

$n = 4$

B
S

BS

1
 $10\ 10$
 00
s BBS

$B \rightarrow 0$
 $S \rightarrow 1$

B	S	S	D
			
B	S	S	S

2

①

$n=3$

$D \rightarrow 0$
 $S \rightarrow 1$

$000 \times D$

001

010

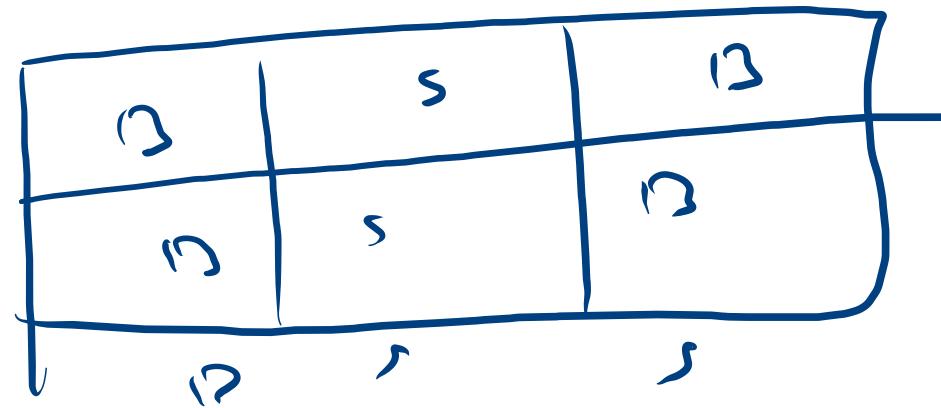
$011 \quad BSS$

~~100~~

$101 \quad SDS$

$110 \quad SSB$

$111 \quad SSS$



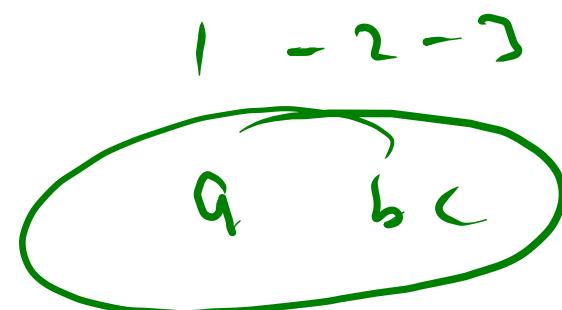
$1 \rightarrow a$
 $2 \rightarrow b$
 $3 \rightarrow c$

\vdots

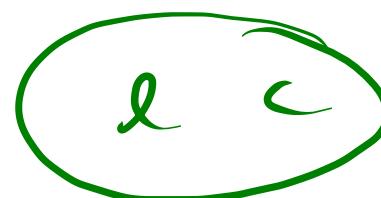
$26 \rightarrow z$

" 1 2 3 "

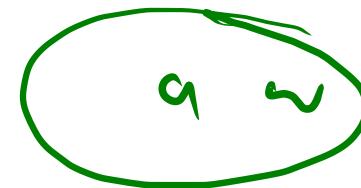
3



12 - 3



1 - 23



1 2 0 7

1 - 2 - 0 - 7
a b

1 - 2 0 - 3

a k c

✓

12 - 03
e

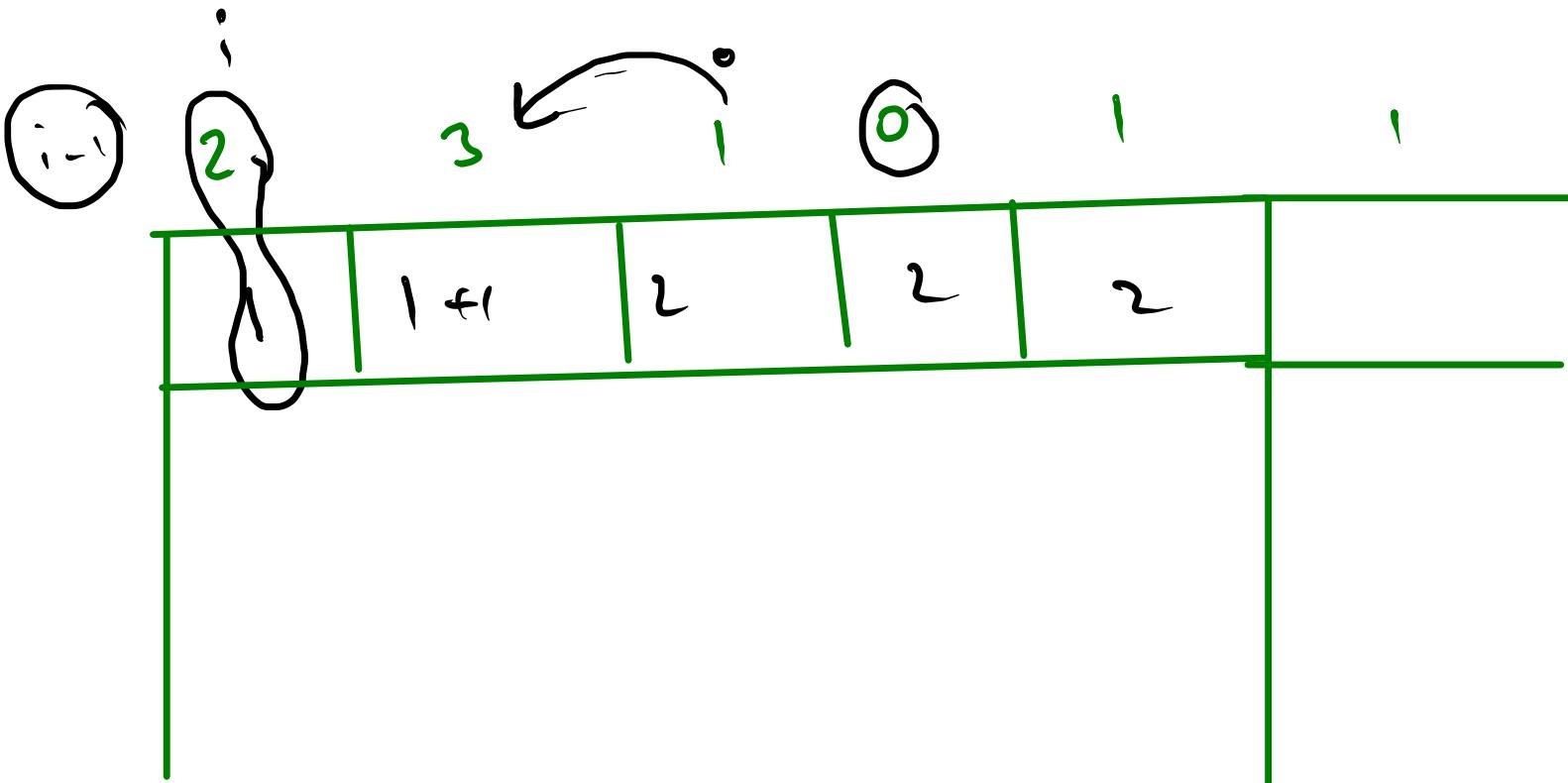
✗

1 2 3
↑
1 - {2 3} a [2 3] b c
 ↗ ↘ w ↗
 a w

12 - {2} → λ - c

2	3	1	0	1	1
1	x2	2	2	2	$2+2$
b	bc	bc a	bc j	bc ia	bc ja a

w w a w i w i a
w j a a
b c j c
w j l c

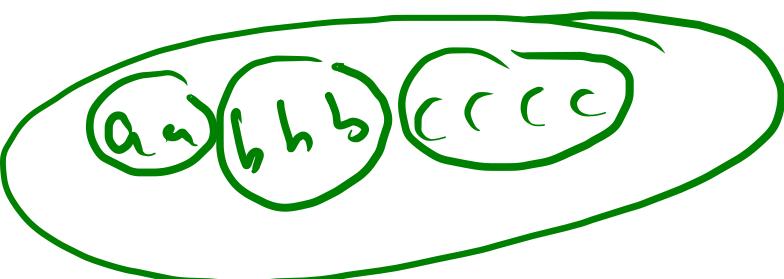


single → 1...9
 pair → 10...26

" 2 i s "

si ($i-1$, i)

$a + b + c$



$aabb\ aacc\ \alpha$

$ab\ b'\ c$

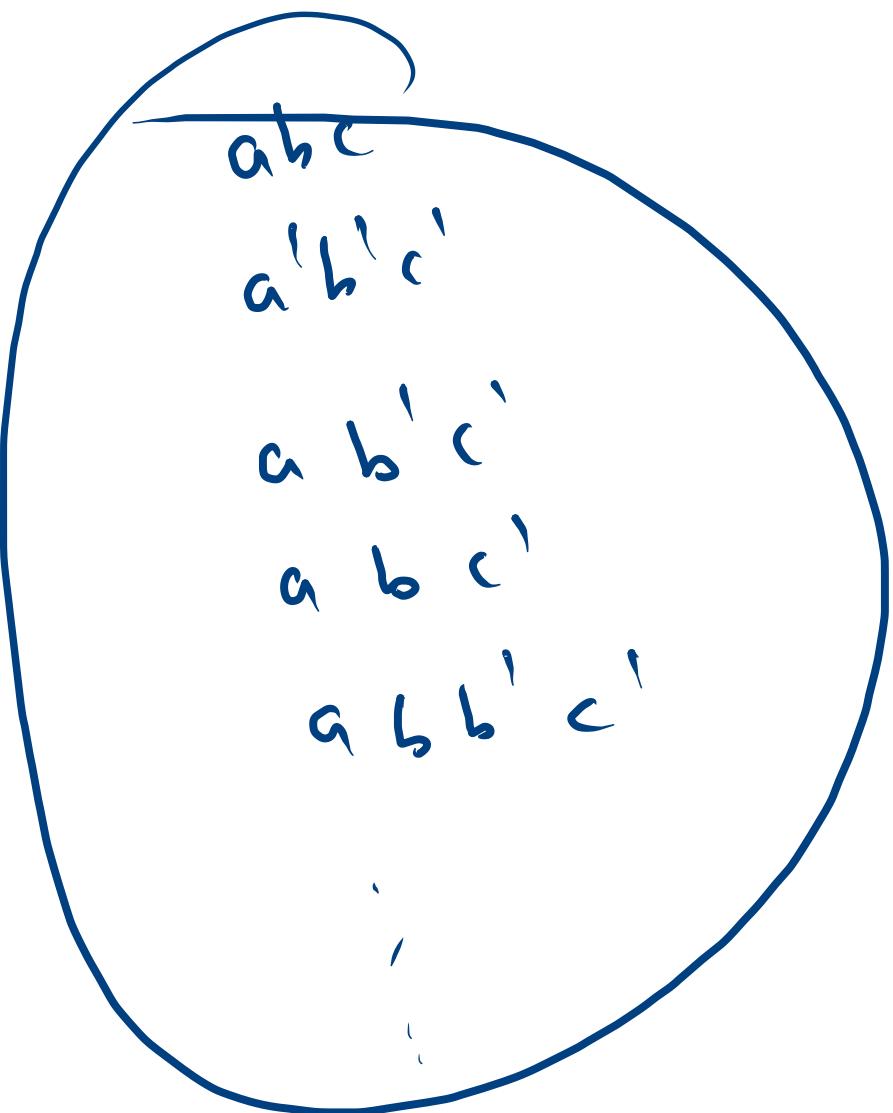
abc ✓

$ab'c$ ✓

$abb'c$ ✓

$a+b+c$

$a b c$ $a' b' c'$

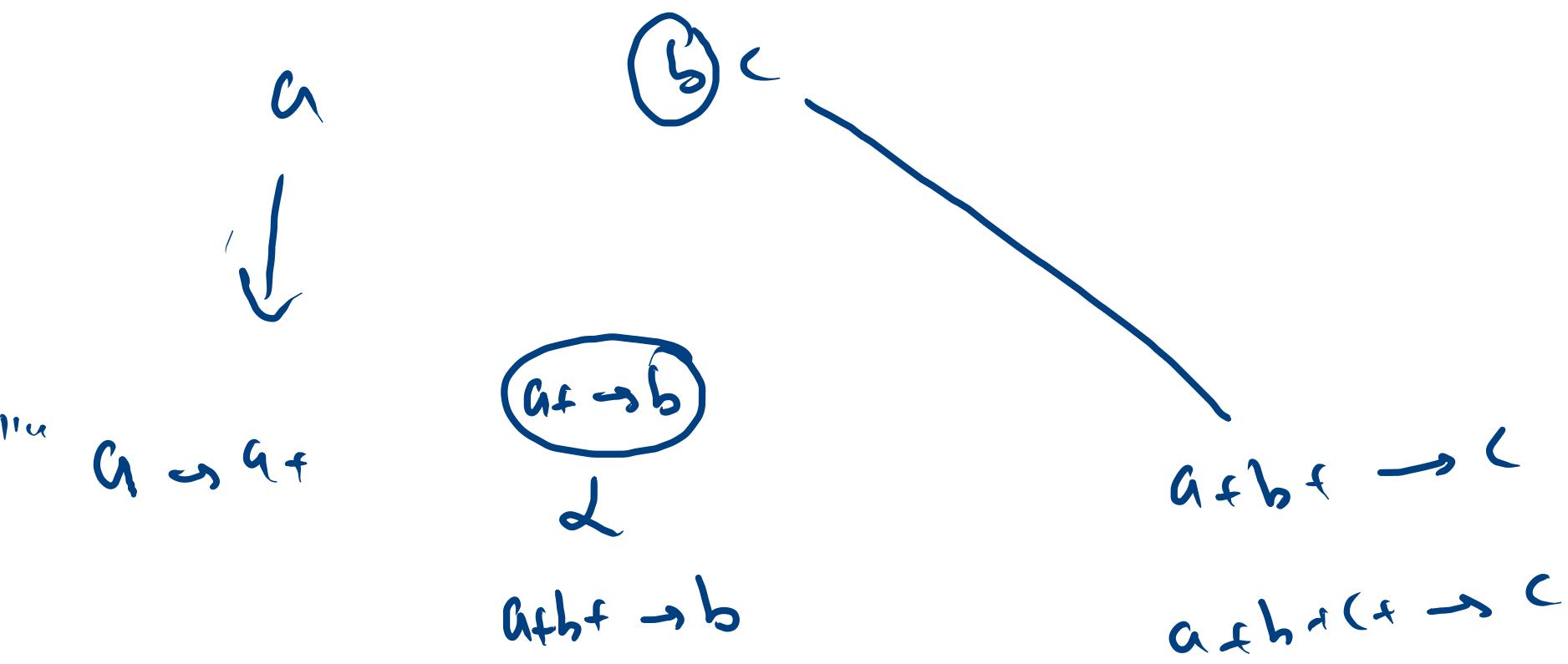


01 1
01
10

a s b t f

a f

aaaaa a \rightarrow a⁺
aaab \rightarrow a s b t



$b \rightarrow 2(a+b+c)$	$c \rightarrow 2(a+b+c)$	$a \rightarrow$	$a' \rightarrow$	$b' \rightarrow$	$c' \rightarrow$
$a + b + c$	$a + b + c$	a	a'	b	b'
$a + b + c$	$a + b + c$	a	a'	b	b'
$a + b + c$	$a + b + c$	a	a'	b	b'

Handwritten annotations:

