1 3 -1 -3 5 3 6 7

0 – K-1

ep K=3

sp

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

Idx 7
val 7

0

8

3 3 2 3 6 7

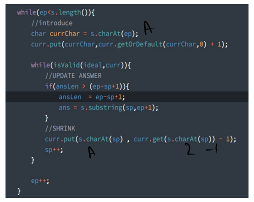
len= 70

len2 = 30

len3 = 20

	10	10	10	10	10	10	10
	10,	20,	30,	50,	10,	70,	30}
	0	1	2	3	4	5	6
NSEL⇒	-1	0	1	2	-1	4	4
NSER⇒	7	4	4	4	7	6	7
	70	30	20	10	10	10	10

```
-> DQ
-> for(first k people){
     add in DQ
   }
window[0] = frontDQ
sp=1
ep = K
while(ep<n){
   add in DQ arr[ep]
   while( front of DQ < sp) DQ.removeFront()
   window[sp] = arr[dq.getFirst()]
   sp++
   ep++
}
```



```
while(ep<s.length()){
    //introduce
    char currChar = s.charAt(ep);   A
    curr.put(currChar,curr.getOrDefault(currChar,0) + 1);

    while(isValid(ideal,curr)){
        //UPDATE ANSWER
        if(ansLen > (ep-sp+1)){
            ansLen  = ep-sp+1;
            ans = s.substring(sp,ep+1);
        }
        //SHRINK
        curr.put(s.charAt(sp) , curr.get(s.charAt(sp)) - 1);
        sp++;        A                           2 -1
    }

    ep++;
}
```

∞ A B A A B A

sp

ep ⟶ 2

ideal
A = 2

Curr
A:1
B:1

x = 3
k = 2

x unique
↓
k

S= ADOBECODEBANC
ABC

t=
AAA

hm.put('A', hm.get('A') + 1)

sp
A B X B P C C B D C D B B P

ep

x=3
k=2

Unique = 3

ans= 8

NumRepK = 1

++ ⇒ 1 ⇒ uni++
++ ⇒ K ⇒ numRepK++
-- ⇒ 0 ⇒ uni--
-- ⇒ K-1 ⇒ numRep K--

A:0
B: 2
P: 1
C: 0
D: 1

t= A A B C C

ans=B C A A C
ansLen= 5

s= A Y B C P C C P A B C A A C X

sp ep

Ideal
A:2
B:1
C:2

Curr
A: 2 C: 2
Y: 0 P: 0
B: 0

① Introduce
② Validshrink
③ consider ans
④ expand