 - 1 = 10$



	a	b	c	a	b	c	a	d	a	b	c	a	b	c	a	e
dp	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
z_i	-	0	0	4	0	0	1	0	7	0	0	4	0	0	1	0
sp_i'	0	0	0	0	0	0	~~1~~ ~~0~~ 4	0	0	0	0	0	0	0	~~1~~ ~~0~~ 7	0

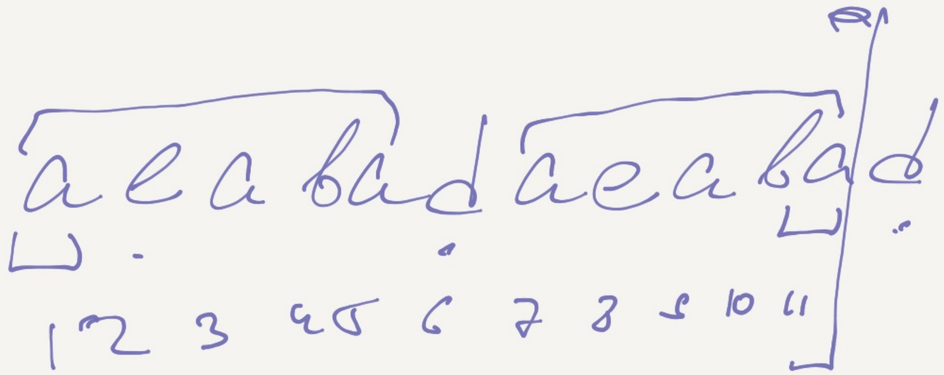
$5+1-1=5$

$12+4-1=5$

$9+7-1=5$

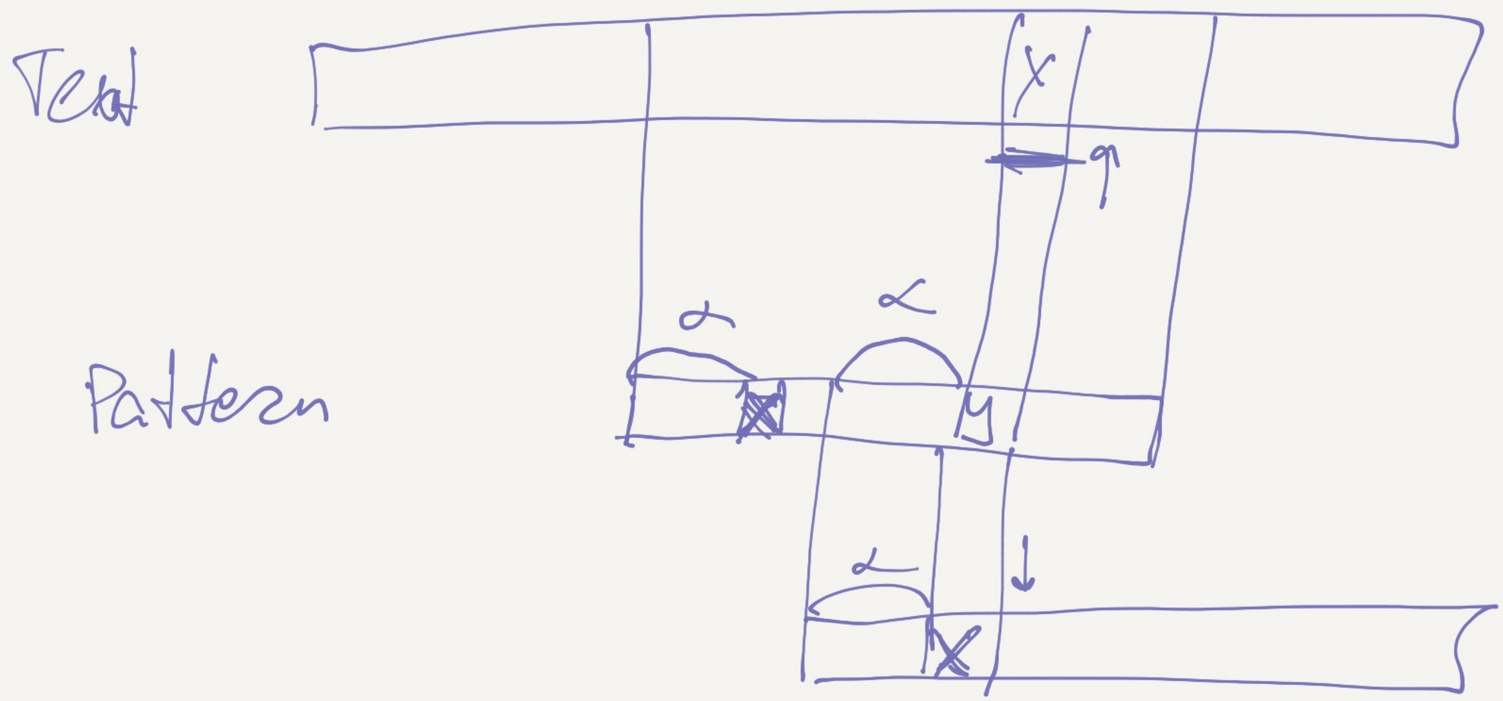