- Row 1: $a + b + c$, $a + b + c$, a , a' , b , b'
- Row 2: $a + b + c$, $a + b + c$, a , a' , b , b'
- Row 3: $a + b + c$, $a + b + c$, a , a' , b , b'
- Row 4: $a + b + c$, $a + b + c$, a , a' , b , b'

$a \rightarrow 2(a + f)$	$b \rightarrow 2(ab + b) + a$	$c \rightarrow 2(ac + c) + a + b + c$	a'	b'	c'
a	b	c	a^- aa' a'	a^- aa' a'	a
a_f					
$a + b + f$	ab	abc	ab	$ab -$ $ab' b$ ab' $aa' b'$ $a' b'$	c
$a + b + c + f$			abc	abc	$abc -$ $abc' c$

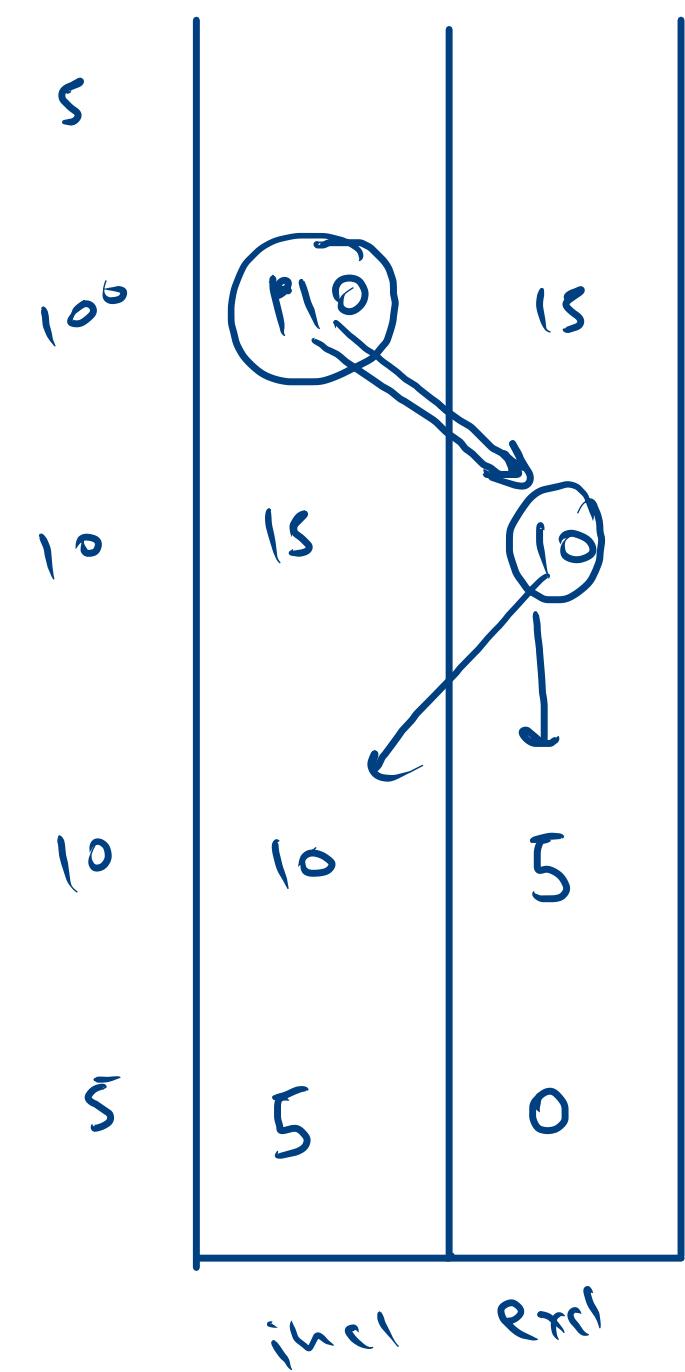
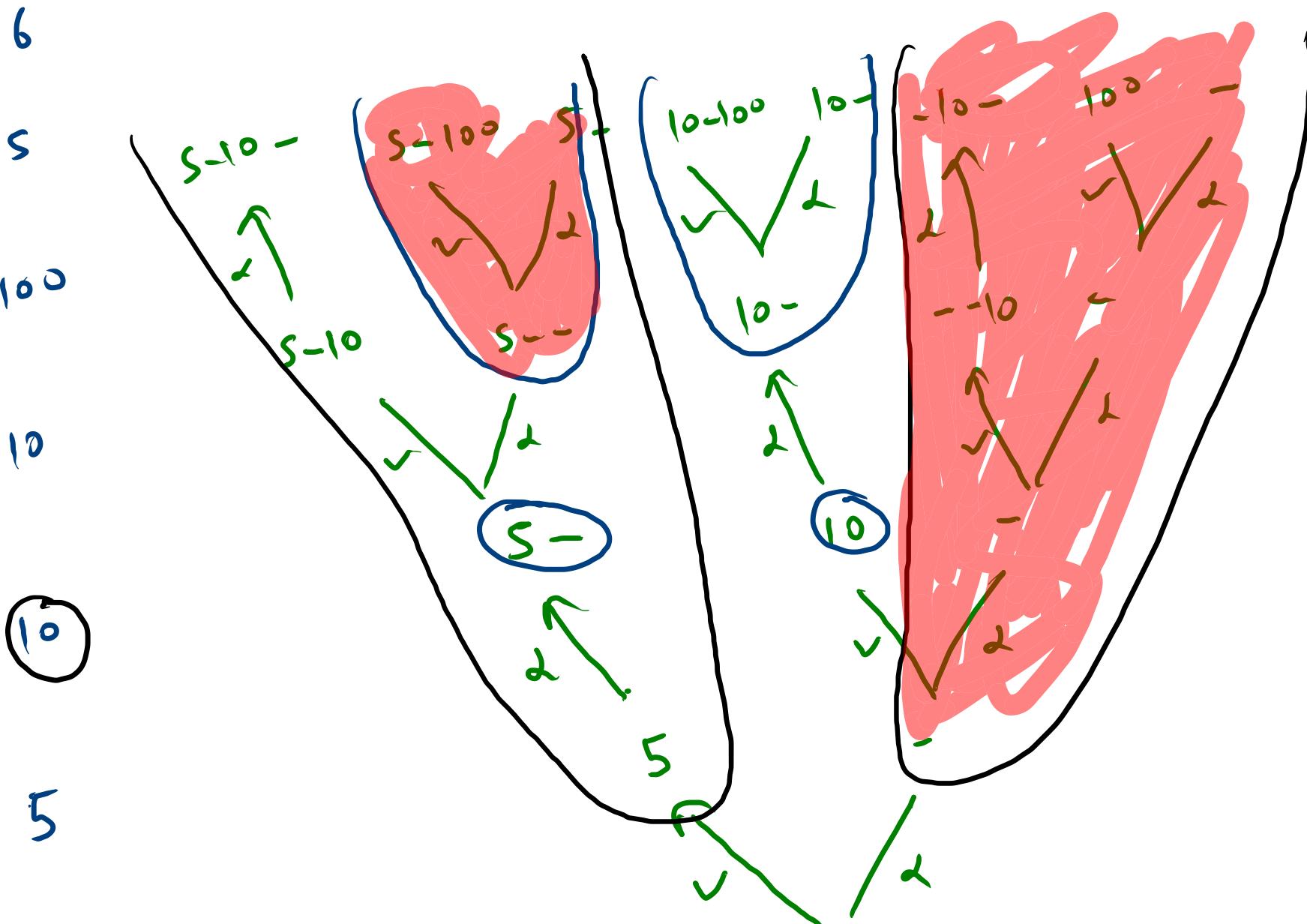
10 20 30 10
✓ ✓

sur
max
value

5 10 10 100 5 6

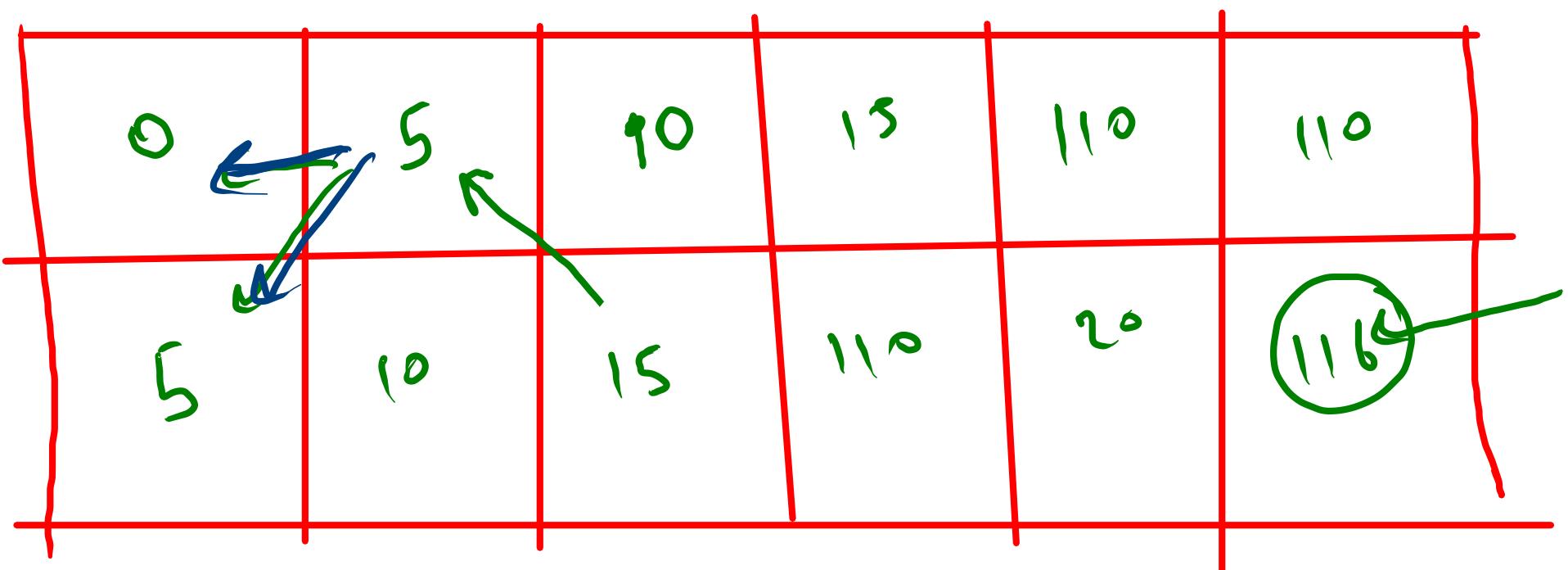
5 x 10 x 5 x 20

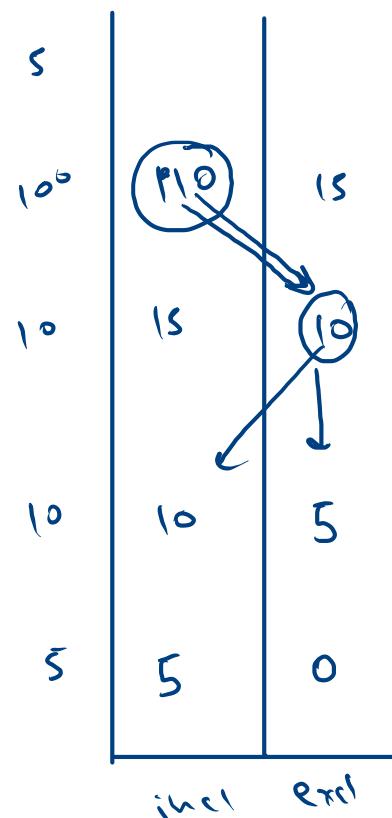
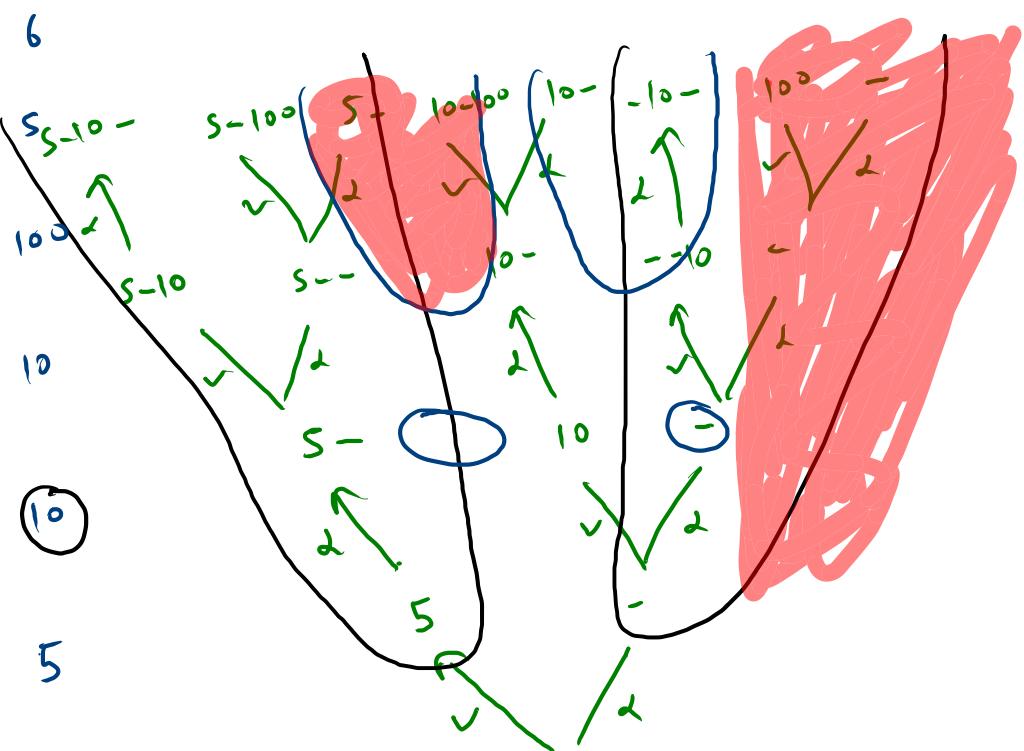
5 - - 100 - (→ 11
- 10 - 100 - - 6 → 116)



