Prefix Sum array

ps → allocate

for (int q = 0 → n) q = n

{ int n;

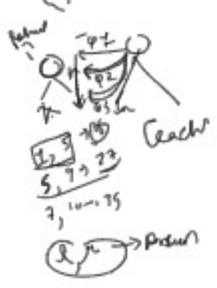
for (int n)

~~sum = sum + a[i]~~

~~printf(sum)~~

} → printf(ps[n] - ps[l-1])

→ O(n) → O(q)



TC → $O(n^2)$

TC → $O(n \times (n-l+1))$

10^8 sec → $O(q \times (n-l+1))$

$q \to 10^5$

$l \le n \le 10^5$

$l = 1$

$n = 10^5$

$10^5 \times (10^5 - 1 + 1)$

$\to 10^5 \times 10^5$

$\to 10^{10}$

$q \times (n - l + 1)$ $l = 1$

$n = 10^5$

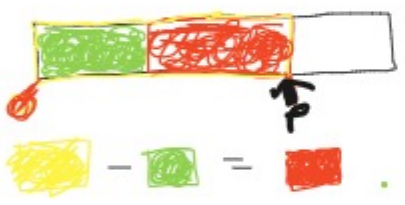
$10^5 \times (10^5 - 1 + 1)$ $q = 10^5$

$= 10^5 \times 10^5 = 10^{10}$ → TLE

$10^8 \approx 1$ sec

```
for (q → q) → Prefix
{
    for (i → l to r)
}
```

optimize



original

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

→

0	1	2	3	4	5
1	4	6	13	19	24

ps → prefix sum Array

2 + 7 + 6 = 13

Sum from [2 - 4] = Sum from [0-4] - sum[0-1]

l r

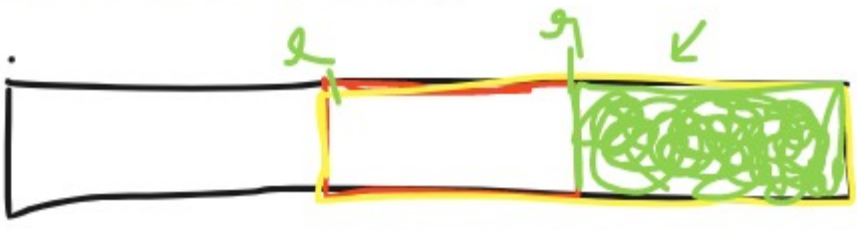
ps[4] - ps[1]

Sum(l, r) ⇒ ps[r] - ps[l-1]

0 -1

sum(0, 4) ⇒ ps[r]

```
for (q → n)
{
    if (l == 0)
        print(ps[r])
    else
        print(ps[r] - ps[l-1])
}
```



sum(l, r) → ps[l] - ps[r+1]