$7+1-1=7$

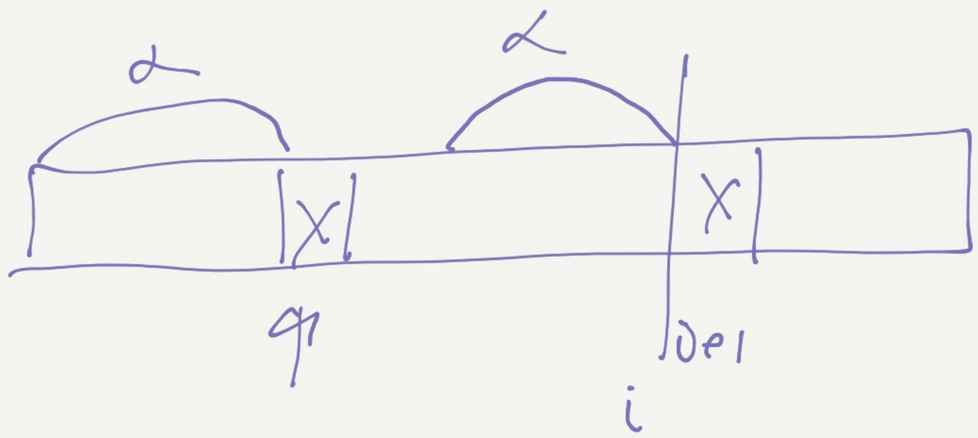
$4+4-1=7$



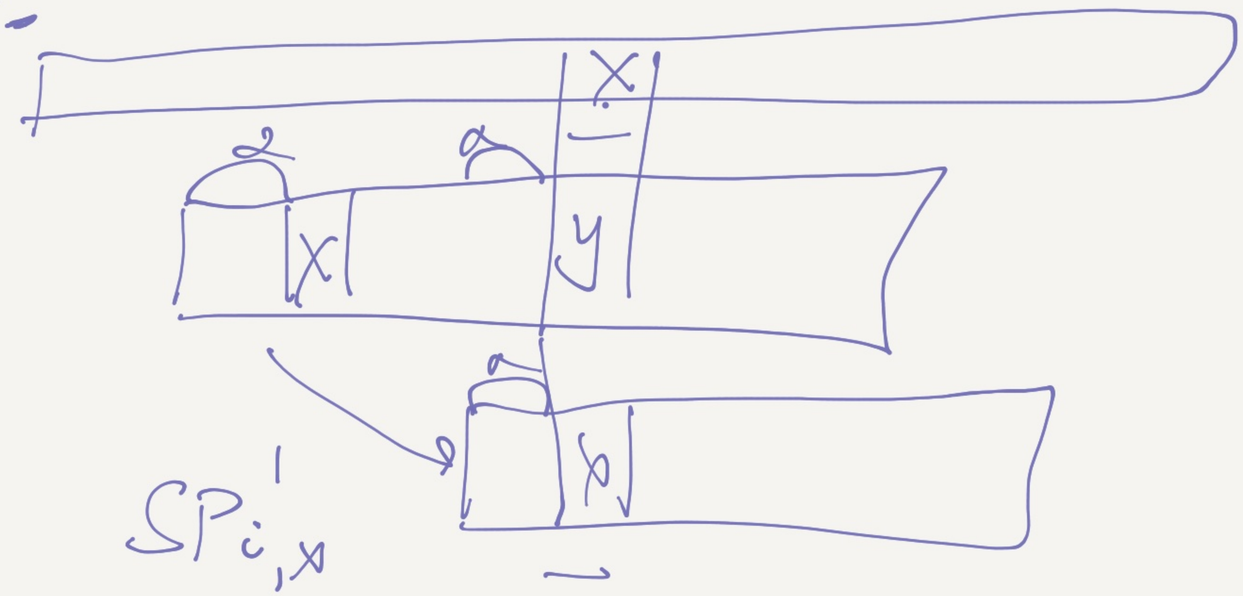
$SP_{11} = \sqrt{}$

$SP'_{11} = 1$





$SP_i' \longrightarrow SP_{i,x}'$



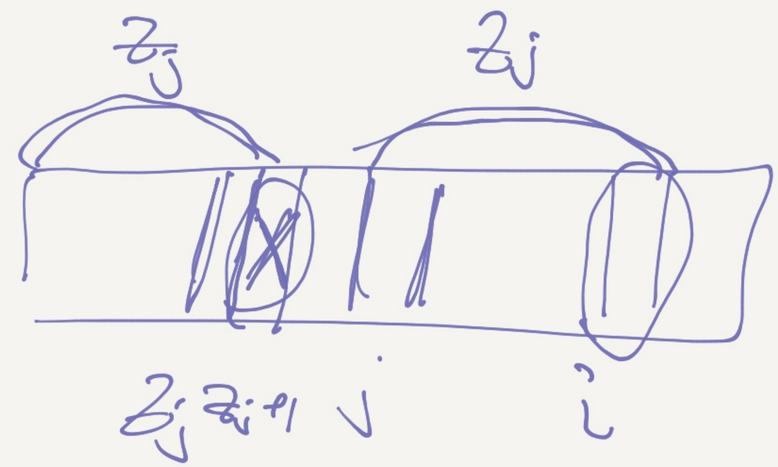
```
for i = 1 to n:
    SP[i] = 0

for j = n to 2:
    i = j + Z[j] - 1
    SP[i] = Z[j]
```

