

mainQ

Q4.

★

1 2 3 4 5 6 7 8 9 10 11

val = ~~5~~ 6

pop ~~push~~

★

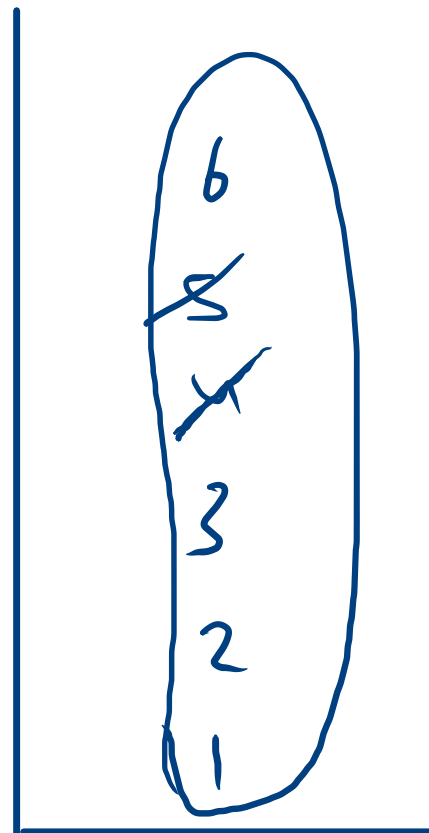
helperQ

1 2 3 4 5 6

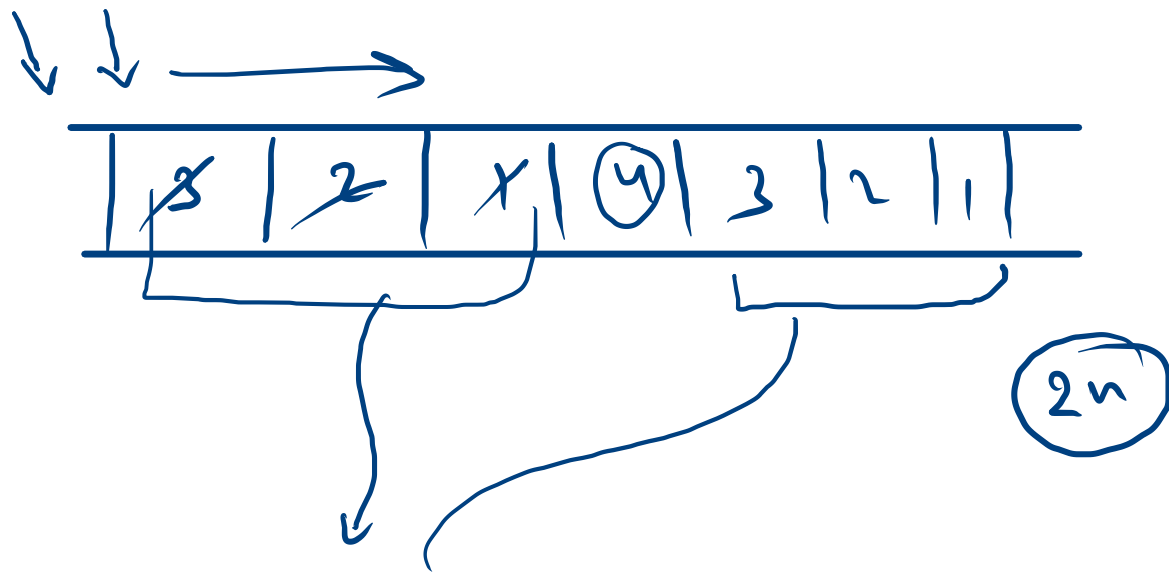
push $O(1)$

pop $O(N)$

4
5
6



main2

