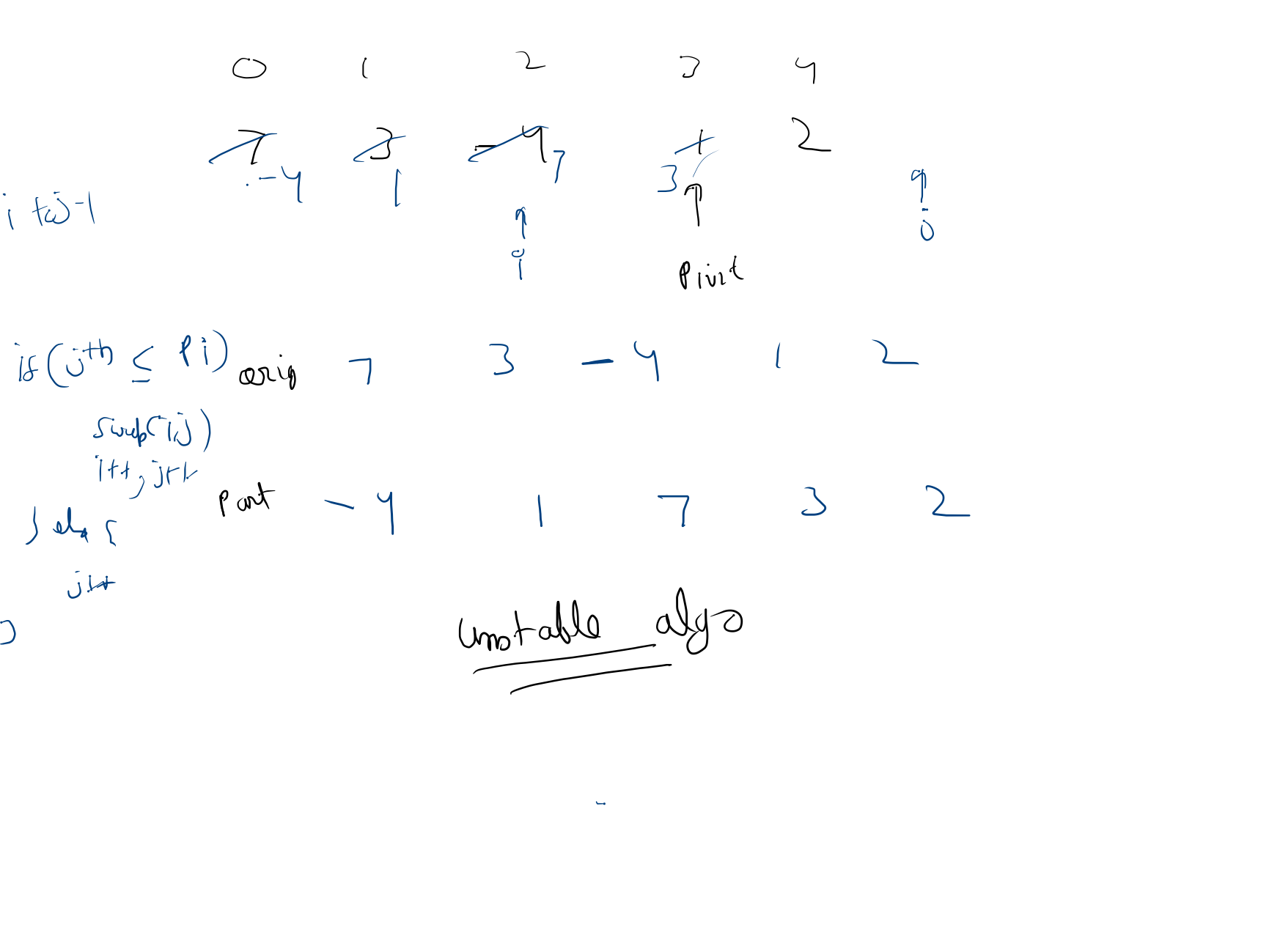
