Some more Array Problems

About Me:

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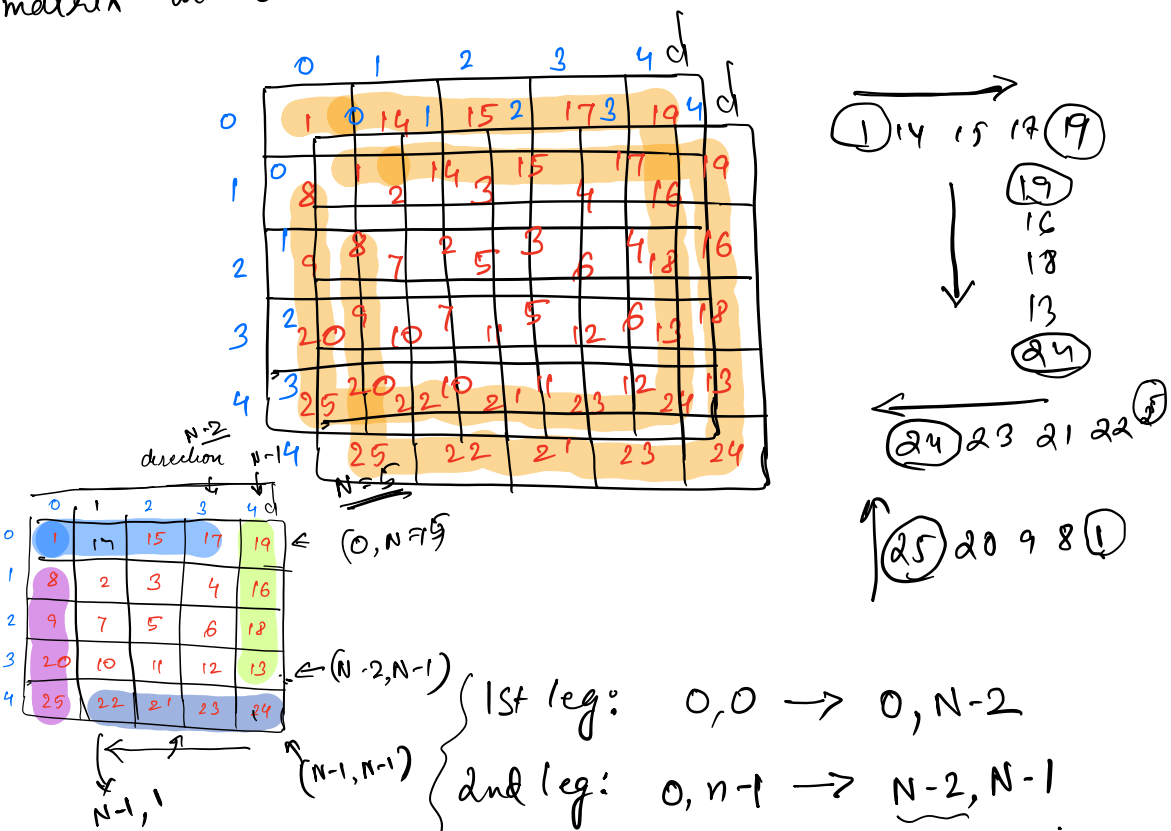
Q. 1 Given a mat [N][N], print the boundary of the matrix in clockwise direction.

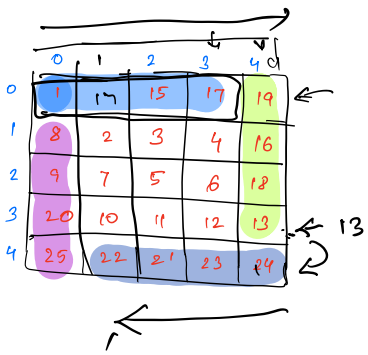


1st leg: 0,0 → 0, N-2
2nd leg: 0, n-1 → N-2, N-1
3rd leg: n-1, n-1 → N-1, 1
4th leg: n-1, 0 → 1, 0

N-1

Observations:

1. Each leg of the boundary will have N-1 elements.
2. Once we are done with printing 1st leg, (with variables i, j), these become equal to the indices of start of next leg.



i=0, j=0

1, 14, 15, 17

i=0, j=0

1, 14, 15, 17

(0,3)

0,4

i=0 ?
j=4 ?