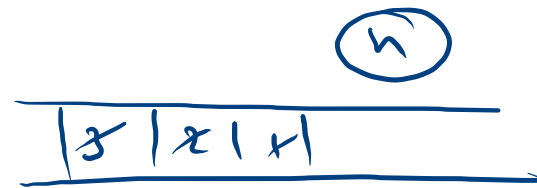


help2



pop $O(1)$ ★
push ★

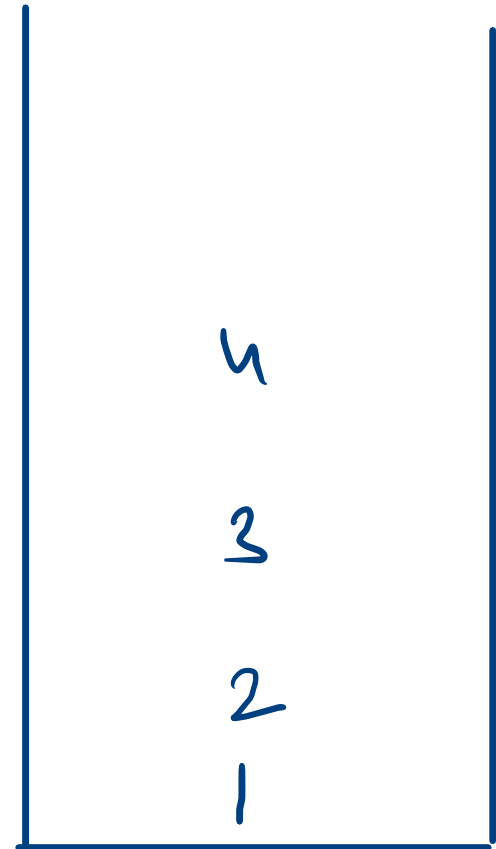
help2



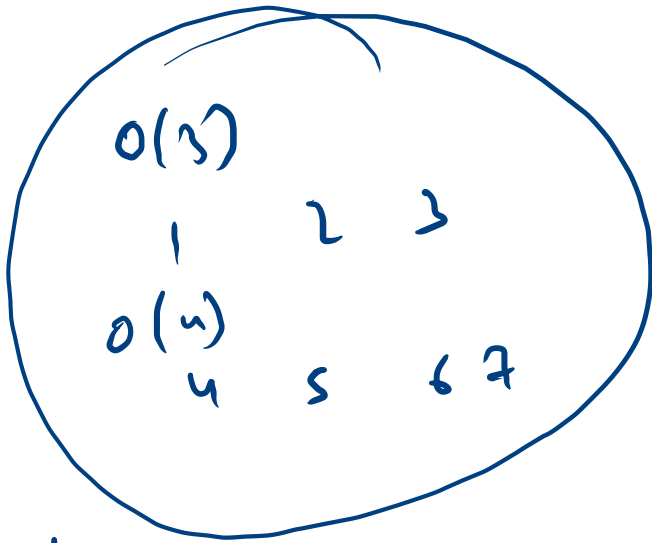
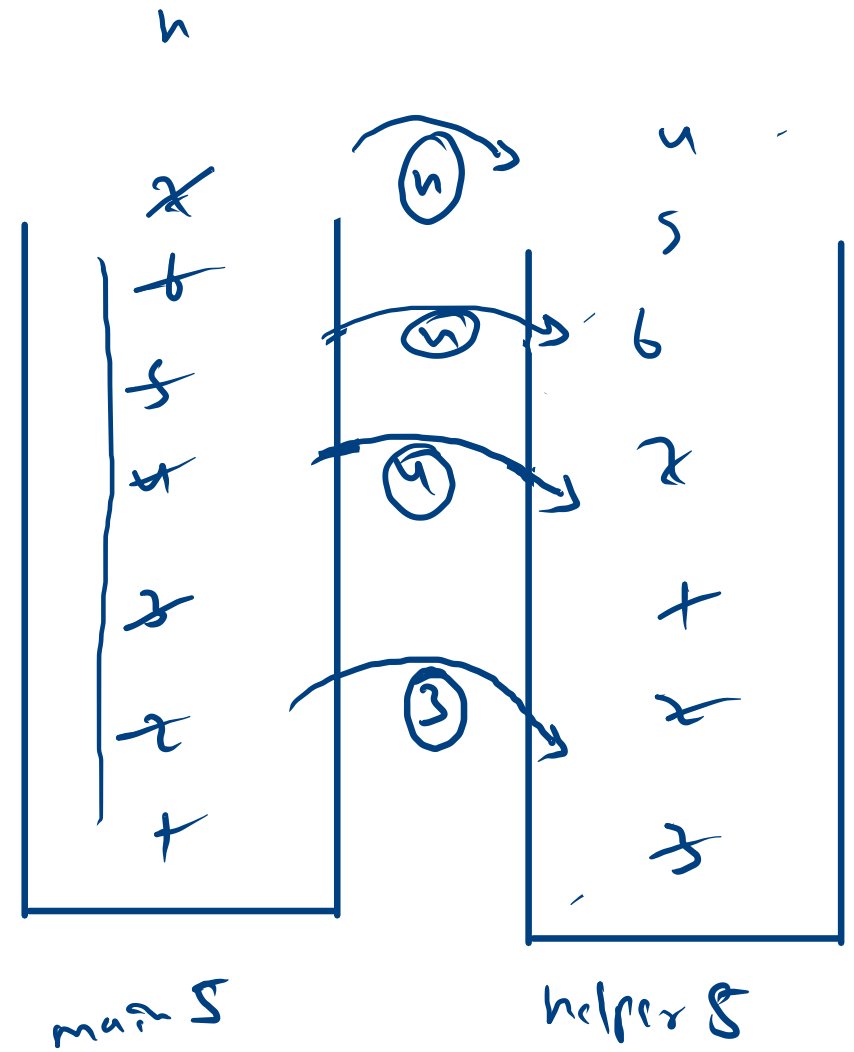
main2