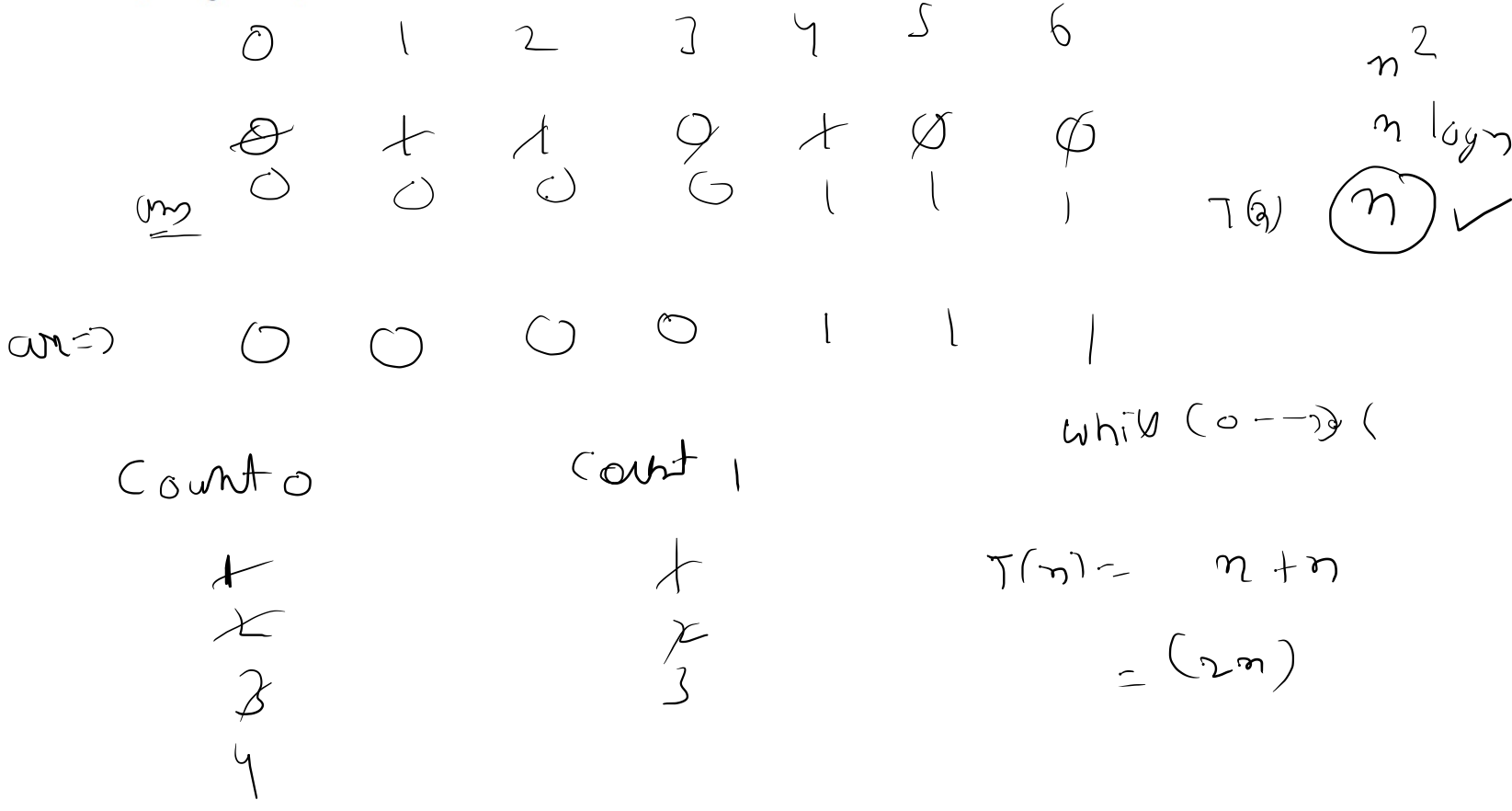

