VV Important

Announcement: Solved < 2 questions → Give a reattempt Saturday + Sunday

Sylabus for next Contest Monday

Q1) Maximum positivity — Microsoft

Given an array of size N.
Return length of maximum size subarray having only non-negative numbers (>=0)

ans = -∞

A = { 3 | 5 | -1 | 2 | 3 | 6 | 9 | -3 | -2 | -7 | 1 | 2 | 3 | 4 | 5 }

c=0 | c=1 | c=2 | ans=2, c=0 | c=1 | c=2 | c=3 | c=4 | ans=4, c=0 | ∝ | ∝ | c=1 | c=5

```
ans = -∞
c = 0
for (i=0; i<N; i++){
    if (A[i] >= 0){
        c++
    }
    else{
        ans = max(ans, c)
        c = 0
    }
}
return max(ans, c)
```

TC: O(N)

SC: O(1)

Q2) Farmer pickles is obsessed with 3 factor numbers.

Three factor numbers : ~~Having atleast 3 factors.~~ → Composite nums

We have an array A of nums and B for queries.

Find count of number of 3 factor numbers from L-R for each query.

	0	1	2	3	4	5	6	7	8
A =	3	8	9	12	15	17	12	13	21
	✗	✓	✓	✓	✓	✗	✓	✗	✓

Q : [[1, 9], [2, 3], [4, 9], [6, 8]] [1 based indexing]

↓

[[0, 8], [1, 2], [3, 8], [5, 7]]

↓ ↓ ↓ ↓

6 2 4 1

checkprime Metho Class 1

Prefix sum question

Prime → 0

Not prime → 3 factor num → 1

	0	1	2	3	4	5	6	7	8
A :	3	8	9	12	15	17	12	13	21

	0	1	2	3	4	5	6	7	8
prime :	0	1	1	1	1	0	1	0	1

B[3] = 1 → index 3 is a composite num

B[5] = 0 → index 5 is prime num.

i = 1 : N-1

prime[i] = prime[i] + prime[i-1]

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

↑ no. of composite numbers from [0:5]

pf[i] ⇒ No. of composite numbers from [0:i]

[l-r] No. of composite numbers

pf[r] - pf[l-1] $\sqrt{Num}$

```
prime = []                                   O( N * √A[i] ) + O(Q)
for (i=0; i< N; i++){
    if (A[i] is prime){ ——→ TODO
        prime.append(0)                      TC: O(N√A[i] + Q)
    }else{                                   SC: O(N)
        prime.append(1)
    }
}
```

[Find pf array prime → TODO

```
pf prime →
for (i=0; i<Q; i++){
    l = Q[i][0] -1   // 0 base indexing
    r = Q[i][1] -1
    if (l==0){
        pfprime[r]
    }else{ pf prime[r] - pf prime[l-1] }
}
```

Q3)

```
for (i=1; i<=n; i++) {
    for (j=1; j<=3^i; j++) {
        print (__)
    }
}
```

i	j	iteration
1	$[1\ 3]$	$3+1$
2	$[1\ 3^2]$	$9+1$
3	$[1\ 3^3]$	3^3
		⋮
N	$[1\ 3^N]$	3^N

sum N

$3^1 + 3^2 + 3^3 \cdots 3^N$

GP

$r = 3 \qquad a = 3 \qquad n = N$

$$a\left(\frac{r^n - 1}{r-1}\right)$$

$$3\left(\frac{3^N - 1}{3-1}\right) \Rightarrow 3\left(\frac{3^N - 1}{2}\right)$$

$$O(3^N)$$