19 16 18 13

i=4
j=4

24 23 21 22

i=4
j=4

End.

i=4
j=0

25 20 9 8

i=0
j=0

```
i=0, j=0
while (N>1):
    for k in range(0,N-1):
        print(mat[i][j])
        j+=1
```

N=5

(0, N-1) ⇒ (0, 4)

// Runs n-1 times

4

O(N)

// i=0, j=4 (N-1)

```
for k in range(0,N-1):
    print(mat[i][j])
    i+=1
```

K	i	j	
	0	0	–
1	0	1	–
2	0	2	–
3	0	3	–
4	0	4	

(0,0) 1 14 15 17

// i=4, j=4

```
for k in range(0,N-1):
    print(mat[i][j])
    j-=1
```

5

O(N)

// i=4, j=0

```
for k in range(0,N-1):
    print(mat[i][j])
    i-=1
```

O(N)

// i=0, j=0

i+=1, j+=1

N = N-2

4 (O(N)) = O(N)

5, 3, 1

if (N is odd):
    print arr[N/2][N/2]

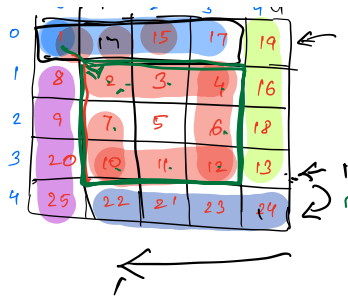
i, j = 1, 1

N/2 → N-3

N-1 elements

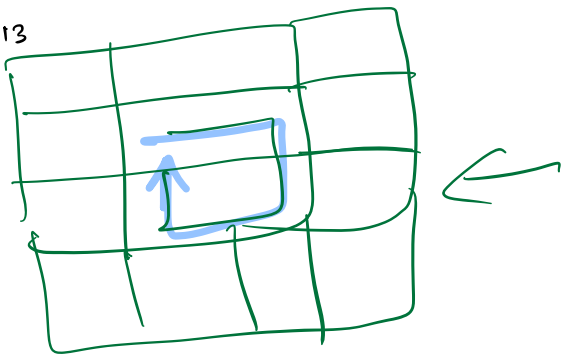
5//2 = 2 (0, 4) (1, 3)

N×N → N-2×N-2



i++, j

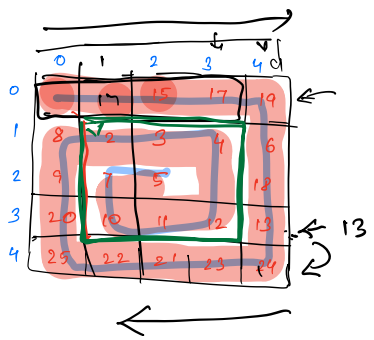
i=2, j=2



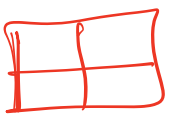
no centre element.

(N), ( )