0 1 2 3 4
7 3 4 1 2
i
j
Pivot
if (jth ≤ Pi)
swap(i,j)
i++, j++
} else {
j++
orig 7 3 4 1 2
Part 4 1 7 3 2
Unstable algo

Unstable alg -> Same elmt have diff order than original

3' 1 4 3'' 7

1 3'' 3' 4 7 -> unstable

Sort 01 (Day 32)



M.2

0 1 2 3 4 5 6

O(n)

i

j

Parts

(1) ⇒ only 0's

0 to i-1

(2) only 1's

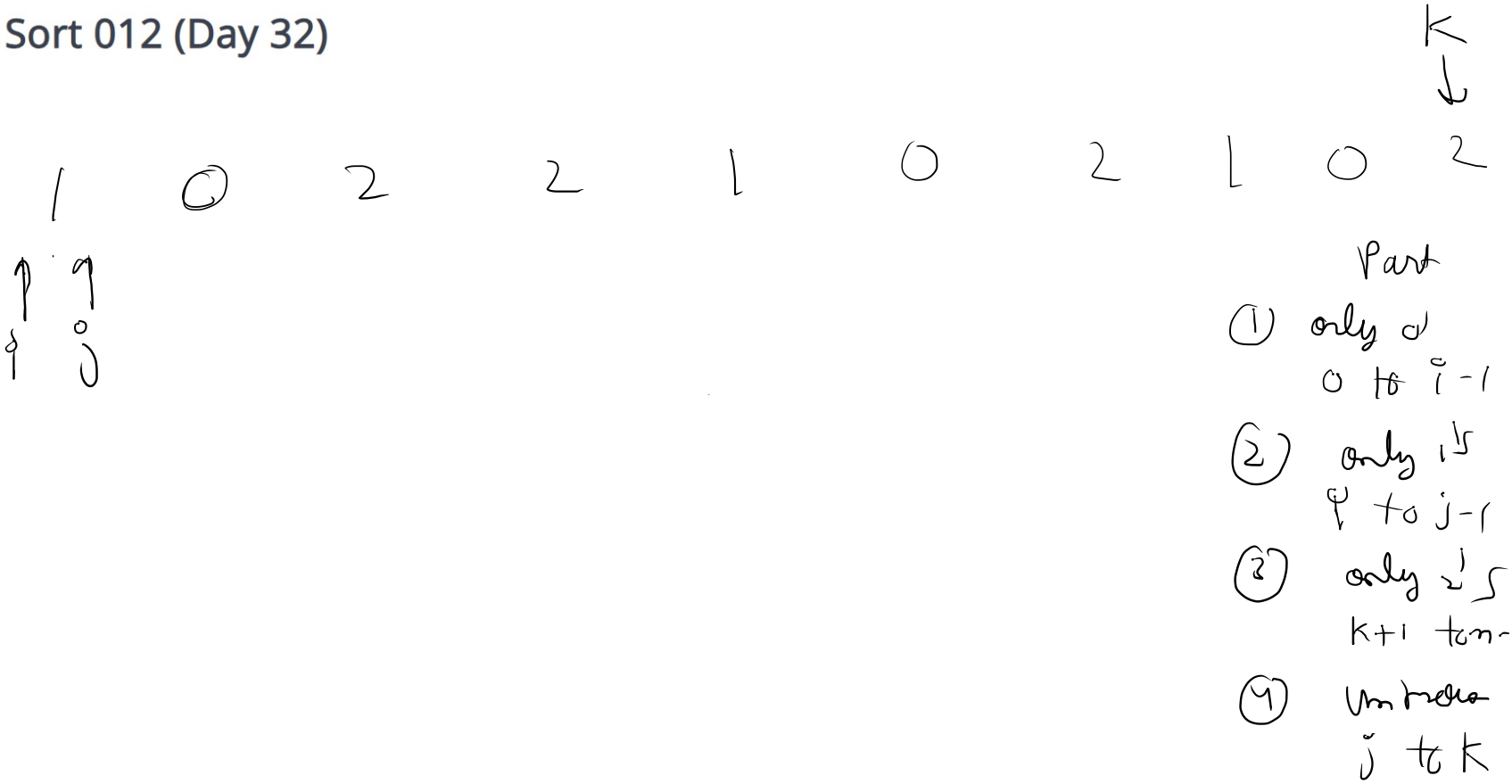
→ i to j-1

(3) Unknown

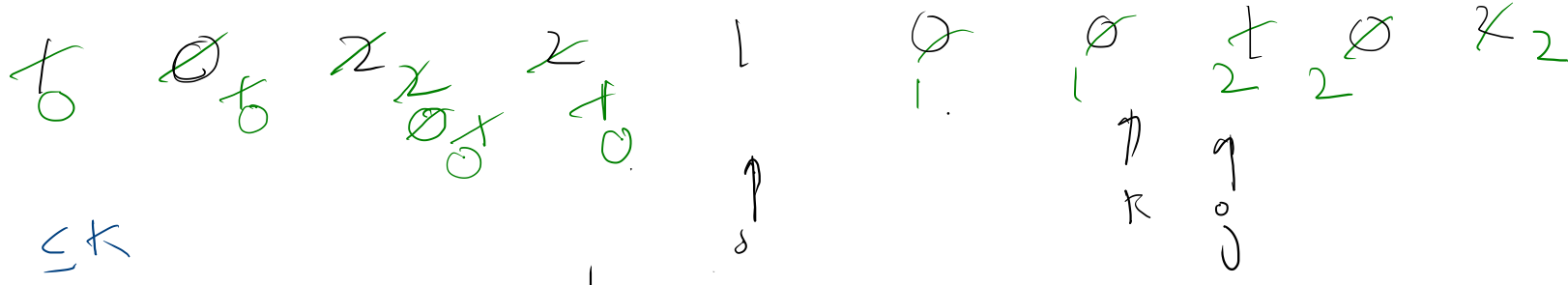
j to n-1

```
if (val==0){
    swap(i,j)   // i in short is 1st elem in 1's part
    i++;
    j++;
}else if (val==1)
    j++
}
```