$SP_i \leftarrow Z_j$

```
for i = 1 to n:
    for x in Σ':
        SP[i,x] = 0

for j = n to 2:
    i = j + Z[j] - 1
    for x = S[Z[j] + 1]
        SP[i,x] = Z[j]
```



	a	b	c	a	b	c	a	d	a	b	c	a	b	c	a	c
dp	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
z	–	0	0	4	0	0	1	0	7	0	0	4	0	0	1	0

$SP'_{7,b} = 4$ $\quad SP'_{15,b} = 4$

$SP'_{15,d} = 7$

$SP'_{7,b} = 4$

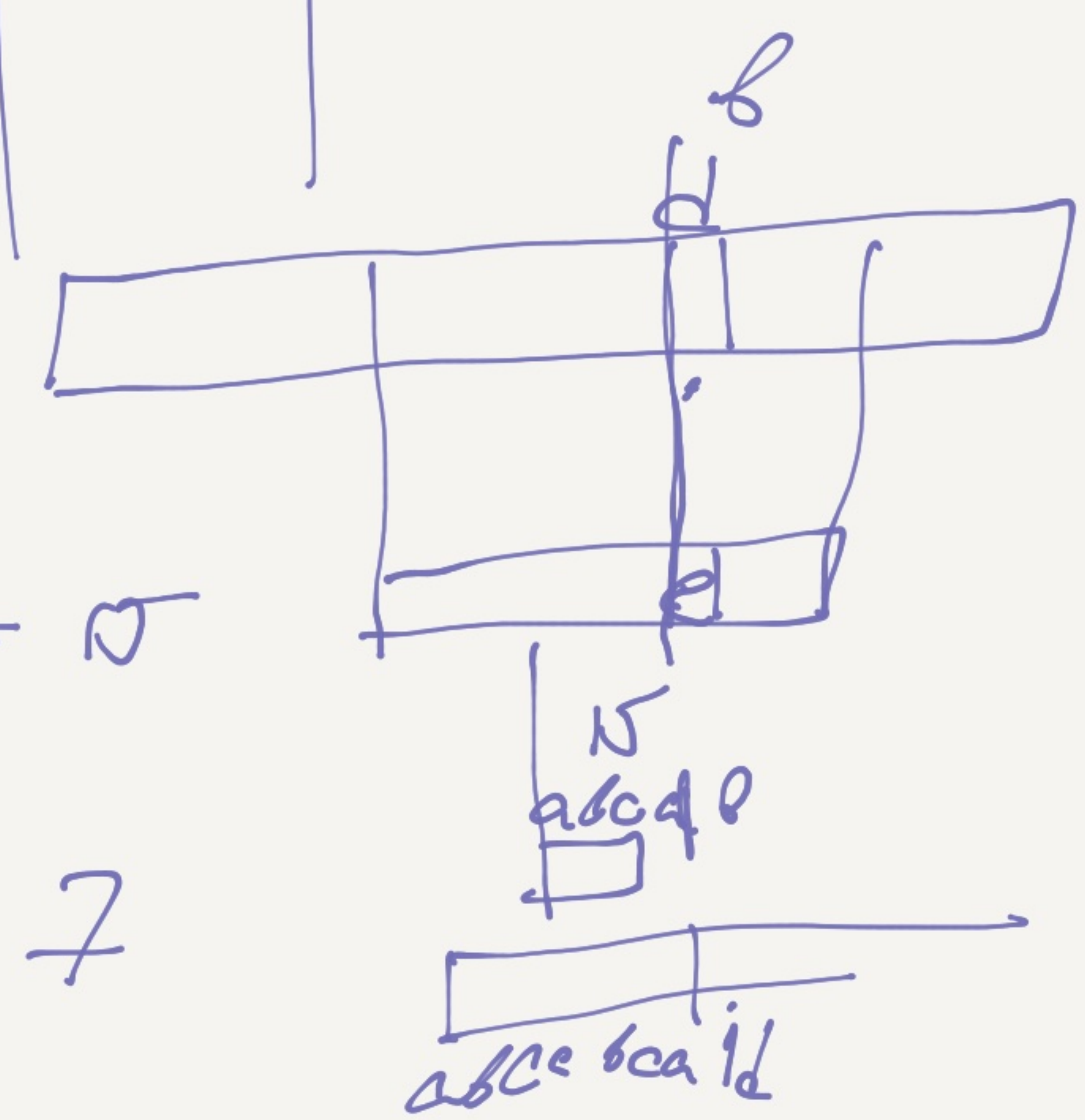
$4 + 4 - 1 = 7$

$SP'_{i,x} = 0$