5 10 10 100 5 6

exclu
inclus





PATM fence

$b \rightarrow 3$

$k \rightarrow 3$

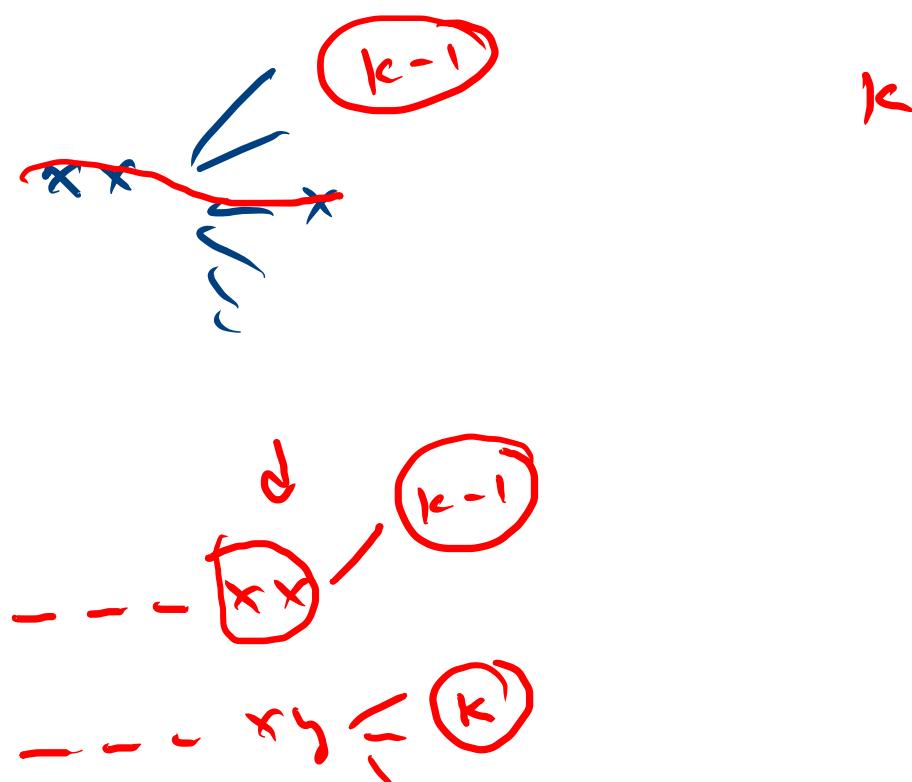
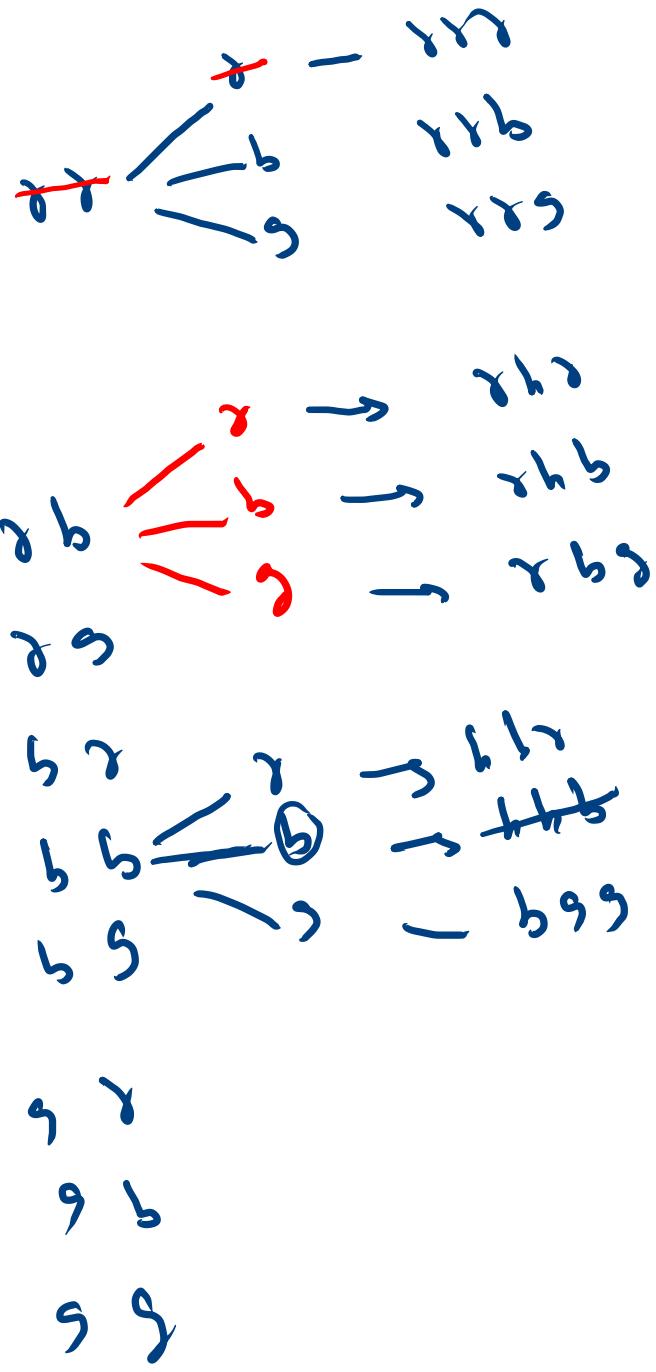
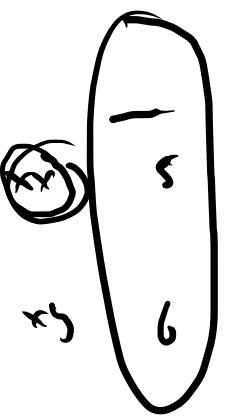
$r b g$

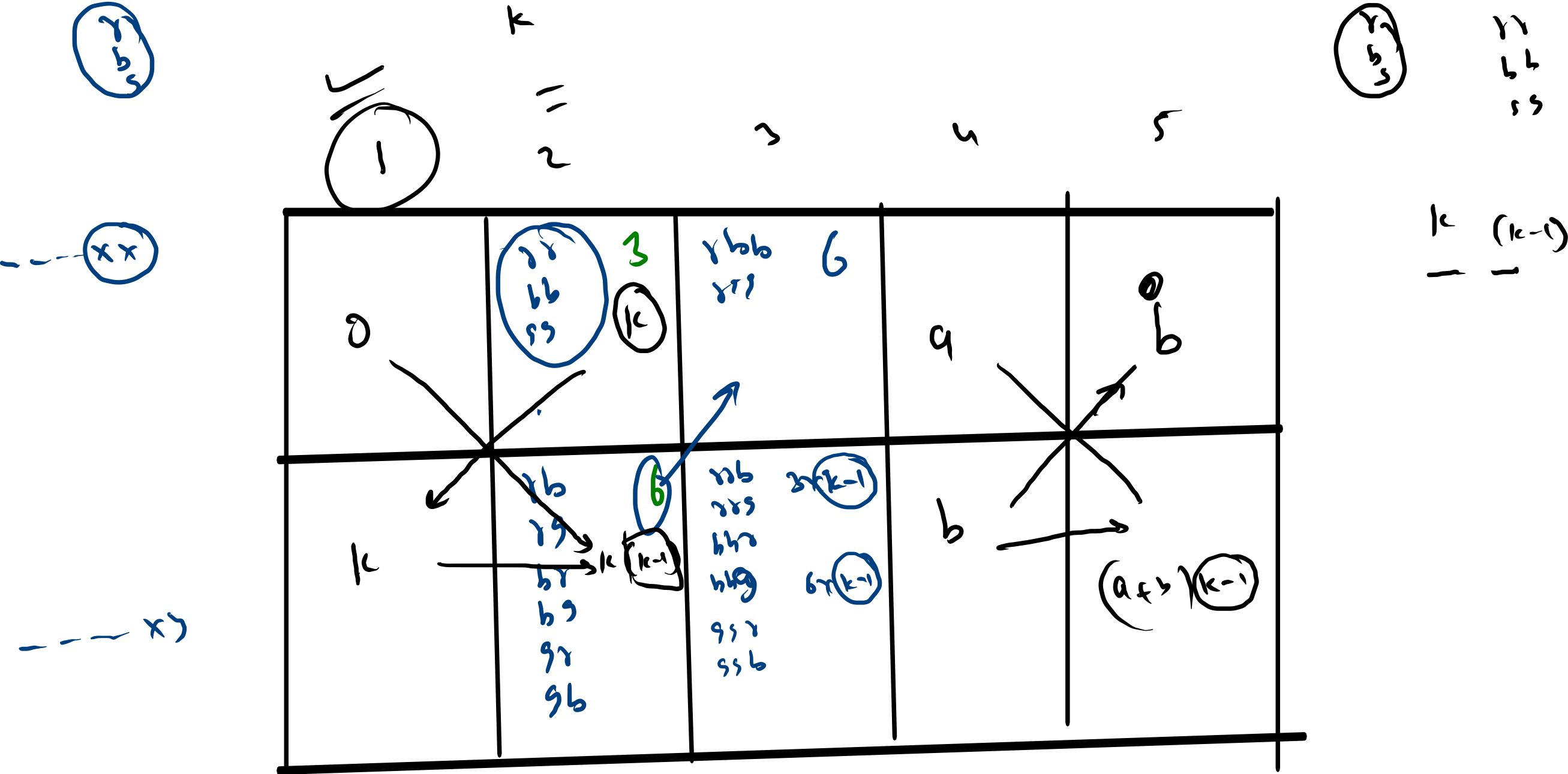
$r b r r b r r b r$

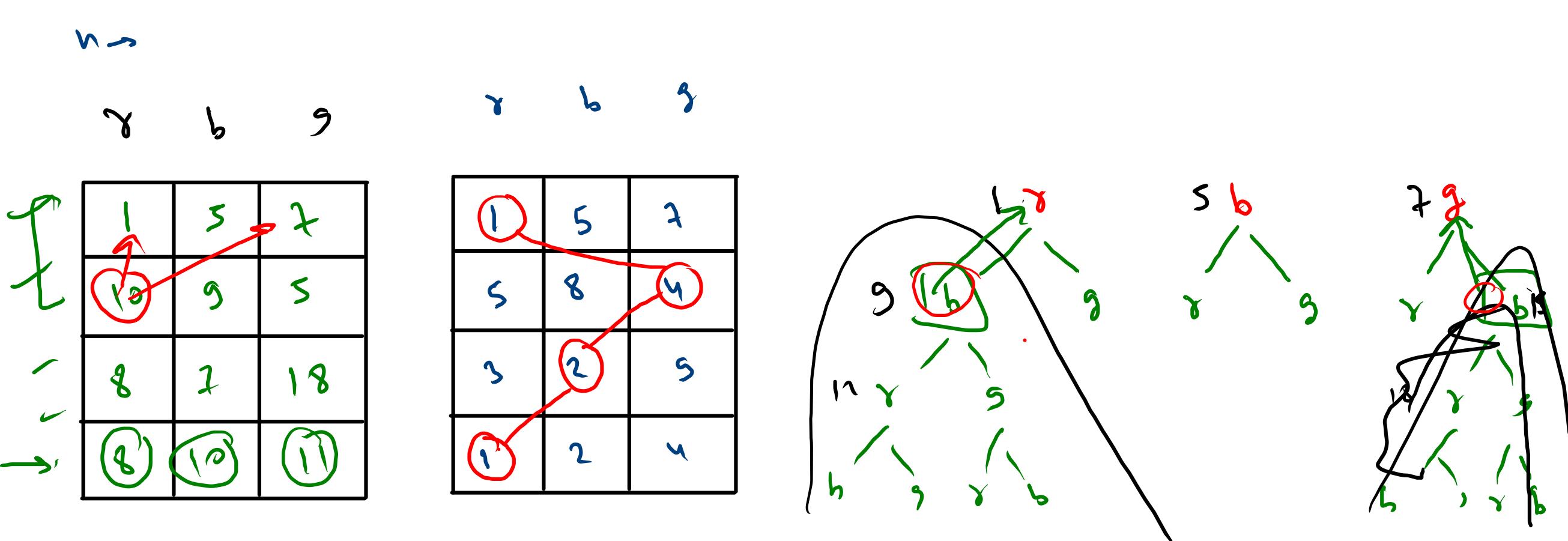
~~$r r r r$~~
 $r r b$
 $r r g$
 $r b r$
 ~~$r b b$~~
 $r b g$
 $r g r$
 $r g b$
 $r g g$

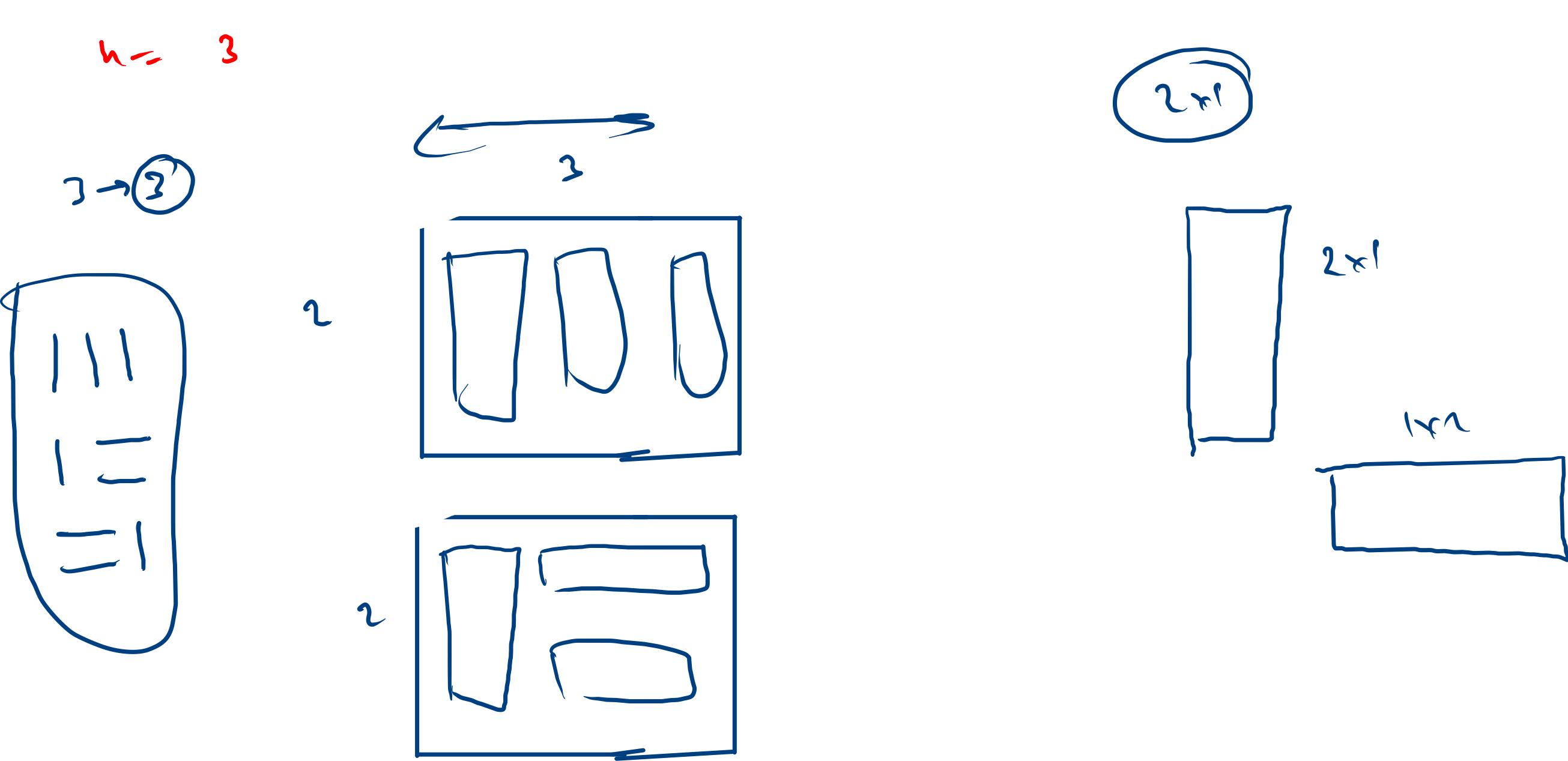
$b r r$
 ~~$b r b$~~
 ~~$r r g$~~
 $r b r$
 ~~$b b b$~~
 $b b g$
 $b g r$
 $b g b$
 ~~$b g g$~~