Sort 012 (Day 32)



Sort 012 (Day 32)



```
if (val_j == 0) {
    swap(i, j);
    i++; j++
} else if (val == 1) {
    j++
} else if (val == 2) {
    swap(j, k); k--
```

0 1 2 3

0 1 3 1 2 0 2 0 1 2 3

Part

(1) only a
0 to i-1

(2) only b
j to j-1

(3) only c
k+1 to l-1

(4) l to m-1

Target Sum Pair (Day 32)

	0	1	2	3	4	5	6	7	8	9	10	11
n=12	9	-48	100	93	84	74	86	34	-37	60	-29	44

tar = 160

M1 = have all comb

arr[i] + arr[j] == tar

for (i=0; i<n)

for (j=i+1; j<n)

0	1	2	3	4	5	6	7	8	9	10	11
8	-48	100	43	84	74	98	36	-47	69	-79	44

Sort

Arrays.sort(arr)

-48 -37 -29 8 36 44 60 74 84 98 100

tar = 160

0	1	2	3	4	5	6	7	8	9	10	11
-48	-37	-29	0	34	45	47	60	74	84	86	100
								i	j		

val = arr[i] + arr[j]

if (val > tar) {
  j--
} else if (val < tar) {
  i++
} else if (val == tar) {
  print
}

i++
j--

T(n) = n + n log n = (n log n)

S(n) = O(1)

Count Sort Algorithm (Day 31)