Q. Print the matrix in a spiral order.



i+



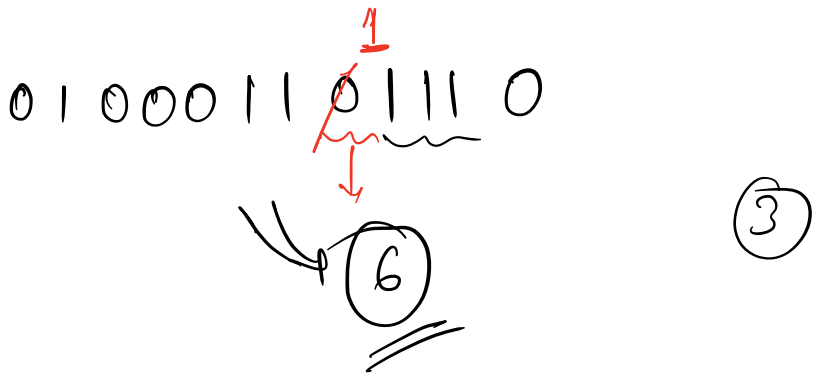
2x2, 3x3, 4x4

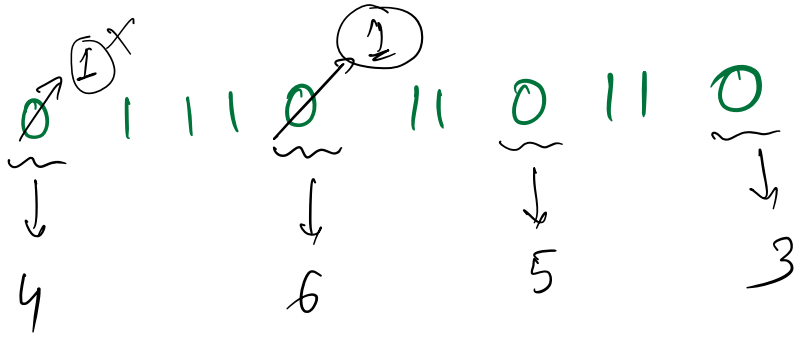
Print

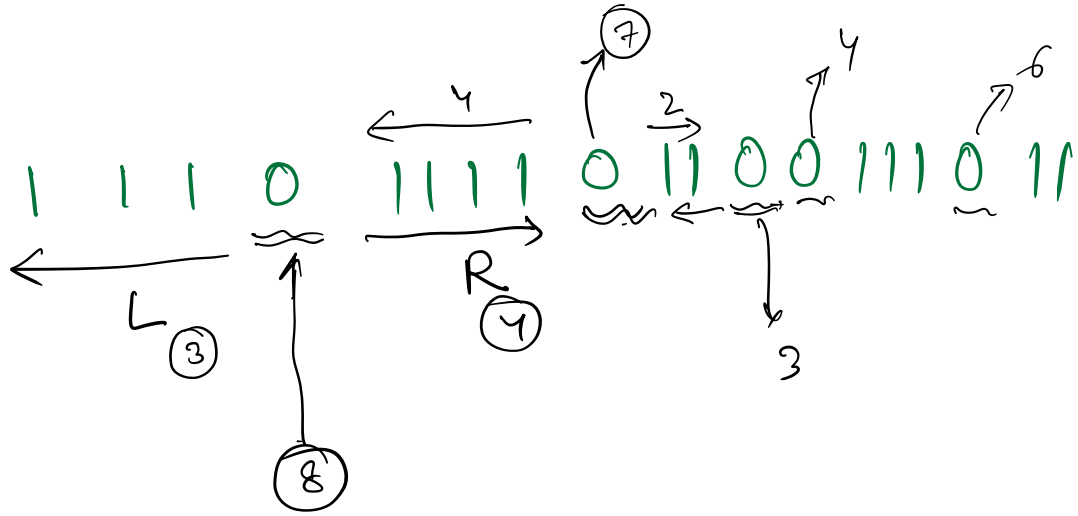
Break Till 10:15

Q. Max no. of consecutive 1's.

Given a binary string, at most replace a 0 with a 1.
Find max no. of consecutive 1's.







L + R + 1

Pseudo code:

```
string S;
ans = 0
for i in range(0, n):
    if S[i] == '0':
        L = consecutive 1's to the left
        R = consecutive 1's to the right
        total = L + R + 1
        ans = max(ans, total)
return ans
```

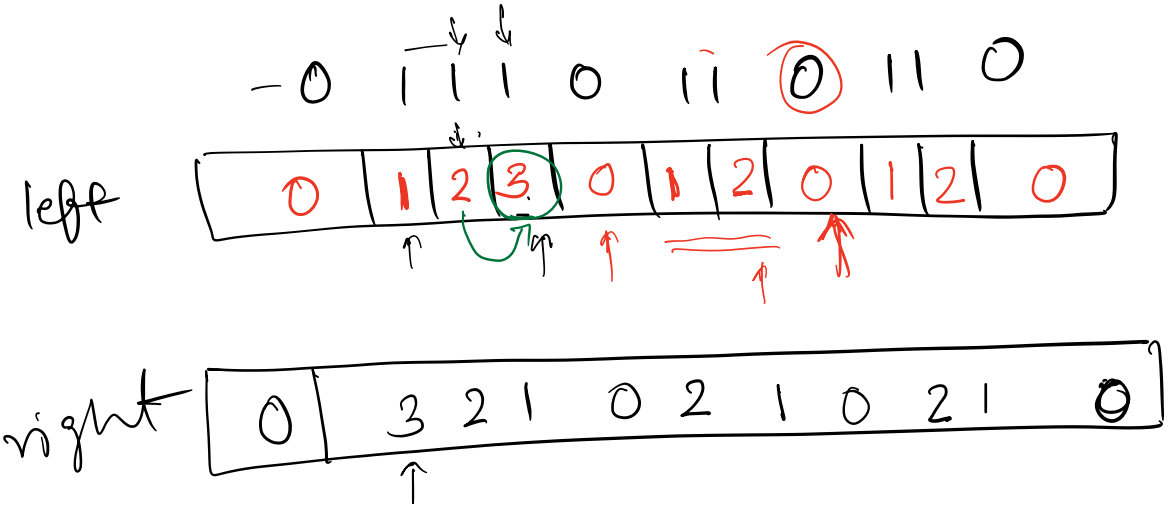
n times

time taking

Prefix arrays and suffix arrays

Left[i] → no. of consecutive 1's upto this point from left

Right[i] → ——— " ——— from right



```
if s[0] == '0':
    left[0] = 0
else left[0] = 1
for i in range (1, n):
    if s[i] == '0':
        left[i] = 0
    else:
        left[i] = left[i-1] + 1
```

left[0] = s[0] (char)

left[0] = int(s[0])

int('0') → 48

left[0] = int(s[0]) - 48

ord()

right[n-1] = int(s[n-1])

```
for i in range(n-2, -1, -1):
    if s[i] == '0':
        right[i] = 0
    else:
        right[i] = right[i+1] + 1
```

// No. of 1's in the array.

```
if count == n:
    return count.
```

```
ans = 0 → count =
for i in range (0, n):
    if s[i] == '0':
        L = i == 0 ? 0 : left[i-1]
        R = i == n-1 ? 0 : right[i+1]
        total = L + R + 1
        ans = max(ans, total)
```

return ans.

1. 0 1 0 0 0 0 0 0 0 0 → 1

2. 1 1 1 1 1 1 1 1 1 → Corrections = 9
   → 0