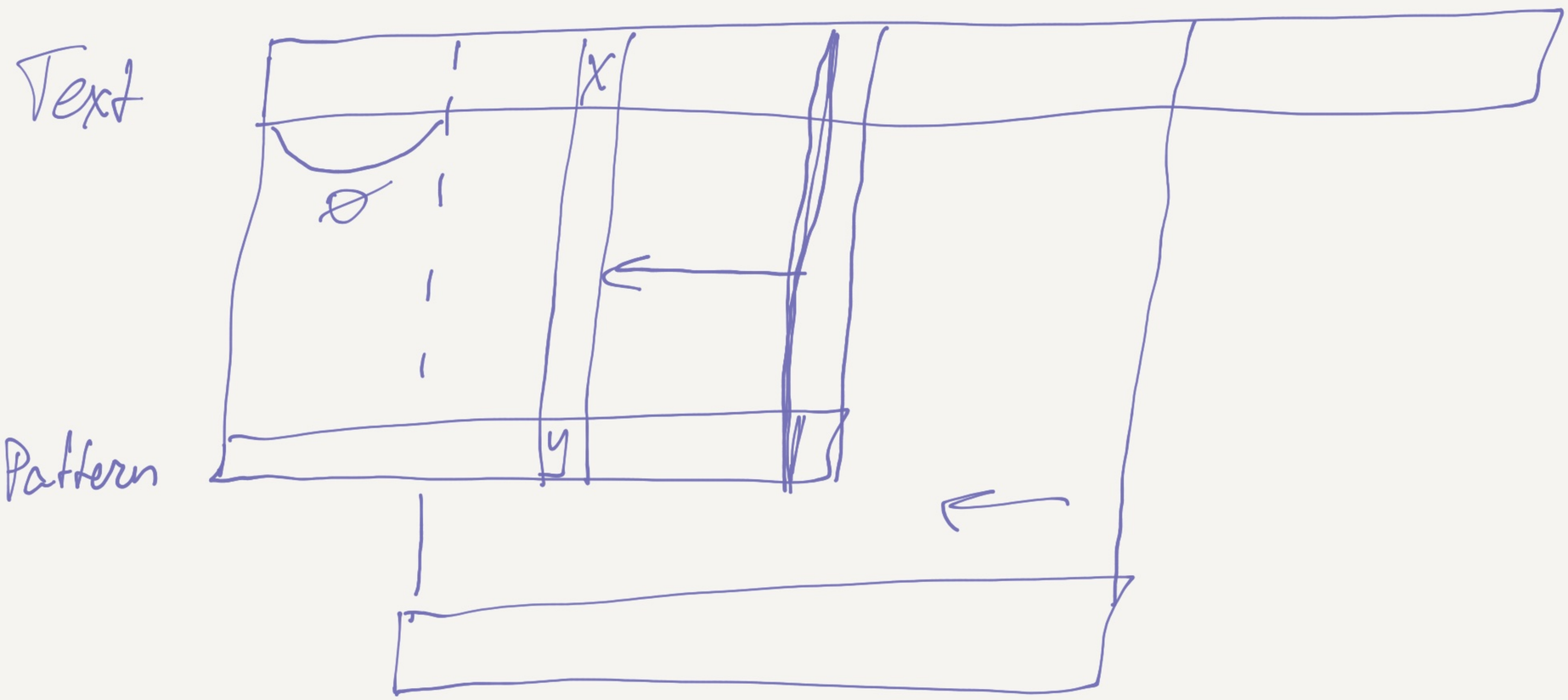
$7 + 1 - 1 = 7$ $\quad$ ~~$SP'_{7,b} = 1$~~

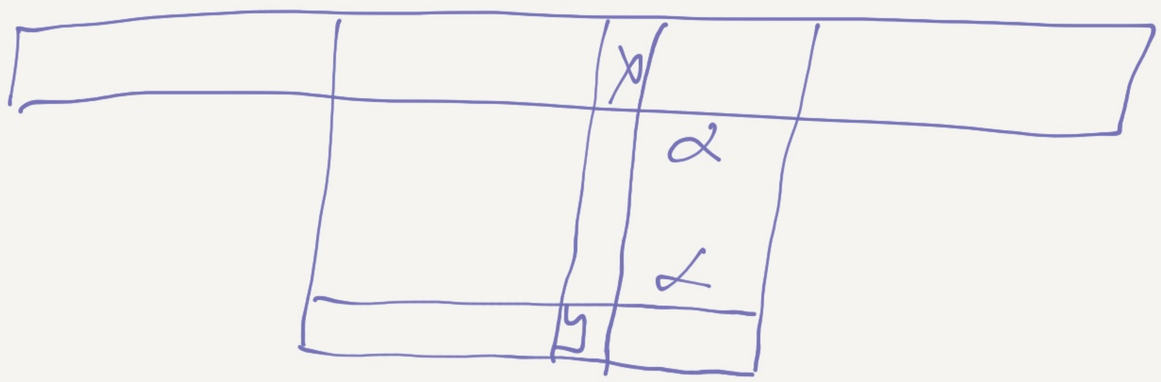
$15 + 1 - 1 = 15$ $\quad 12 + 4 - 1 = 15$ $\quad 9 + 7 - 1 = 15$

~~$SP'_{15,b} = 1$~~ $\quad SP'_{15,b} = 4$ $\quad SP'_{15,d} = 7$



Бойера – Мура





$$\begin{pmatrix} \Pi\Pi c \\ \Pi x c \\ 1 \end{pmatrix} max$$

Правило плохого символа

e f g h

Текст

A

Pattern

A

B

m

A

a b a d

1 3

$R_d = 4$

$R_a = 3$

$R_b = 2$

O(m)