linear

0	1	2	3	4
7	-2	4	1	3

apply count sort

(1) less more — min gap

$7 - (-2) = 9$

for array → array size] min

(2) 5 lakh people → ages

0 - 100 number X

0	1	2	3	4
7	-2	4	1	3

Steps: Calculate max val & min val

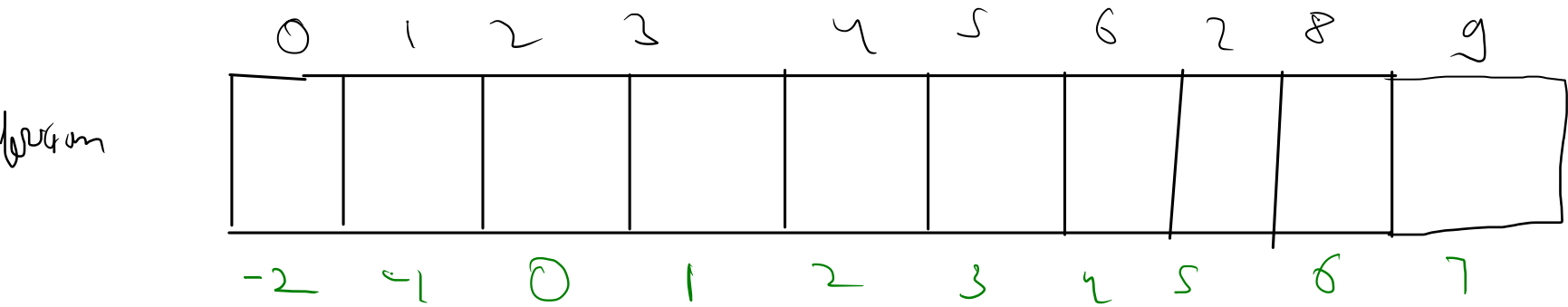
O(n) max = 7 ; min = -2

$T(n) = O(1)$

$S(n) =$ max − min + 1

0	1	2	3	4
7	−2	4	1	3

Step 2 freq arr ⇒ max val − min val + 1 = (7) − (−2) = 9



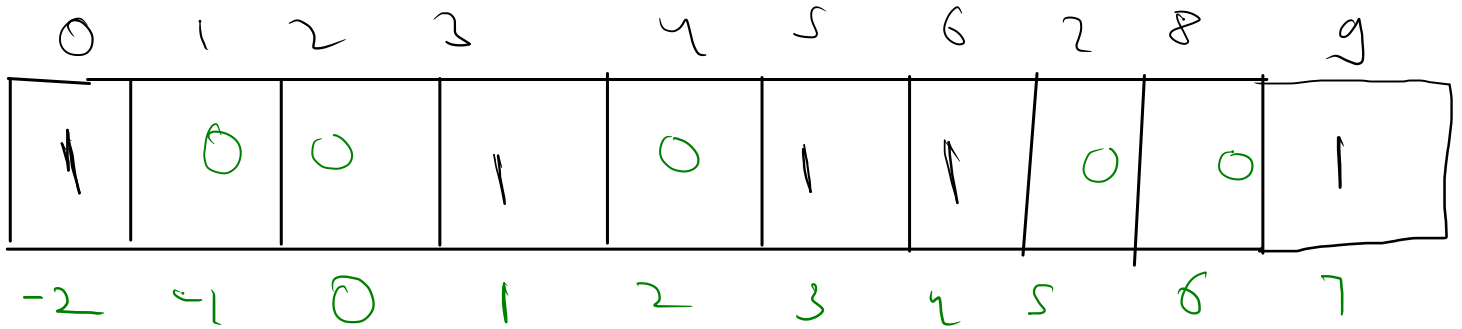
range

[−2 to 7]

Step 2 Traverse array & store freq

$T(n) = O(n)$

0	1	2	3	4
7	-2	4	1	3



freq[num]