$r r$
 $r b$
 $r g$
 $b r$
 $b b$
 $b g$
 $g r$
 $g b$
 ~~$g g$~~

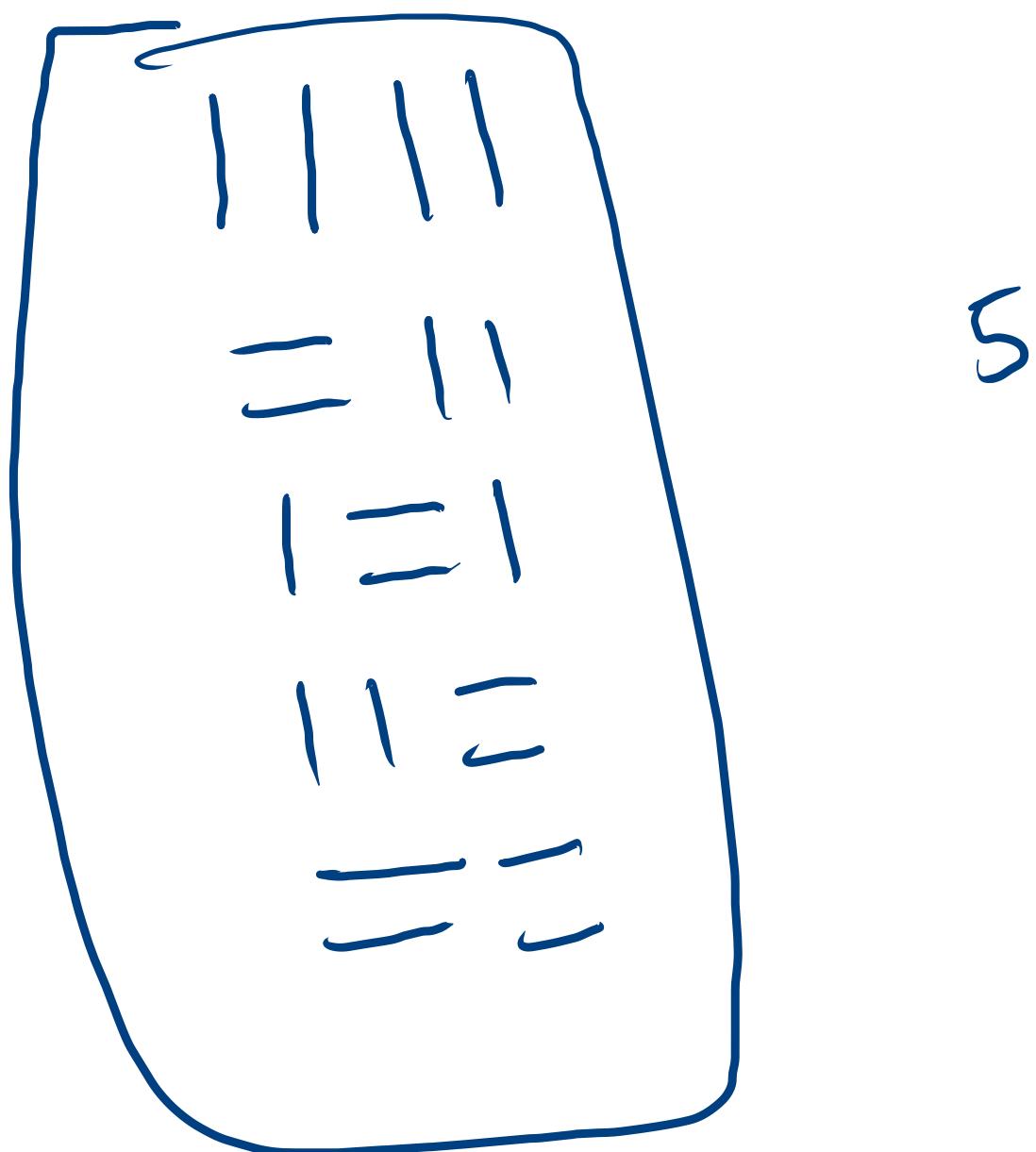






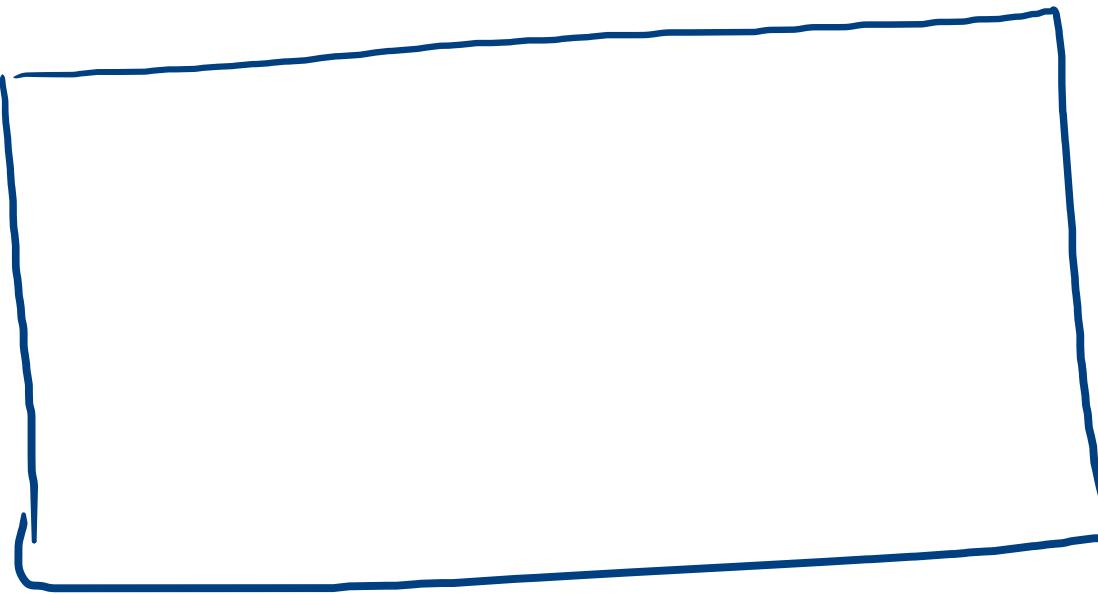


$n \rightarrow 4 \rightarrow 5$



5

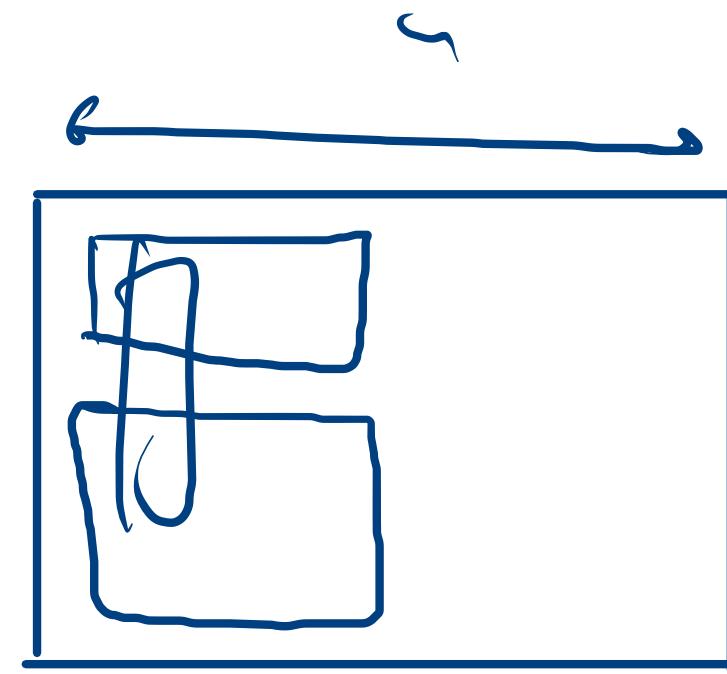
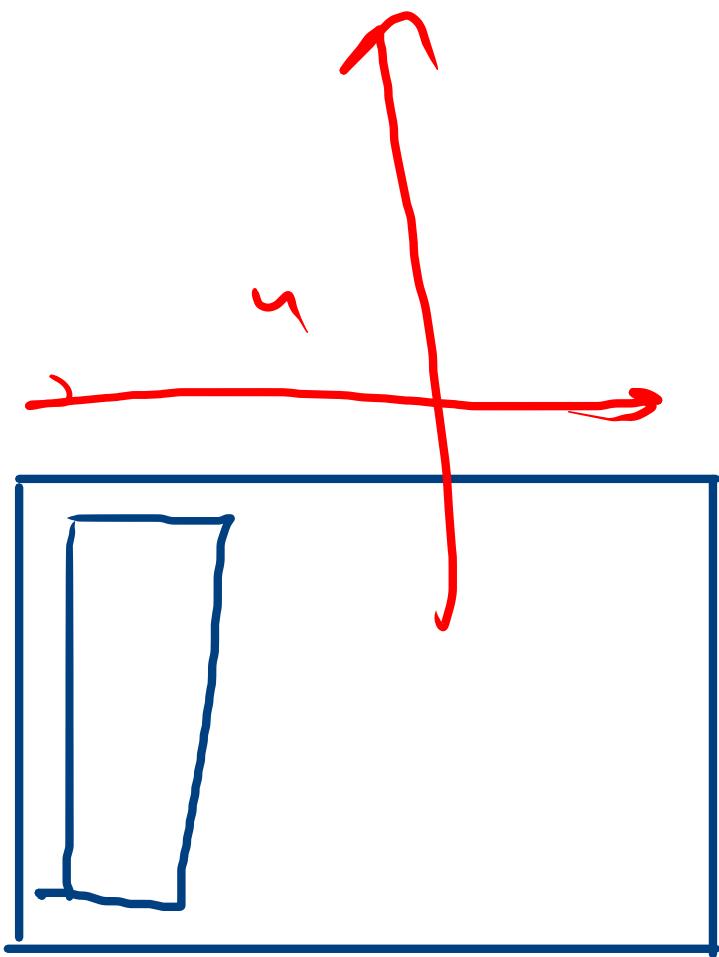
$n \rightarrow 1$