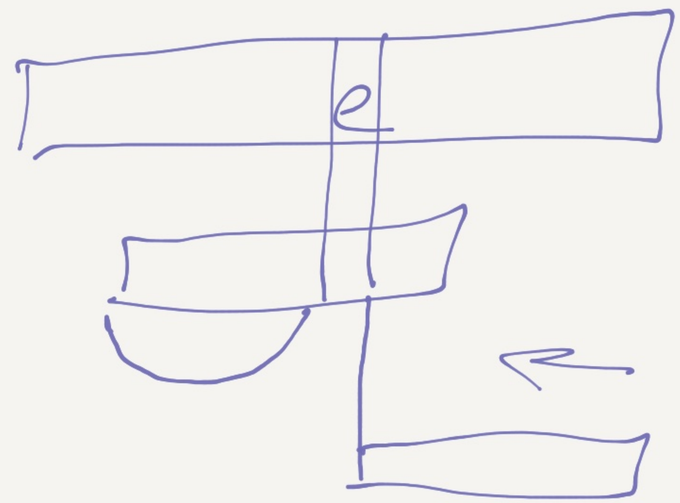
b

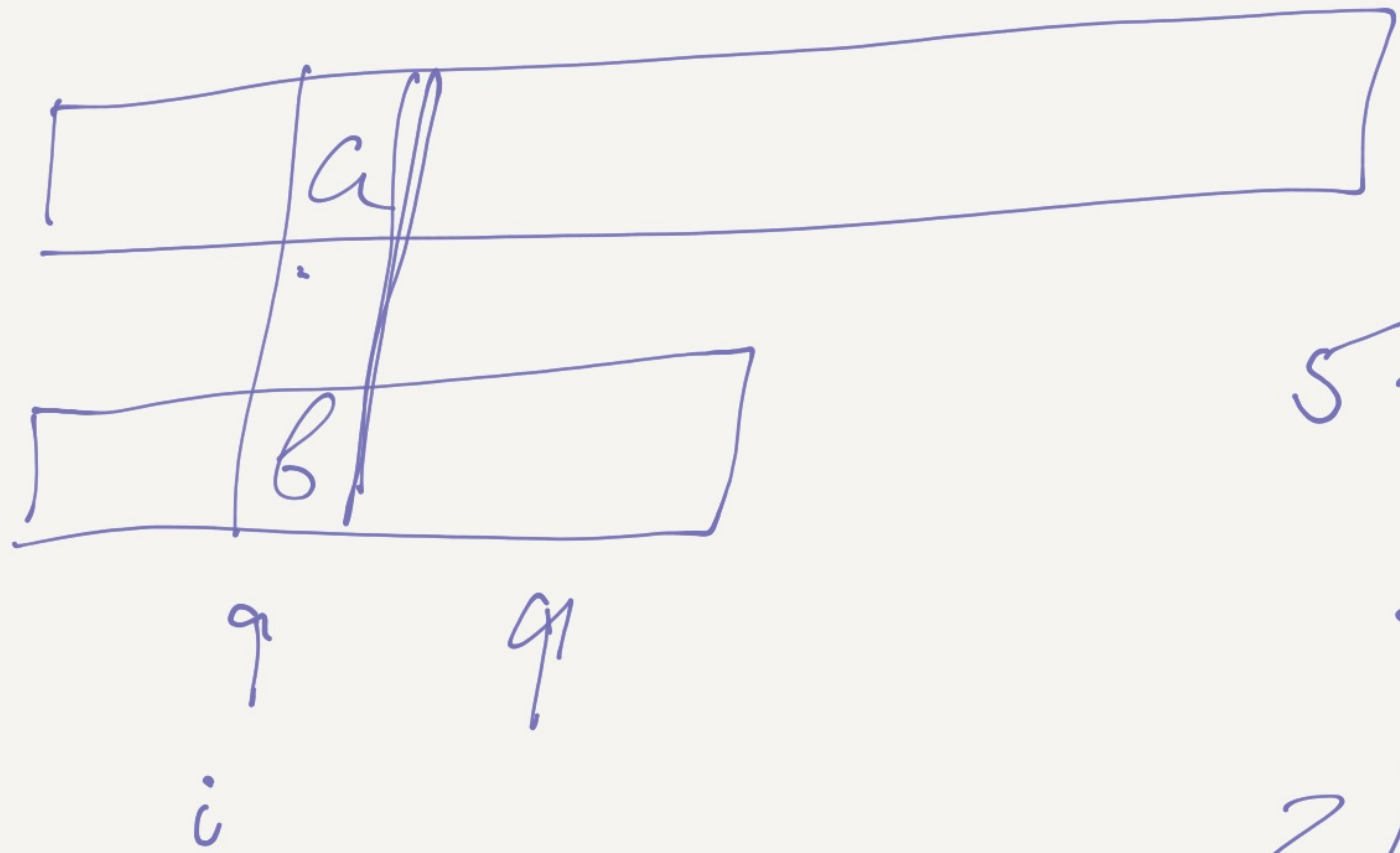
a b a d

2

a b a d