3
2
1



↓
n



for $O(5)$ $O(1)$ $O(1)$ $O(1)$ $O(1)$

④ ⑤ ⑥ ⑦ ⑧



2nd

1
2
3

add $O(1)$
simple

$$\frac{O(n)}{n} = O(1) \text{ linear}$$

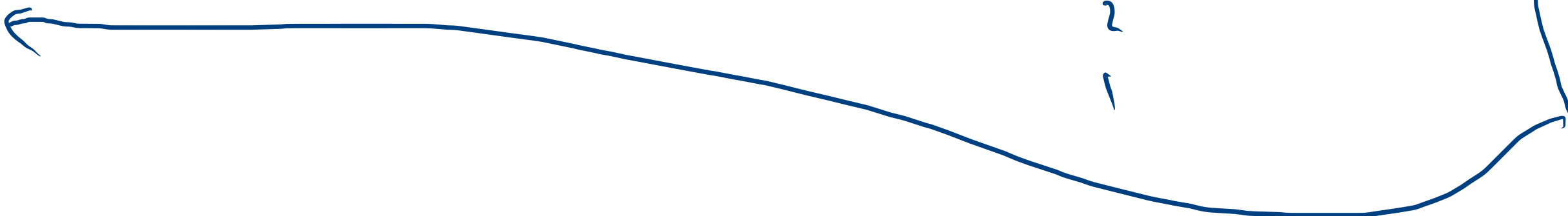
1
2
3
4

4
3
2
1

~~1~~
2
3
4

4
3
2
1

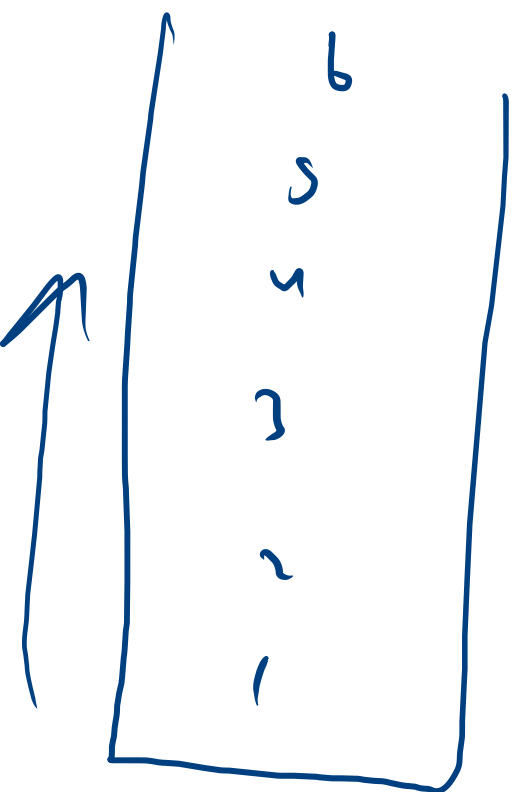
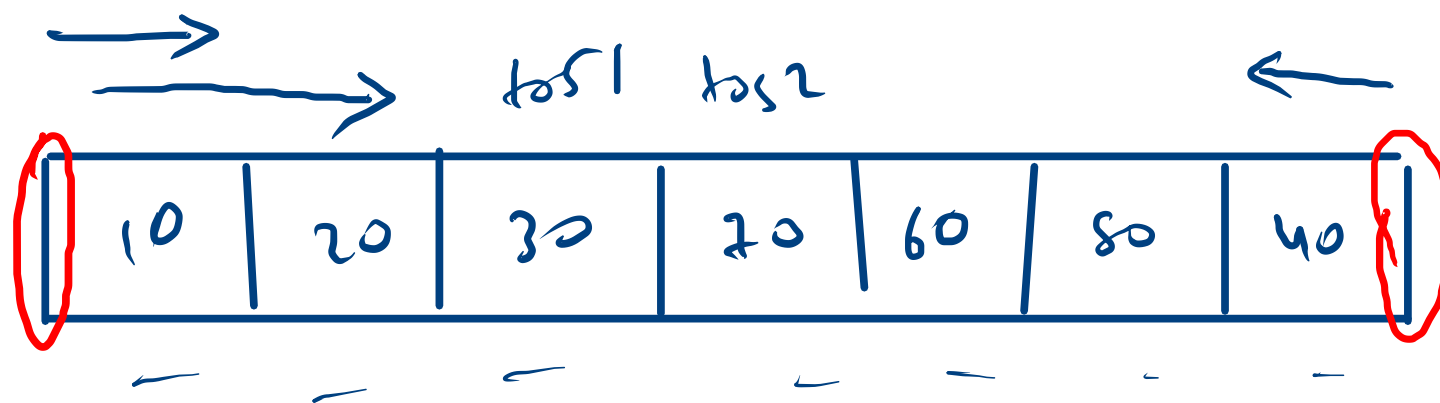
1
2
3
4