min = -2

max = 7

idx => arr[i] - min => 7 - (-2) = 9

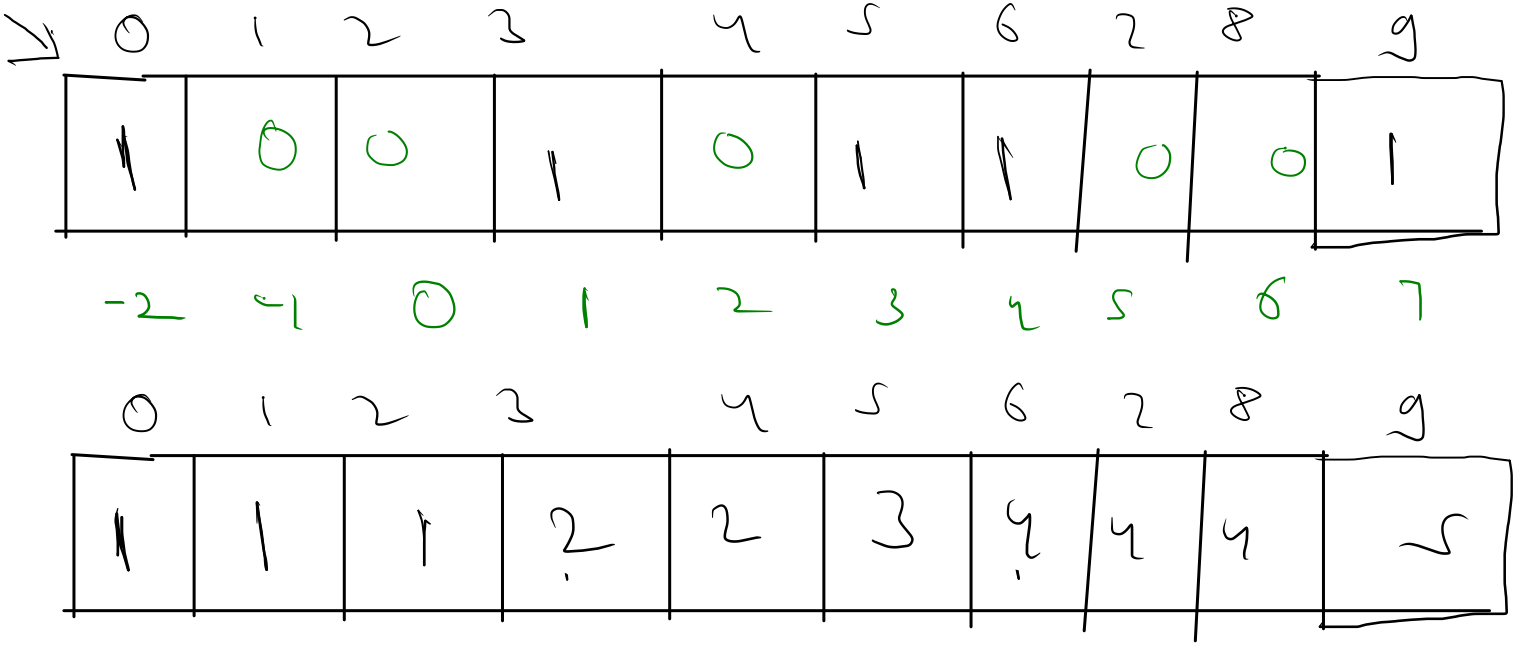
-2 - (-2) = 0

4 - (-2) = 6

Step 4 prefix sum are

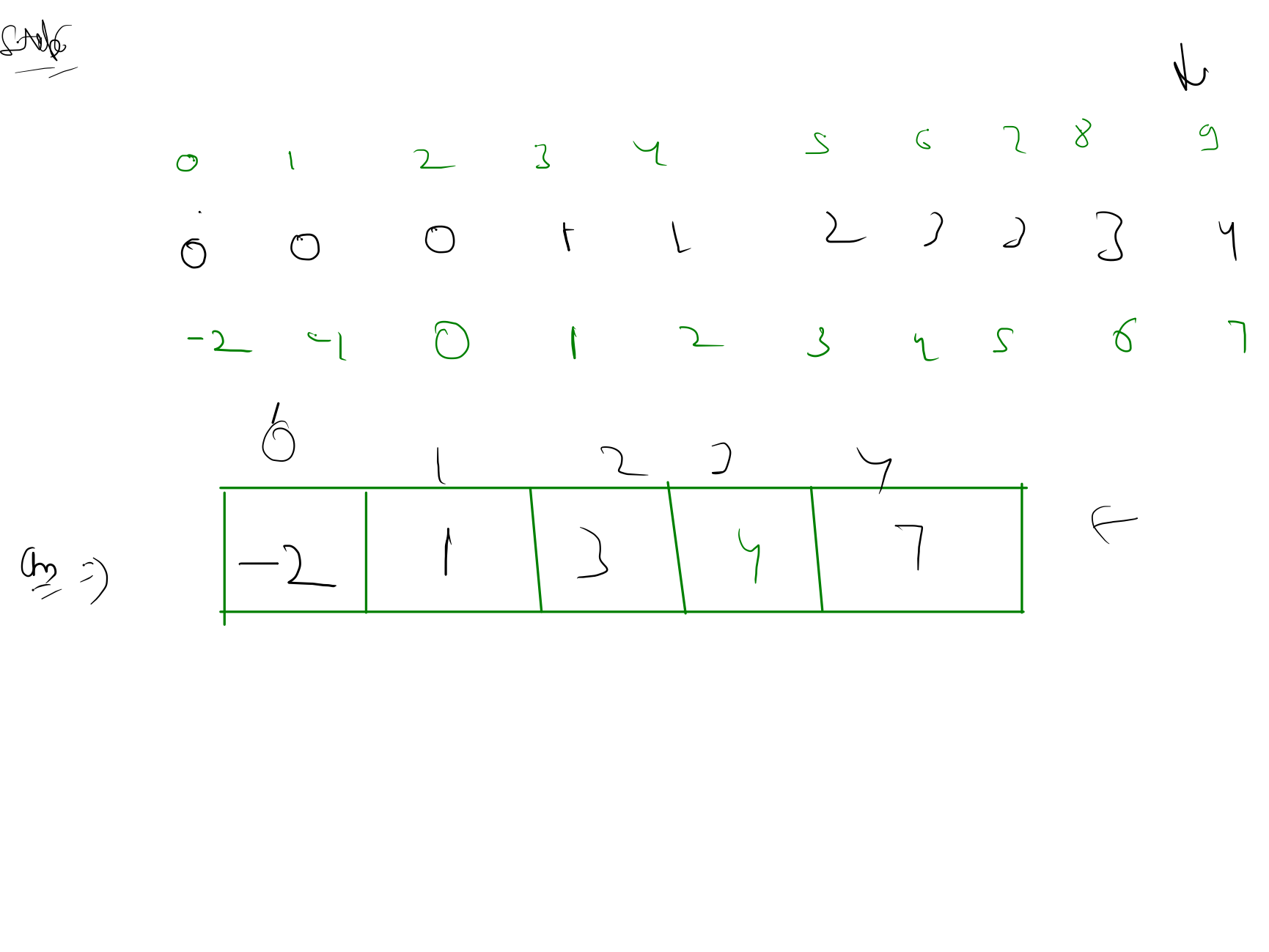
7 -2 4 1 3

Ans -2 1 3 4 7



Stub 5 → -1 in Pref

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


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