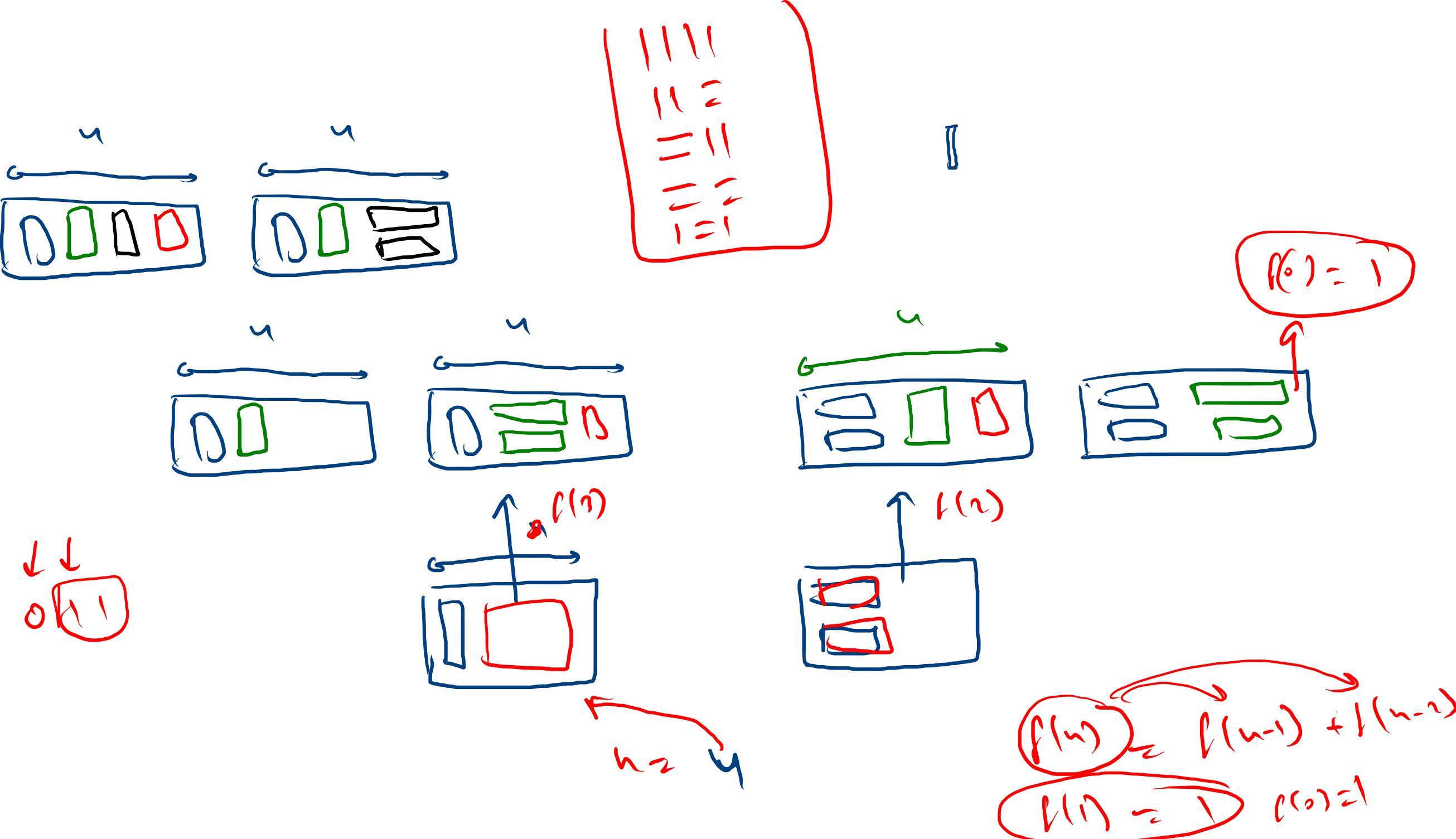
|||
==
||

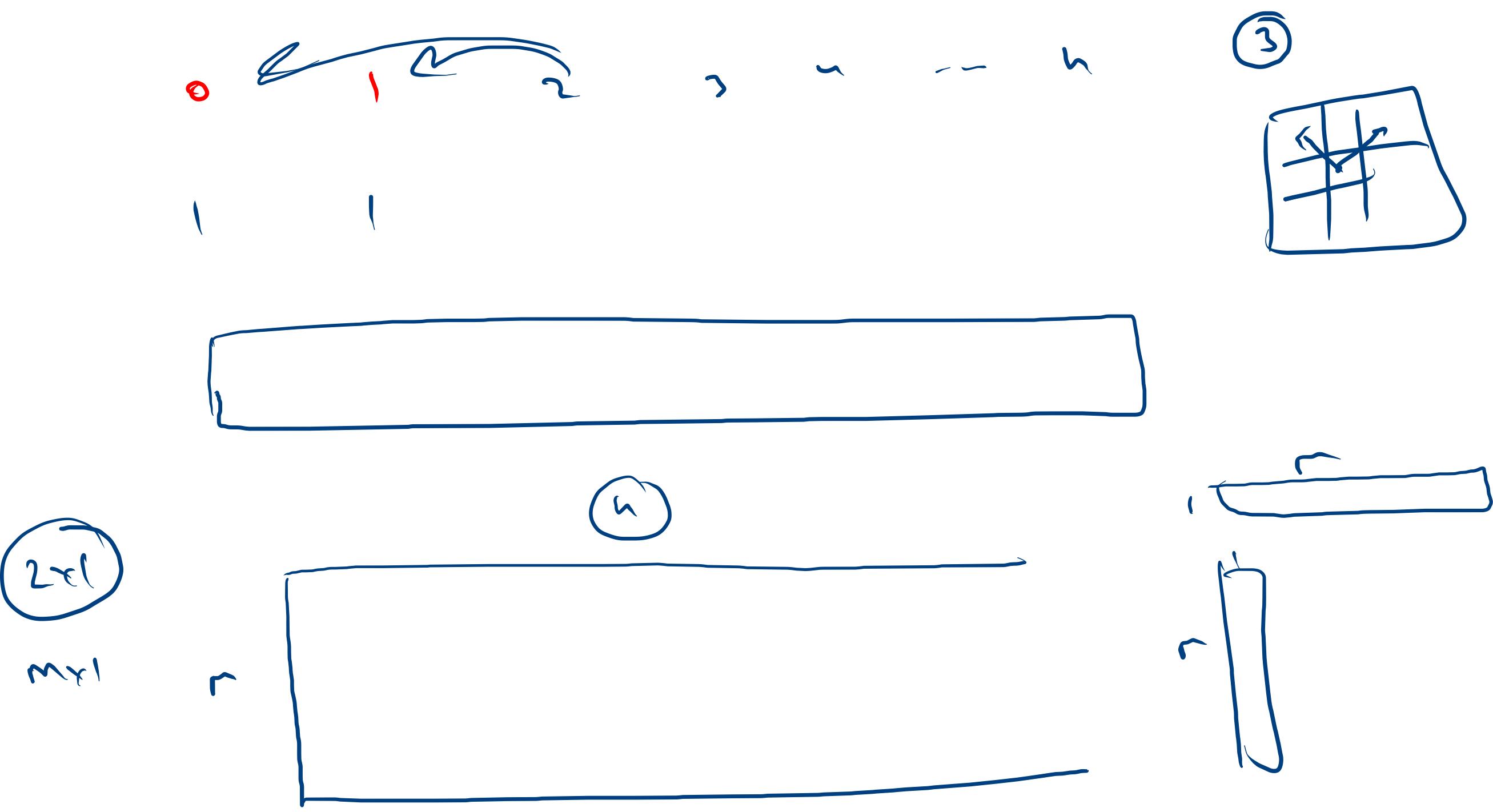


$f(\alpha)$

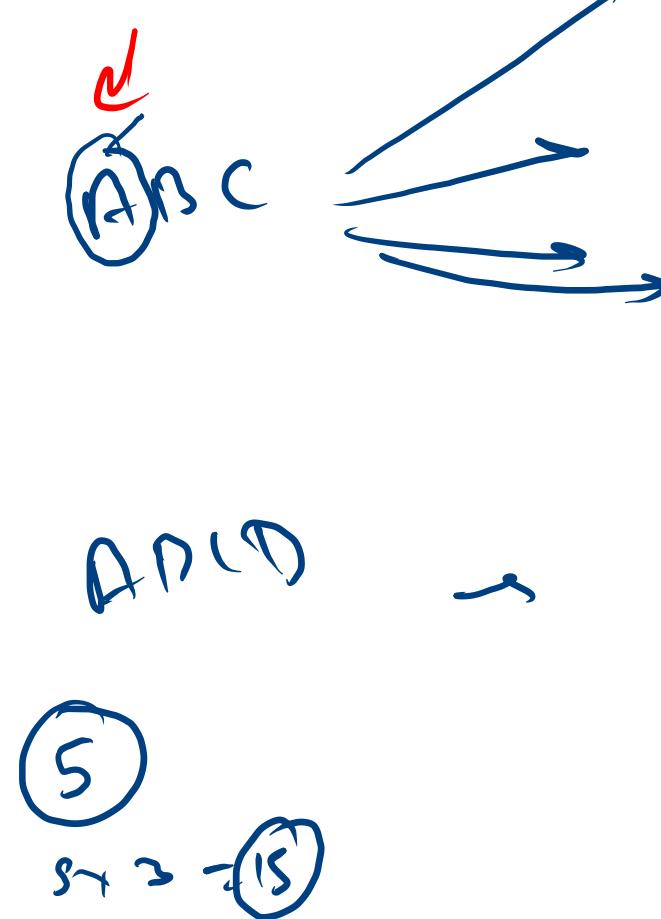
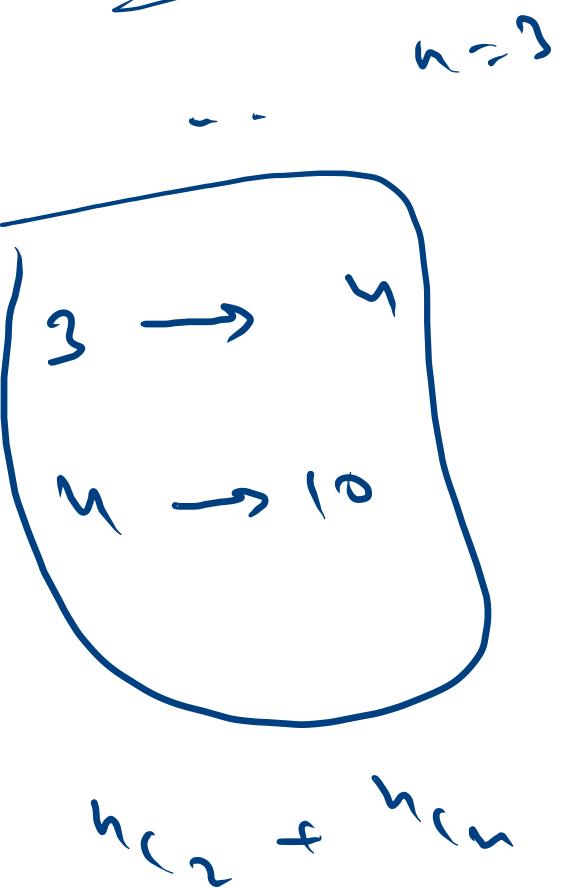


ζ





Friends Paritus



$A - n - c$

$AB - c$

$A - BC$

$A \cap - D$

$A - n - c - D$

$AB - c - D$

$Bn - CD$

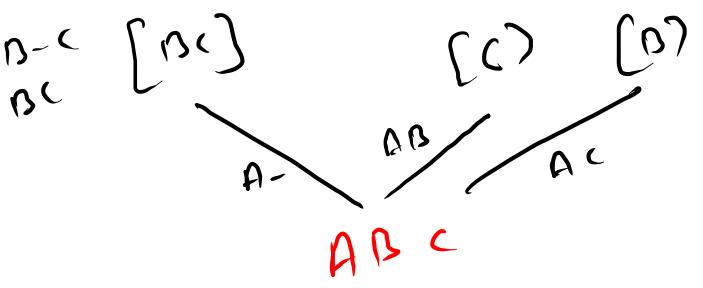
$A - BC - D$

$A - n - CD$

$A - BD - c$

n

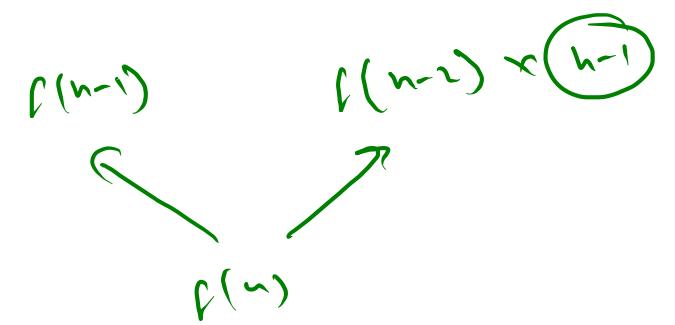
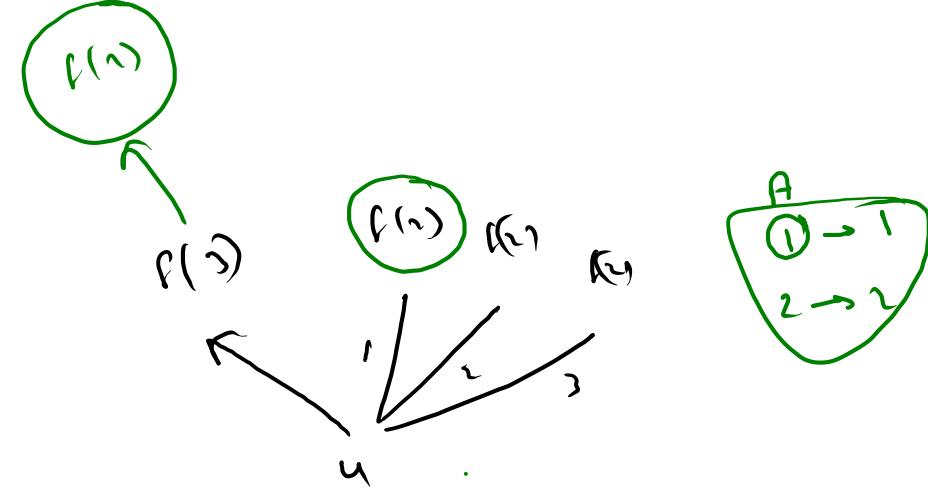
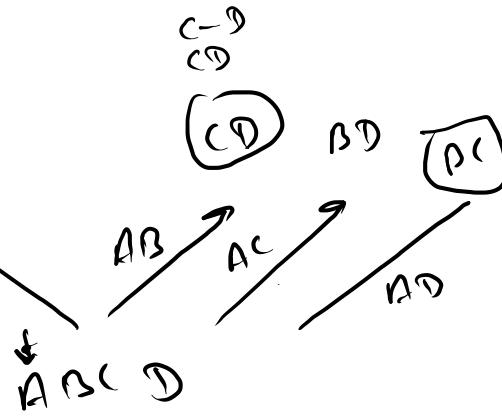
$C - BD$



$A - B - C$
 $A - BC$

$AB - C$
 $AC - B$

$A - DC - D$
 $A - DC - \emptyset$
 $A - B - CD$
 $D - BD - C$



partition into subsets

$$\begin{matrix} n \rightarrow 4 \\ k \rightarrow 3 \end{matrix}$$

A B C D

A - B - C D

A - B C - D

A D - C - D

A C - B - D

A D - B - C

B D - A - C

$AB[2] \rightarrow A - D$

$ABC[2] \rightarrow$

$B - CD$
 $BC - D$
 $BD - C$

$BCD[2]$

$A - \text{alone}$

$A - B - CD$

$A - BC - D$

$A - BD - C$

$B - C - D$

$BCD[3]$

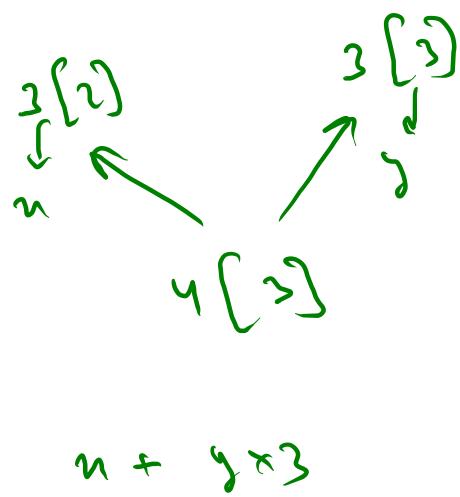
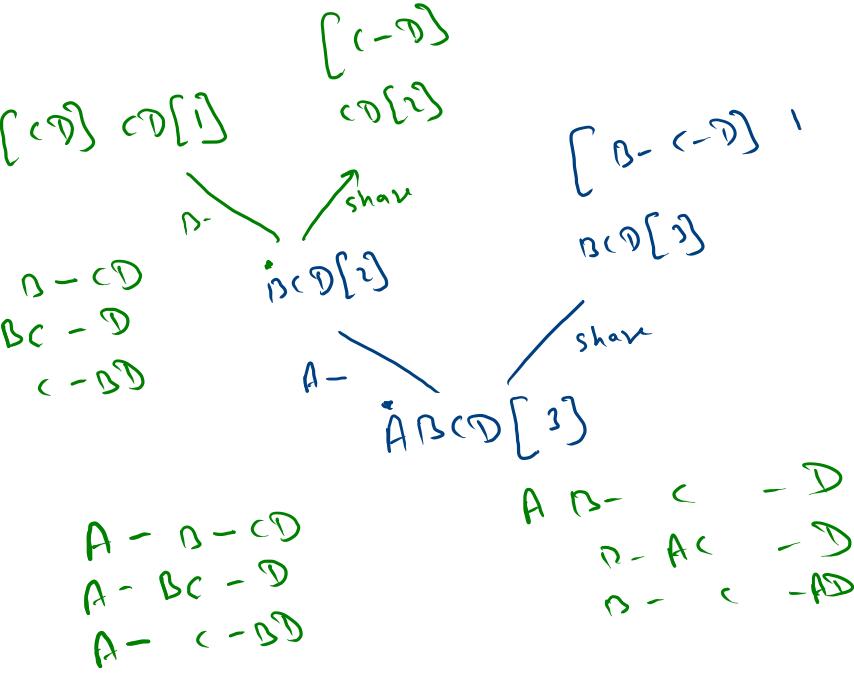
$A \text{ share}$

$ABC[3]$

$ABC - C - D$

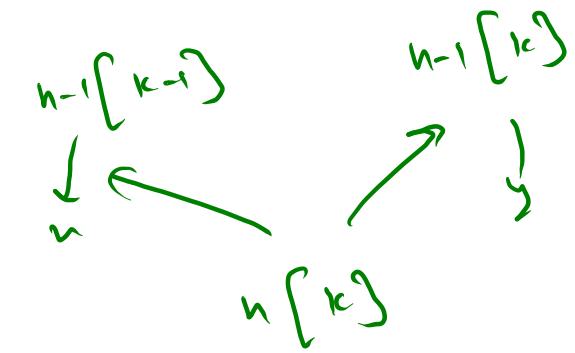
$B - AC - D$

$B - C - AD$



$$n + g \times 3$$

$$\begin{cases} n < k \rightarrow 0 \\ n = k \rightarrow 1 \end{cases}$$



$$f(n, k) \rightarrow \boxed{n + g \times k}$$

$$f(n, k) \rightarrow f(n-1, k-1) + f(n-1, k) \times k$$

$k=0$

```
public static long partitionKSubset(int n, int k) {  
    if(n==k) return 1;  
    if(n<k) return 0;  
  
    long nm1km1 = partitionKSubset(n-1, k-1);  
    long nm1k = partitionKSubset(n-1, k);  
  
    return nm1km1 + nm1k*k;  
}
```