2





$5 - 8 = -3$

1

$8 - 3 = 5$

1) ППС

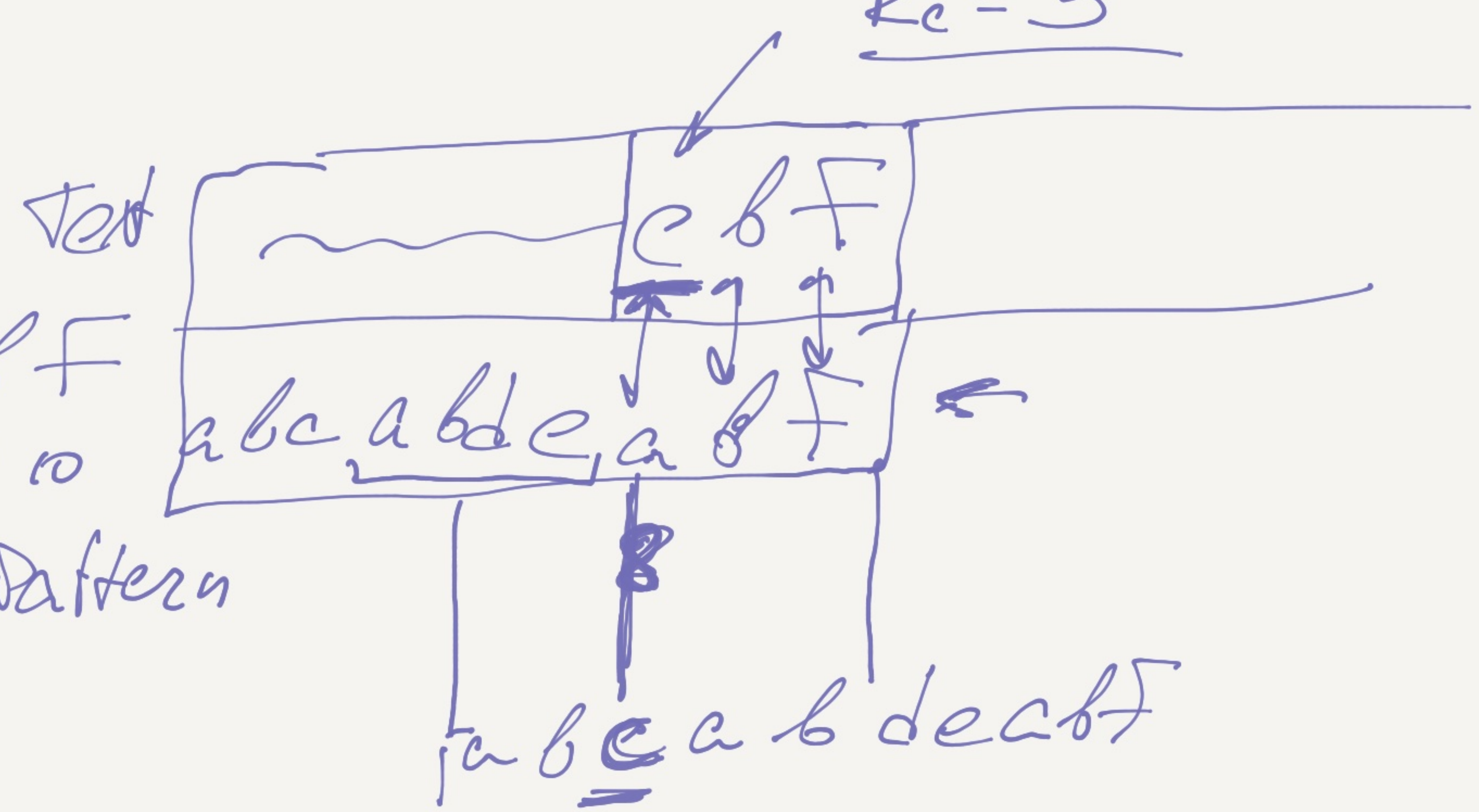
i, $R_a > i \to 1$.