1
2
3
4

1 2 3 4

1 2 3 4

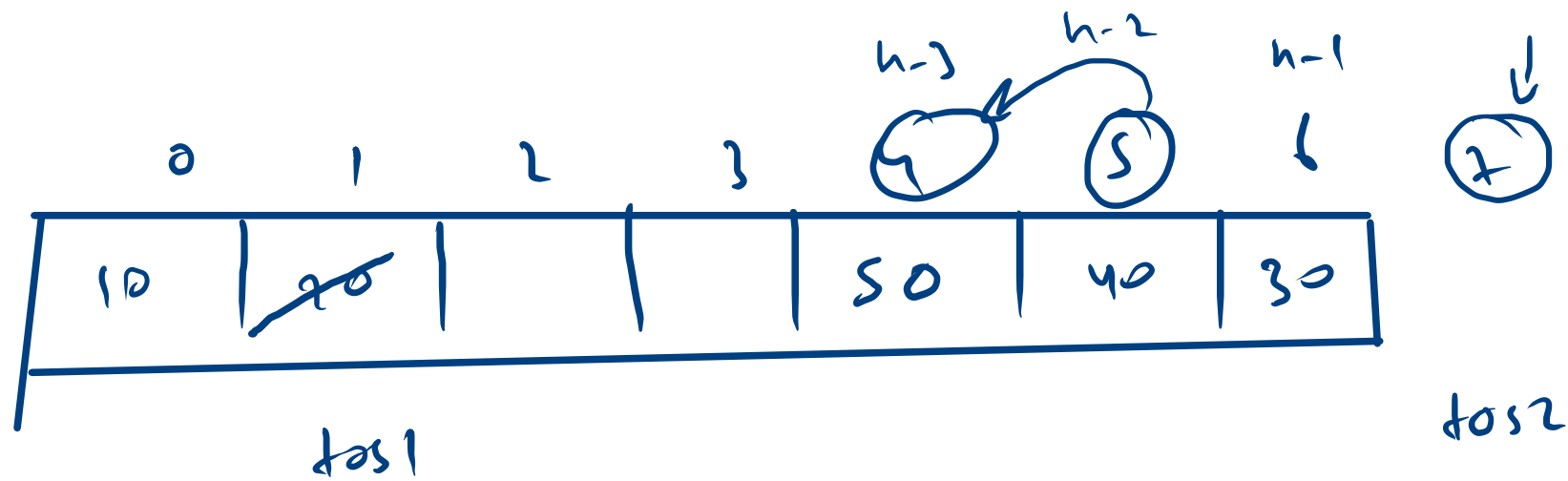


size1 = 3