$1[0]$

$2[1]$

$2[2]$

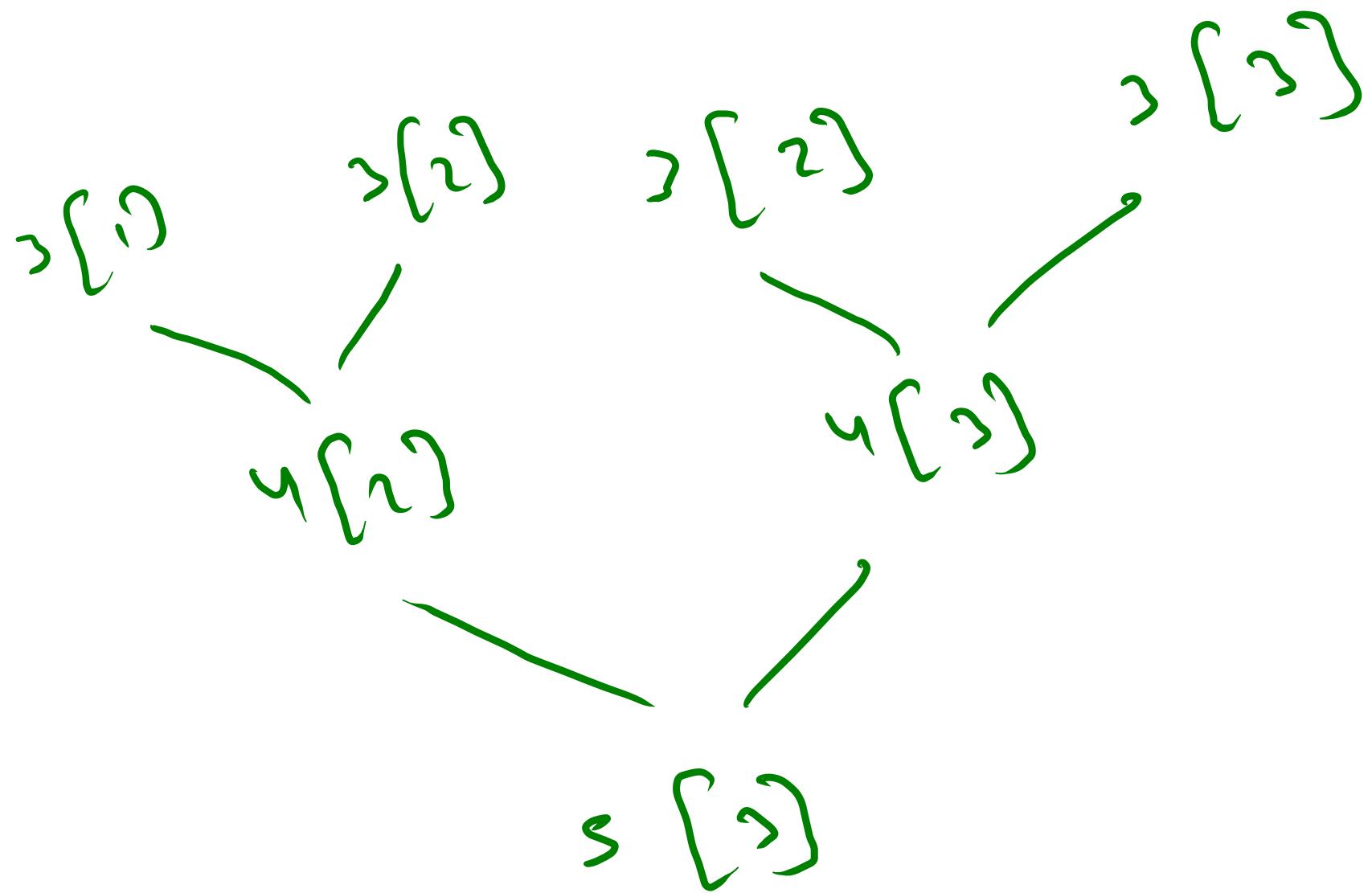
$2[2]$

$3[2]$

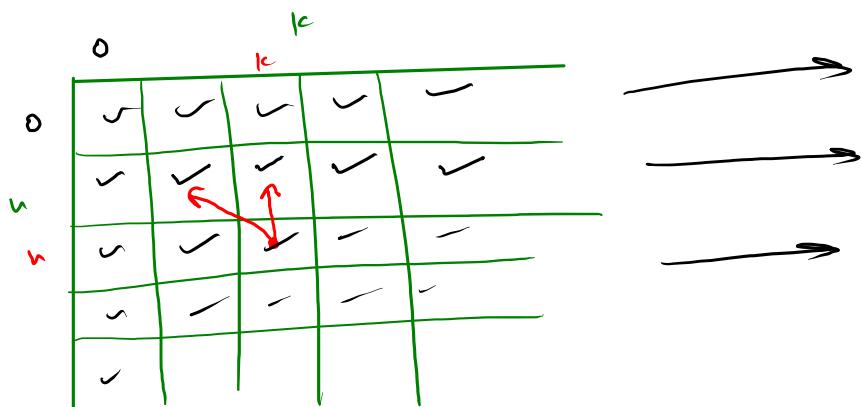
$4[2]$

$3[2]$





$$f(n,k) \rightarrow f(n-1, k-1) + f(n-1, k)^{\Delta k}$$



$$f(n,k) \rightarrow f(n-1, k-1) + f(n-1, k)^{\Delta k}$$

STACK

Arras → arr^i

Arrasizar → arrasizar^i

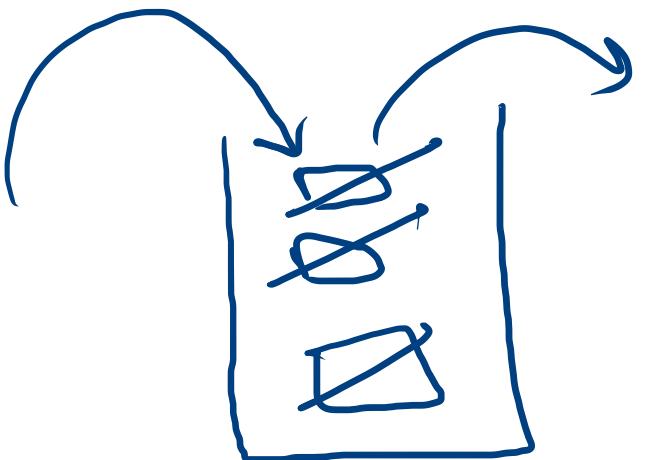
shins → shins^i

S B → S B^i

stack → stack^i

serv(i, val) {a, b, c, ...}

get(i)



Stack< Integer> s2 = new Stack<>();

AL

add(val), add(i, val)

get(i)

remove(i)

set(i, val)

Stack

push(val)

peek()

pop()

L

$$((a+b) + (c+d)) \rightarrow \text{false}$$

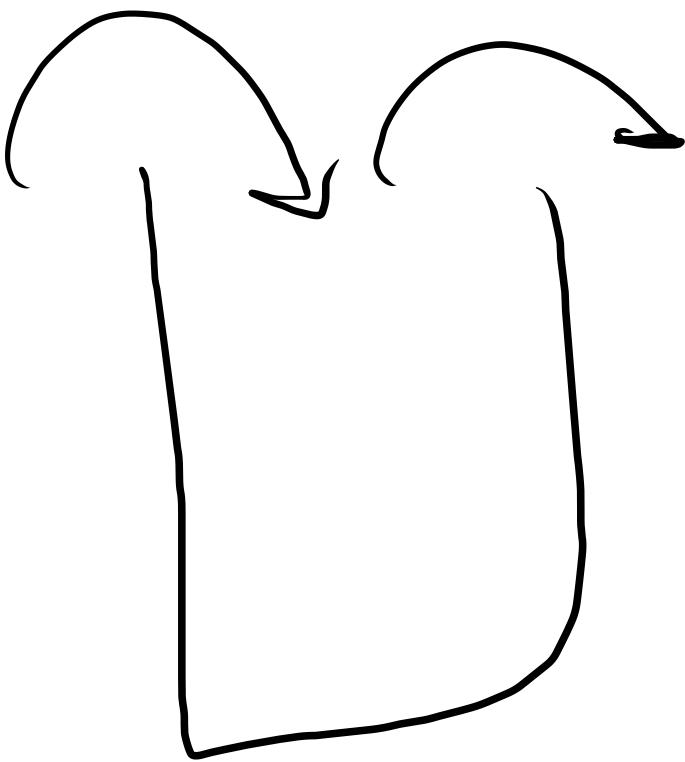
$((a+b) + (c+d)) \rightarrow \text{false}$
 $(a+b) + ((c+d)) \rightarrow \text{true}$

$$(a+b) + ((c+d)) \rightarrow \text{true}$$



$$(\cancel{(a+b)}) \rightarrow \text{false}$$

$$((\leftarrow \cancel{a+b}) + (c+d))$$



$$((\leftarrow \cancel{a+b}) + (c+d))$$
$$(\times \cancel{f(x)})$$
$$(\times) \rightarrow \textcircled{1}$$

$$-(a+b) + ((c+d))$$

↓
+ ~~(+(+))~~
+ (↑)

~~(a+b)~~ + ~~((c+d))~~
+ (↑)

$$[(a+b) + \{(c+d) * (e/f)\}] \rightarrow \text{true}$$

$$[(a+b) + \{(c+d) * (e/f)\}] \rightarrow \text{false}$$

$$[(a+b) + \{(c+d) * (e/f)\}] \rightarrow \text{false}$$

$$[((a+b) + \{(c+d) * (e/f)\})] \rightarrow \text{false}$$

?

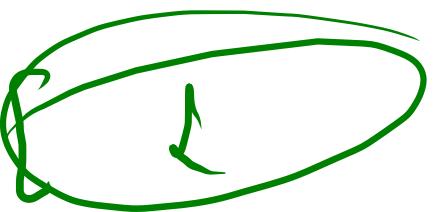
??

[← → { () · () }]
[{ ← → () }]
[← → { () }]

[← → { () · () }]
[{ ← → { () } }]
[{ ← → { () } }]

[i] { () } }

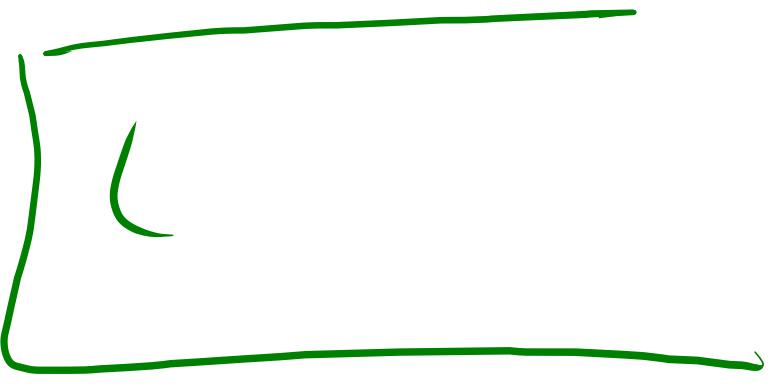
(?)
?)



() 0



(C)



2 9 8

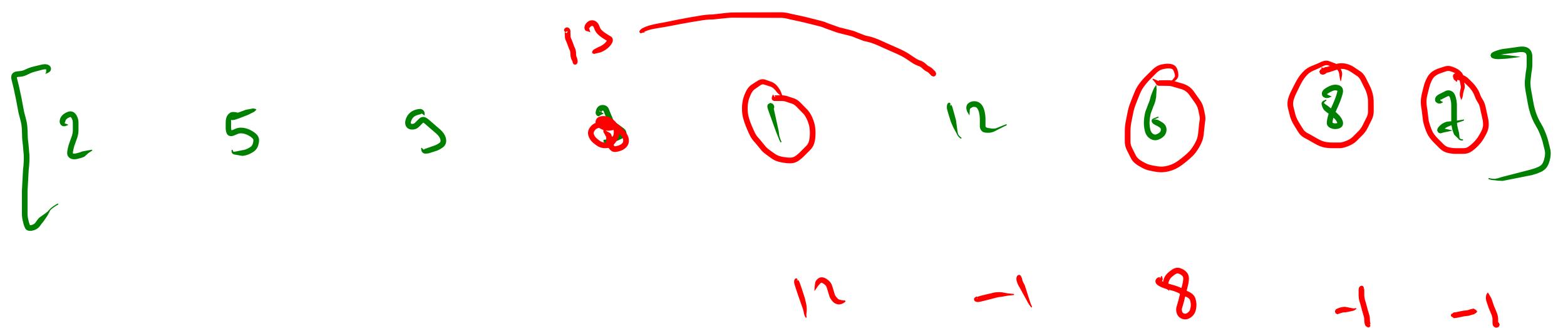
$$\begin{bmatrix} 2 & 5 & 9 & 3 & 1 & 12 & 6 & 8 & 2 \end{bmatrix}$$

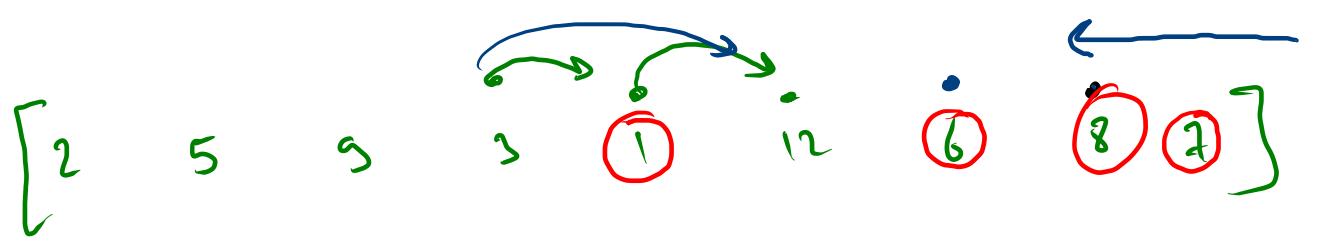
ans \rightarrow $\begin{bmatrix} 5 & 9 & 12 & 12 & 12 & -1 & 8 & -1 & -1 \end{bmatrix}$

←

[2 5 9 3 1 12 6 8 7]

[5 9 12 12 12 -1 8 -1 -1]





for i ← n-1 & 0

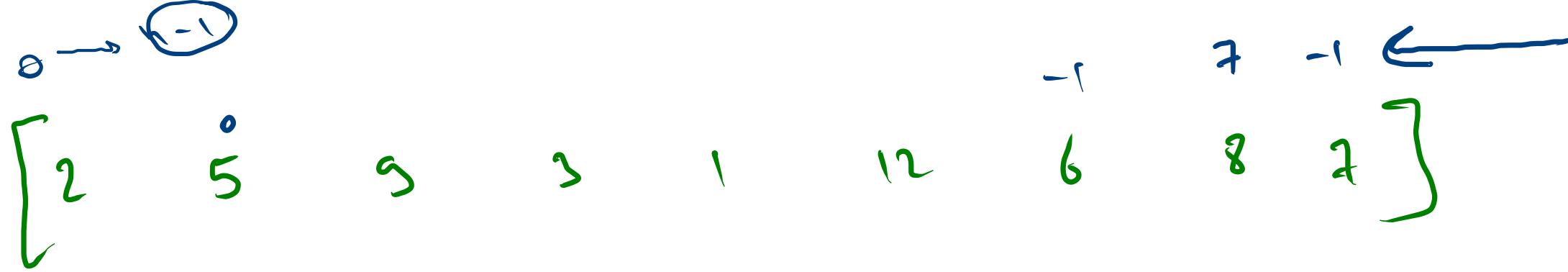
- small equal

ans

ans [12 12 -1 8 -1 -1]