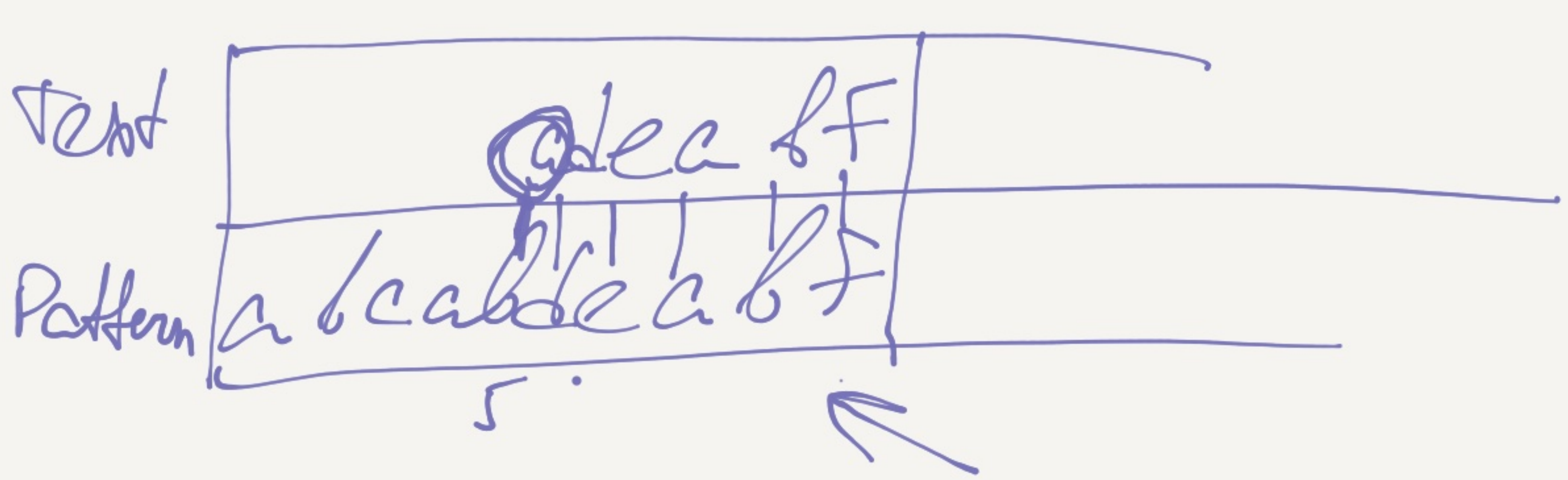
Pattern: a b c a b d e a b f
1 2 3 4 5 6 7 8 9 10