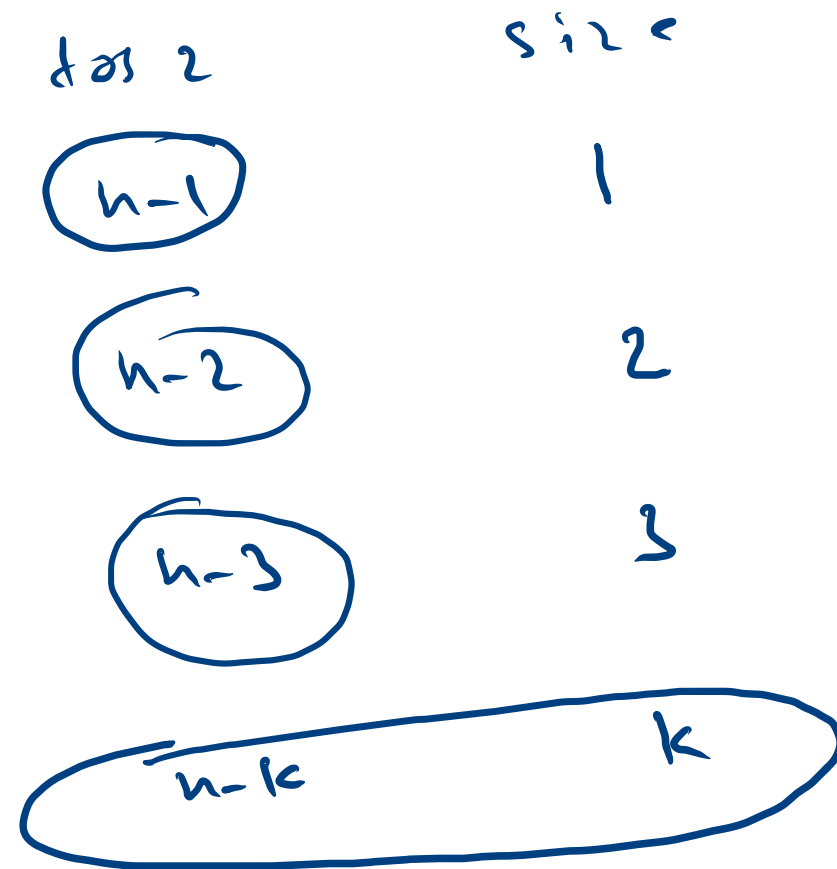
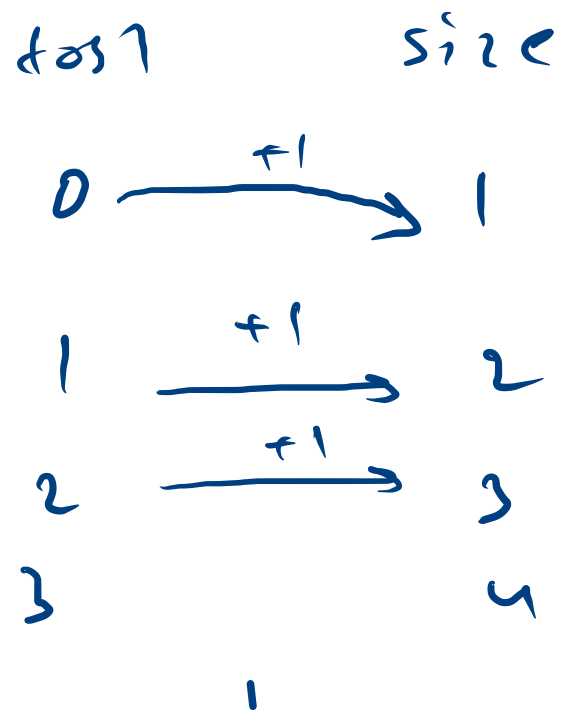
size2 = 4