+ push

right
left



n (5) r
small

gre
small

<= top
>= pop

Complexity

[a b c ↴ ↴ ↴]

e < p

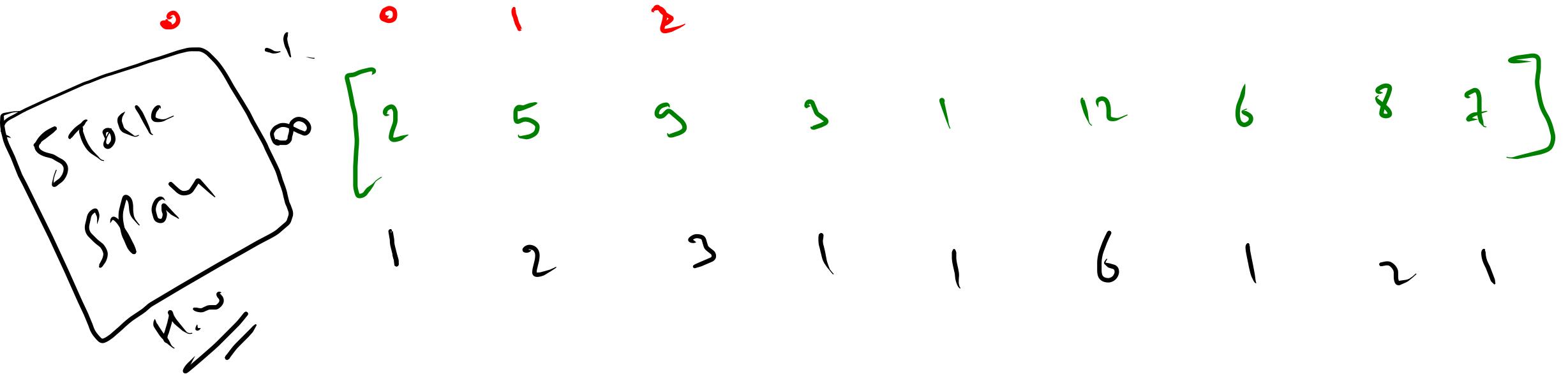
```
for(int i=n-1;i>=0;i--){  
    while(st.size() > 0 && st.peek() <= arr[i]) st.pop();  
    if(st.size() == 0){  
        ans[i] = -1;  
    }else{  
        ans[i] = st.peek();  
    }  
    st.push(arr[i]);  
}
```

$O(n)$

$O(n)$

0
0
2

Time Complexity



for the array [2 5 9 3 1 12 6 8 7]

span for 2 is 1

span for 5 is 2

span for 9 is 3

span for 3 is 1

span for 1 is 1

span for 12 is 6

span for 6 is 1

span for 8 is 2

span for 7 is 1

Greater or Left

-1	0	1	2	3	4	5	6	7	8
0	2	5	9	3	1	12	6	8	2
1	2	3							



- 10

ans

st. is empty

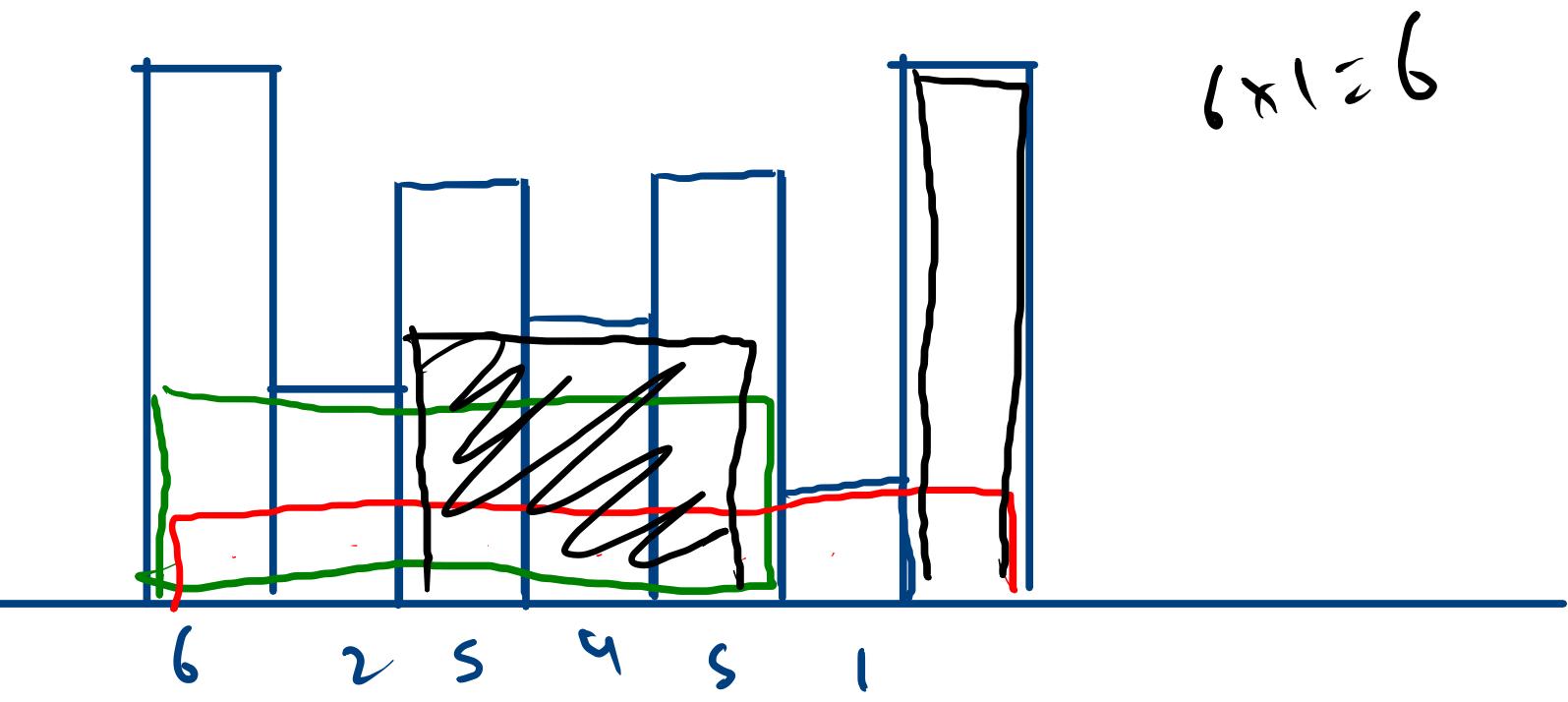
i++

else i = st.pop()