→ $R_a = 8$ $R_f = 10$
$R_b = 9$
→ $R_c = 3$
$R_d = 6$
$R_e = 7$

2) РППС

$R_c = 3$





a b c a b d e a b f
1 2 3 4 5 6 7 8 9 10

$R_a = 8, 4, 1$

$R_b = 9, 5, 2$

$R_c = 3$

$R_d = 6$

$R_e = 7$

$R_f = 10$

Text c b f
P abcabdeabf

$R_c = 3$

abcabdeabf

$8 - 3 = 5$

Text adeabf
P abcabdeabf

5

abca

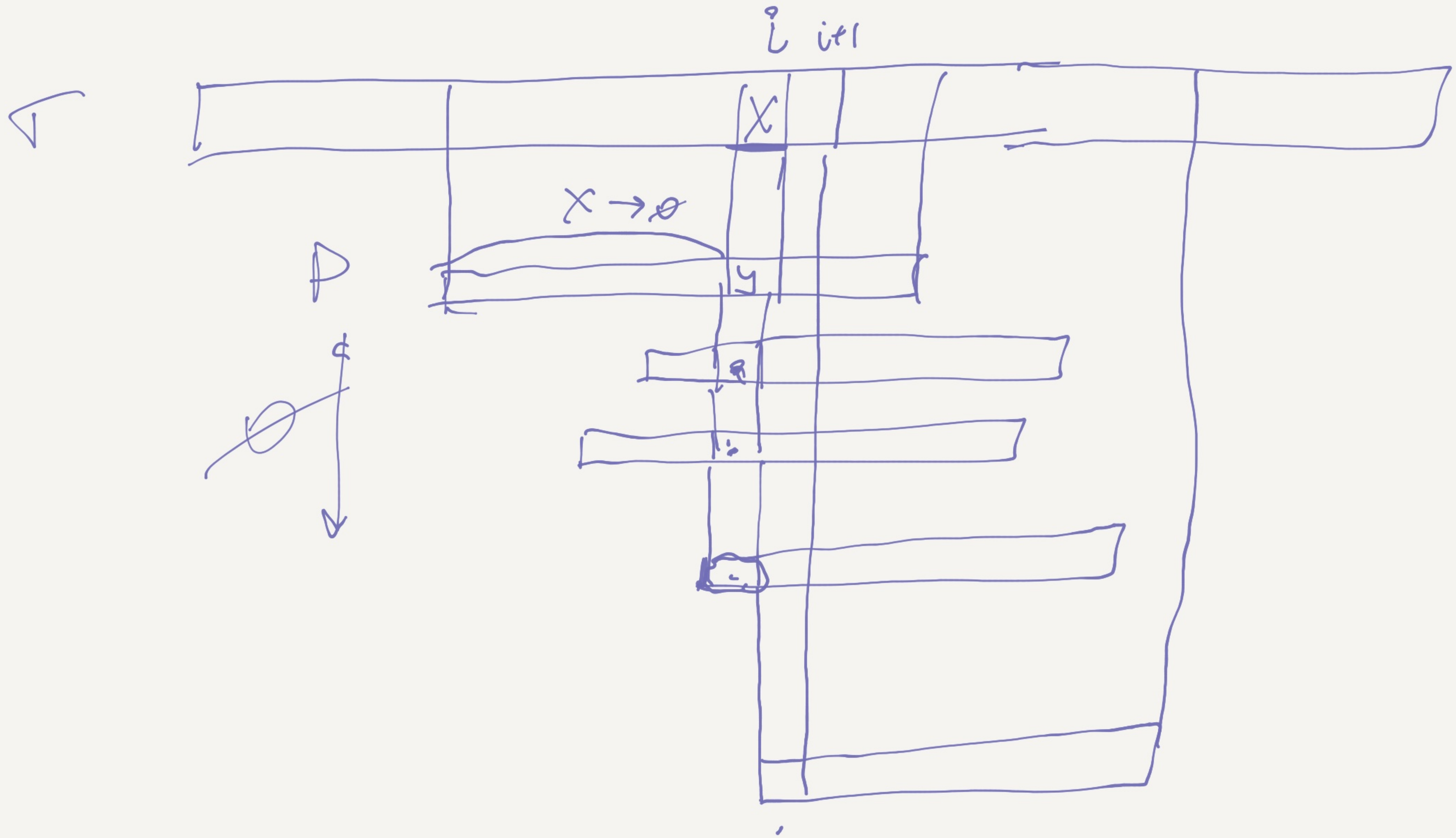
$5 - 4 = 1$

$R_a = 8, 4, 1.$

aabf
abcabdeabf
7
abca. ...

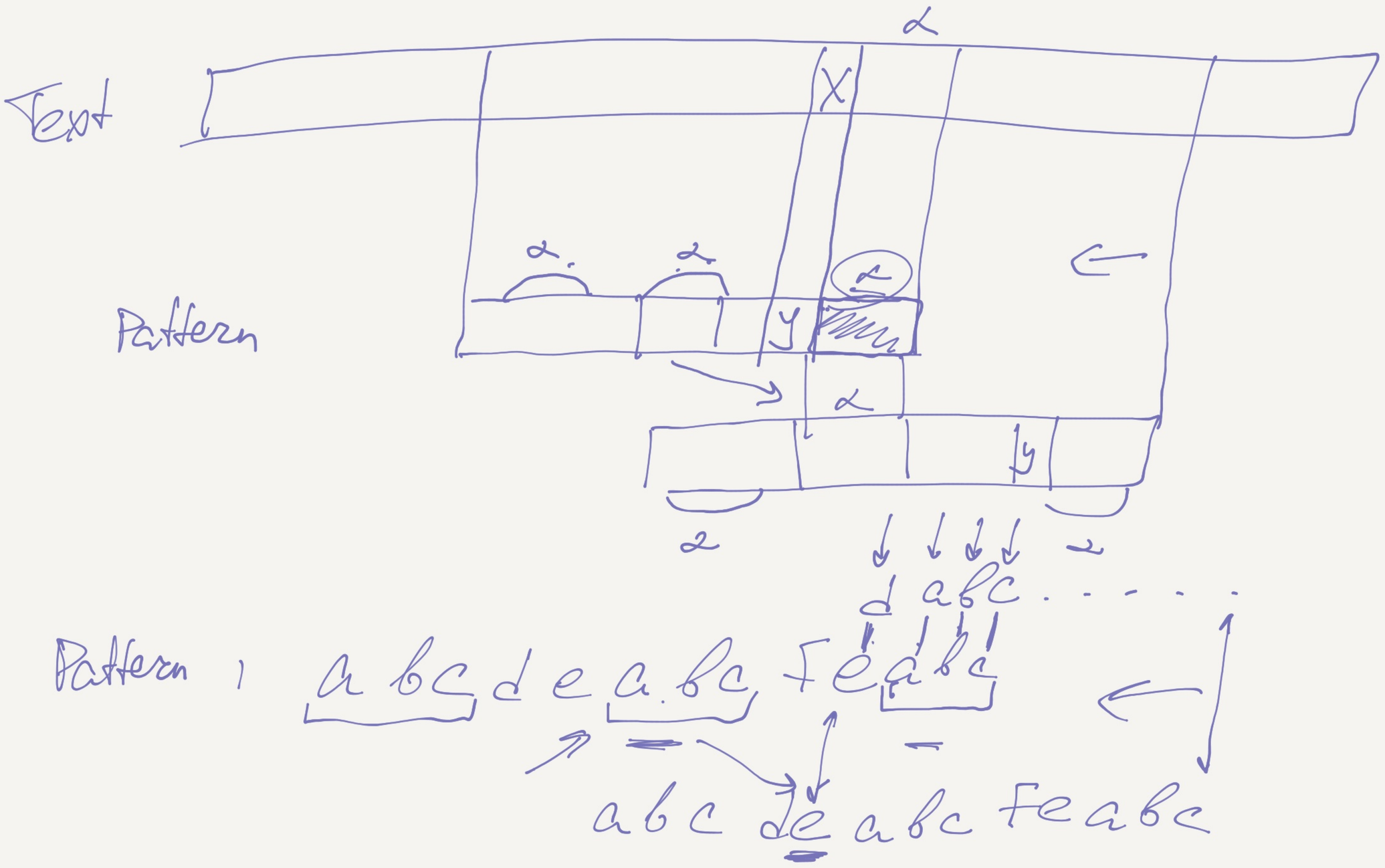
7–4=3

fabf
abcabdcabf
7 abcabd...



i
i+1
T
x
x → ∅
P
y
$
∅

Правило хорошего суффикса




Text
Pattern
Гасфилд, гл.2.
dabc
eabcdeabcfeabc
P d abc de abc fe abc
dabcde
1, 2
= 10
max
1, 2, 3, 4, ..., 9
O(n+m)
O(m)
O(n+m) O(n)