⇒ 7

$$h = 7$$



$$\text{size} = h - h = 0$$

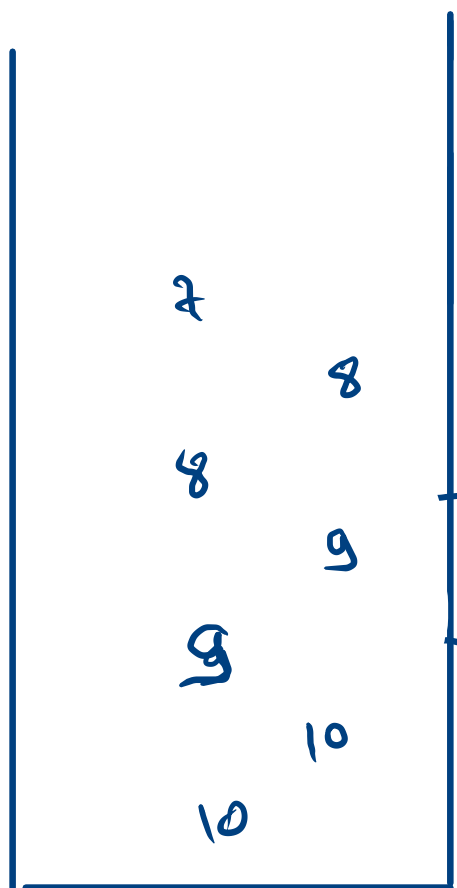


$$\text{size} = h - (\text{dos2})$$

$$k = h - (h - k) = h - h + k = k$$

~~push 10 push 20~~
~~push 5 push 8~~
~~push 2 push 4~~
~~push 11 top min~~
~~pop top min pop~~
~~top min pop top~~
~~min pop top min~~
~~pop top min pop~~
~~top min pop quit~~

11
 2
 11
 2
 2
 5



Data

8
9
10

min



push
 top → peek

push $O(1)$
 pop $O(1)$
 min $O(1)$
 space $O(n)$

11
4
2
8
5
20
10

$val \rightarrow 5$

$val < min$

★

$n = val + (-val - min)$

$2 + (2 - 5)$

$2 + (-3)$

(-1)

pop		push
$peek \geq min$ pop $peek < min$ $pmin = 2min - peek$ pop $val = min, min = pmin$		$val \geq min$ $push(val)$ $val < min$ $n = 2val - min$ $push(n)$ $min = val$

peek

0 n

20

10

10

<

>

=

val

5 $\leftarrow min$

$\rightarrow min$

10

peek min

$n = 2min - pmin$

$pmin = 2min - n$

$= 10 - n$

$= 10$