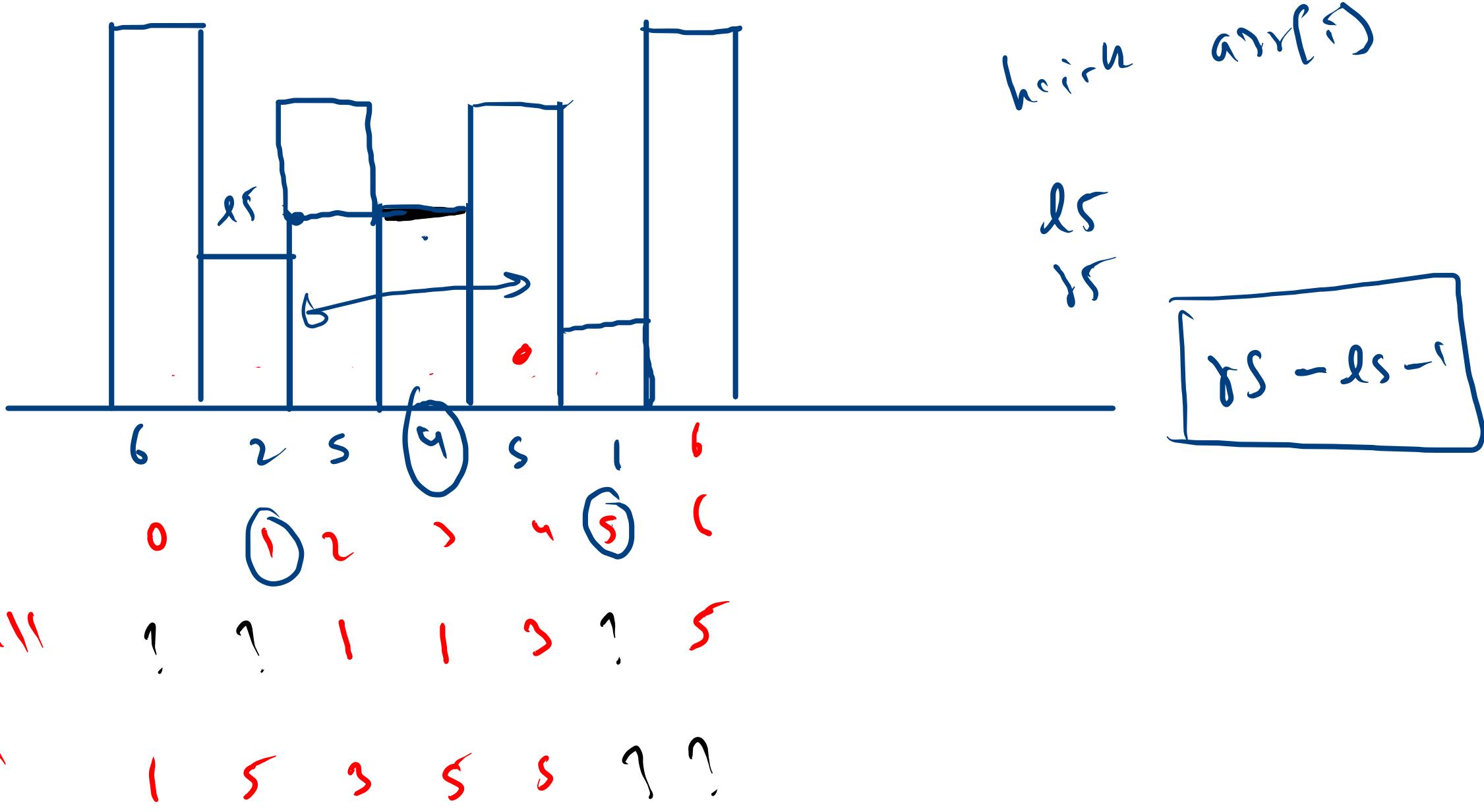
$$2 \times 5 = 10$$

$$1 \times 2 = 2$$

$6 \times 2 = 12$



[6 2 5 4 5 1 6] \rightarrow 12



Indirect
Method
Complex



$$a+b - (c \& d) * e / g$$

\downarrow
 $a+b$
 $+ab$
 $ab+$

infix
prefix
 postfix

C
* /
+ -

$$2 + \sqrt{6} \quad |8 - 3$$



$$2 + \sqrt{24} \quad |8 - 3$$



$$\boxed{2 + 3^{-3}}$$

s →

↓
z ↙

$$2 + 6^{\star} 4 / (8 - 3) \rightarrow$$

$$\downarrow$$

$$2 + 6^{\star} 4 / 5$$

$$\downarrow$$

$$2 + 2^{\star} 15$$

$$2 + 2^{\star} 1 / (8 - 1)$$

$$2 + 2^{\star} 1 / 5$$

$$2 + 2^{\star} 1 / 6$$

$$2 + 2^{\star} 1 / 6$$

$$2 + 6 \star 4 \quad (08\ominus 2)$$

$$\frac{2 + 6 \star 4}{2 + 6 \star 4}$$

~~for~~ for

$$S^2 \geq m_{\text{soluc}}$$

$a+b \rightarrow a \cdot b$
 $b \in a$
 $a-b$
 a/b

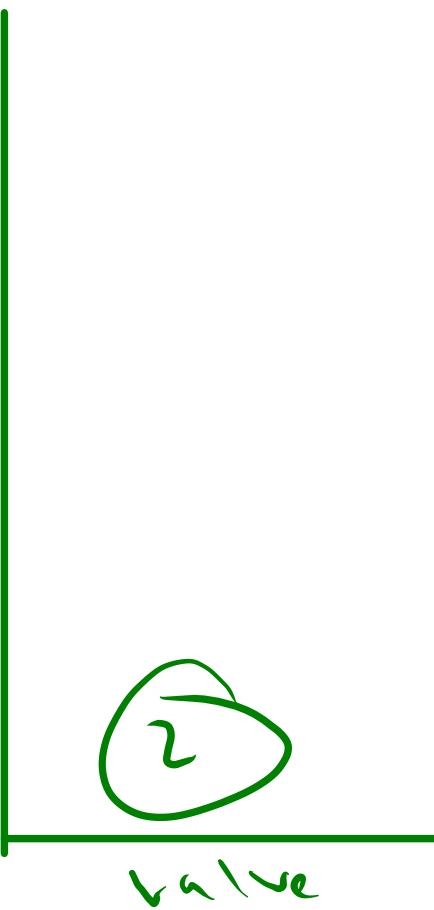
if $i \in \{1, 2, \dots, n\}$

$s = 3$

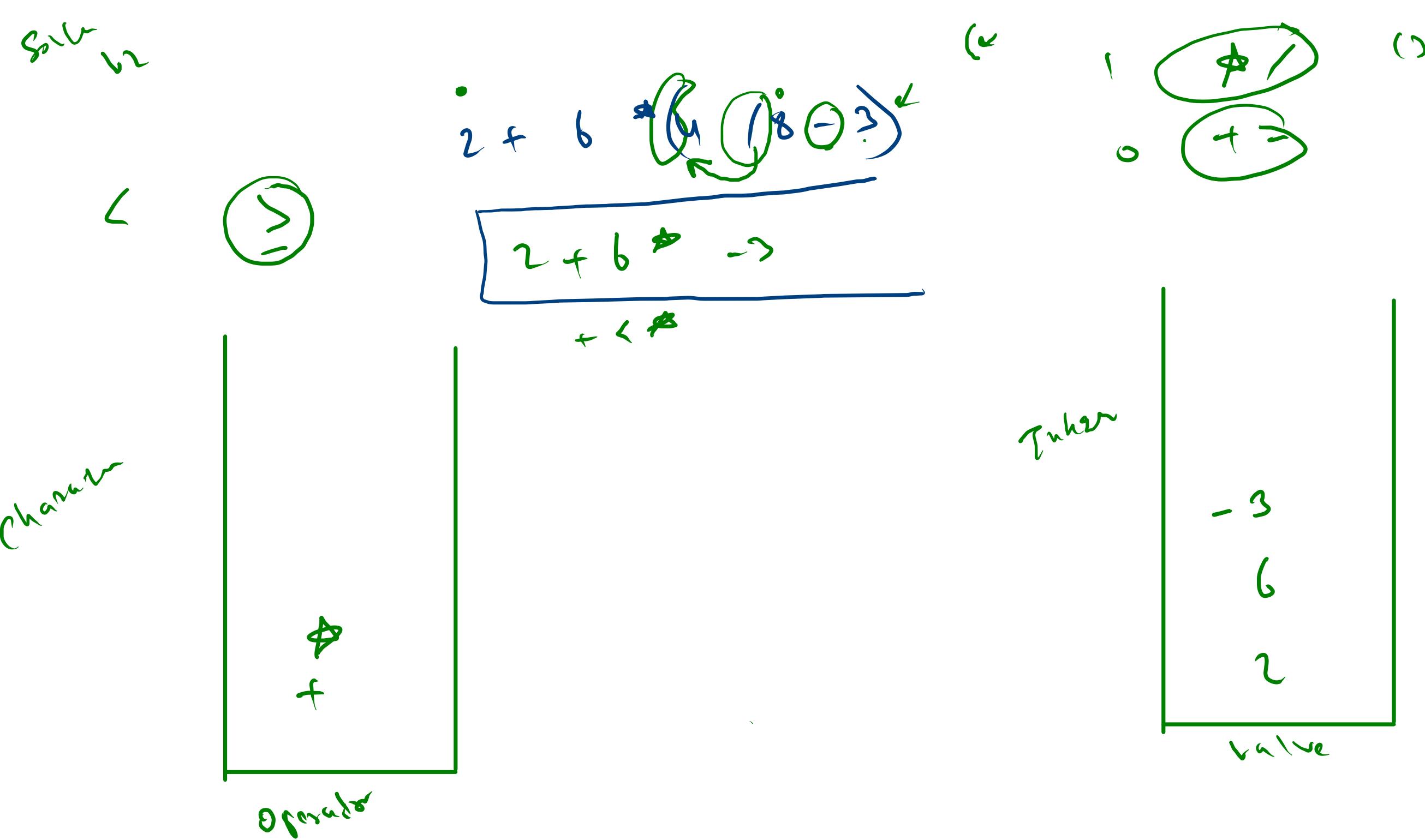


$op = 1$

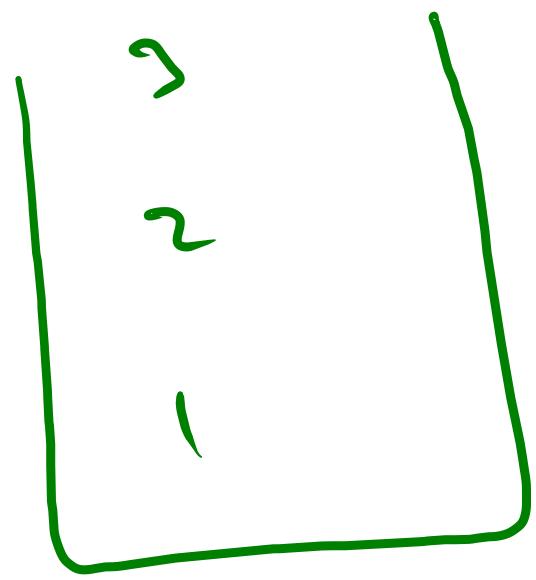
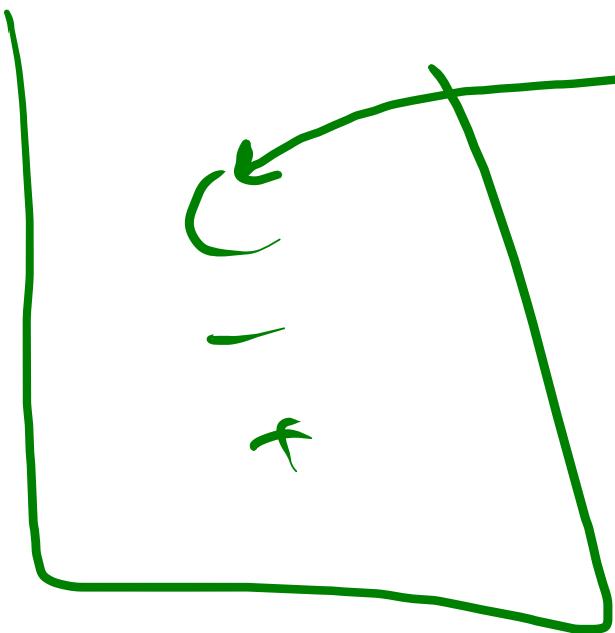
$v_2 = 8$
 $v_1 = 2$



$+ \geq *$
 $* \geq 1$



i+i : (i+i)



Conventions

Syntax

$$a * (b - c + d) / e$$

$$a * (-bc + d) / e$$

$$a * + -bcd / e$$

$$+ a + -bcd / e$$

$$/ \not a + -bcd e$$

in
pre

$a+b$

$+ab$

$ab+$

post

$$a * (b - c + d) / e$$

$$a * (bc - +d) / e$$

$$a * bc - d + / e$$

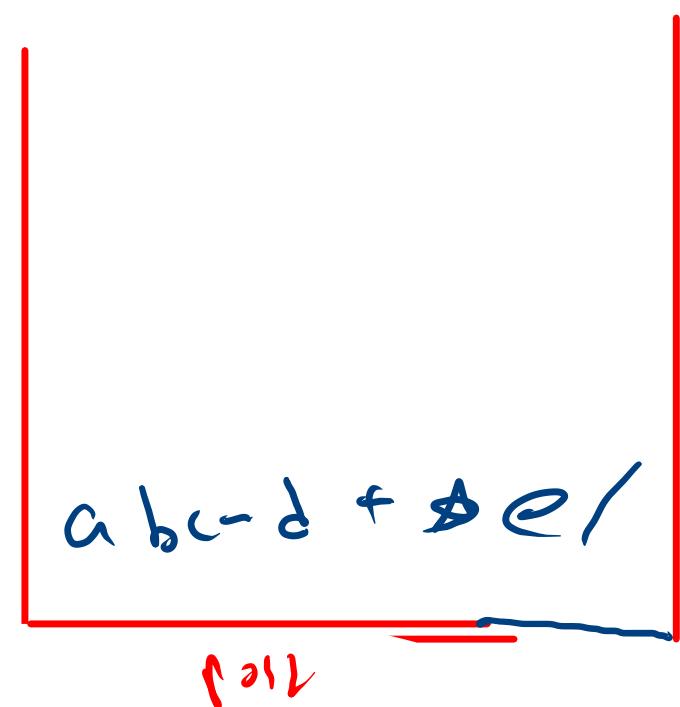
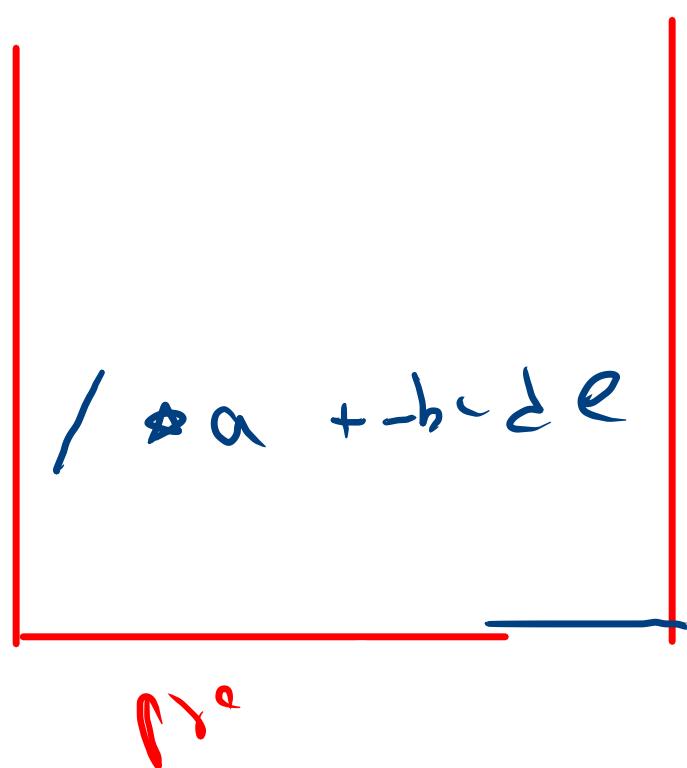
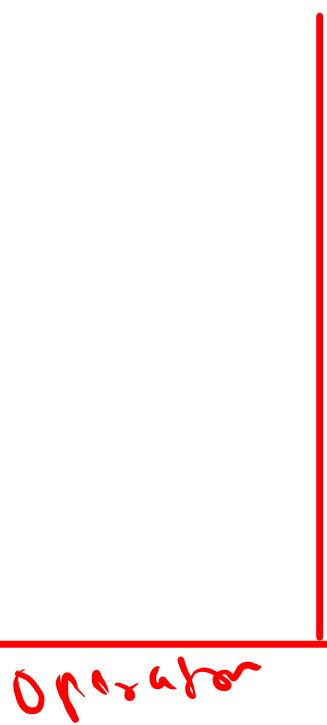
$$a bc - \rightarrow + e /$$

in $v_1 \text{ op } v_2$

pre \rightarrow op $v_1 v_2$

post $\rightarrow v_1 v_2 \text{ op}$

inp(b-c+d)e



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$$a \otimes (b - c + d) / e$$

$$a \otimes (bc - + e) / e$$

$$a \otimes bc - d + / e$$

$$a bc - \rightarrow x \otimes e /$$

$$a \otimes (b - c + d) / e$$

$$a \otimes (bc - + e) / e$$

$$a \otimes bc - d + / e$$

$$a bc - \rightarrow x \otimes e /$$

$$a bc - \rightarrow x \otimes e /$$

~~ah~~ \leftarrow +. Δe^l

$$a \oplus (b - c + d) / k$$



$$v_1 v_2 \oplus$$

$$v_1 \oplus v_2$$

$$v_2 \leftarrow c$$

$$v_1 \leftarrow b$$

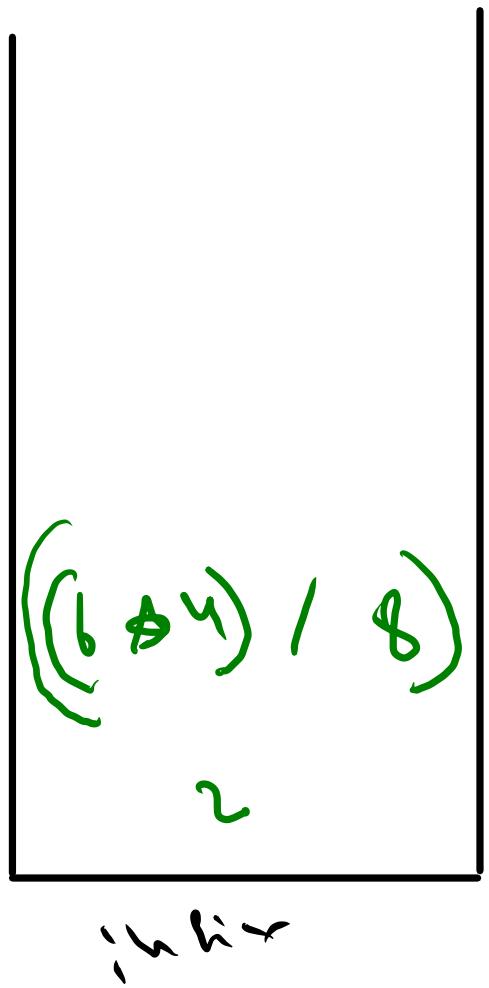
$$v_1 v_2 \oplus$$

264*8/+3-

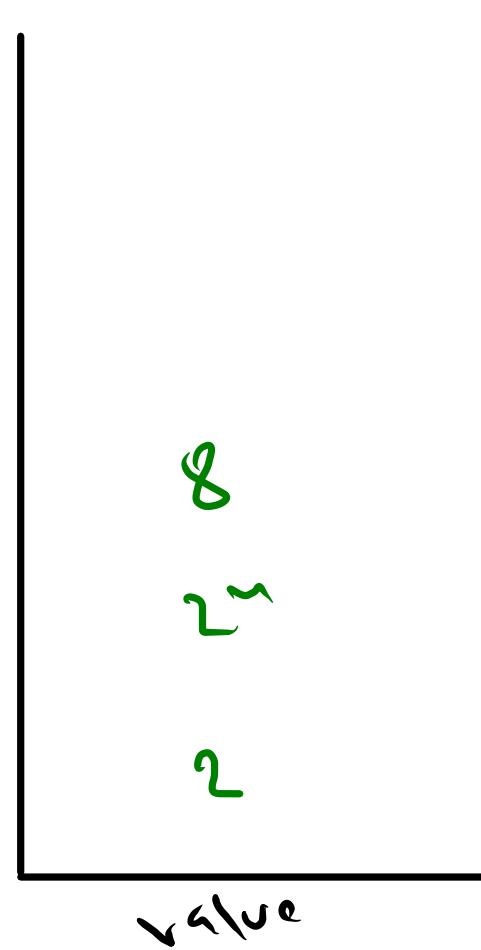
i^o b a ~~8~~ i + 3 -

2 1 8

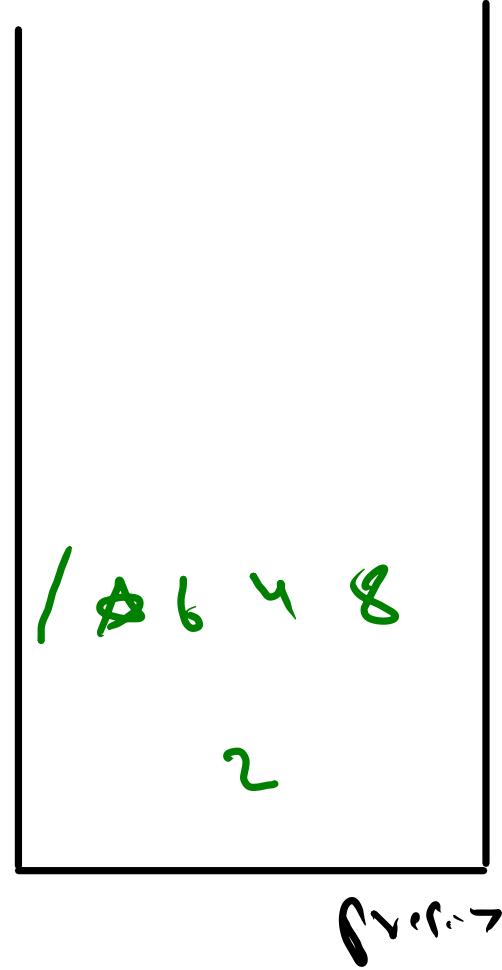
v1 v2
l s



local



value

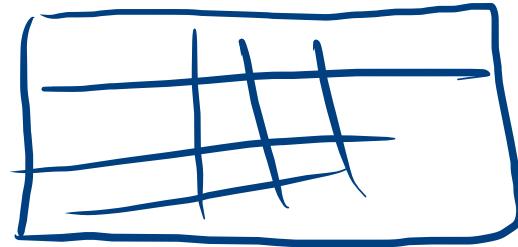


sum

Targets

subsequn

no-rep

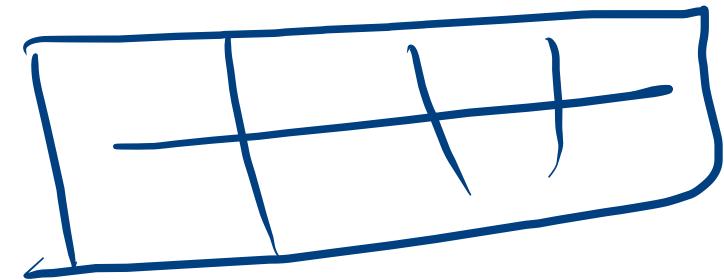


2D

01 keys

subsequn

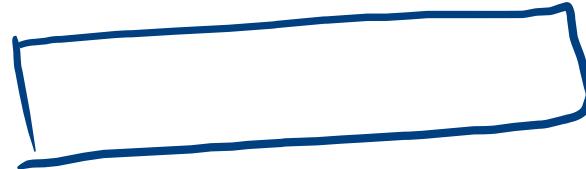
no-rep



combin

subsequn

repetit



1D

uniqu-
keys

subsequn

repetit



1D

right \rightarrow

$$a+b \not\in (c+d)$$

$$a+b \not\in c+d$$

$$a+b \not\in c+d$$

$$ab \not\in c+d$$

$$a+b+c+d \not\in$$

$$a+b \not\in c+d$$

$$abc \not\in c+d$$

$$a+b \not\in c+d$$

left