1. Sort the permutation
2. Bus dilemma
3. Smallest XOR
4. XOR Prime
5. Maximum positivity.

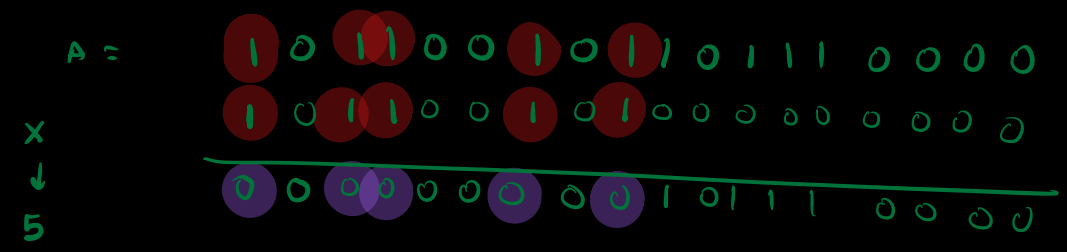
Q. Smallest XOR

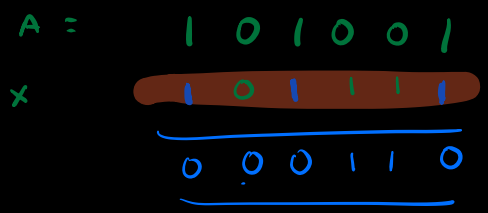
Given A & B. Find X

$A \wedge X$ is minimum & set bits in X = B

A = 15
B = 2

x = 12





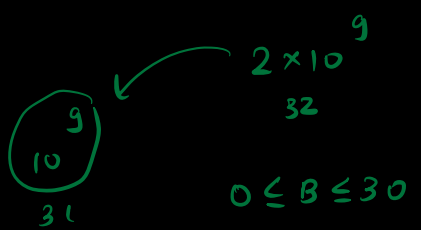
1. Take the set bit from left side.

   If still some bit are left

   ⇒ take the unset bits from the right side.

TC : O(1)

SC : O(1)



A = 5

0 0 0 0 1 1 1 1

1 ... 1 1 1 1

31

A = 0 0 0 0 1 0 0

x = 0 1 1 1 1 1 1 = 63

```
for (i=30; i>=0; i--)
{
    if( ith bit is set in A && B>0)
    {
        B--
        set ith bit in your answer
    }
}

for (i=0; i<31; i++)
{
    if( ith bit is unset in A && B>0)
    {
        B--
        set ith bit in your answer
    }
}
return ans
```

Q. Maximum positivity.

Given Arr. Return maximum size subarray containing all non-negative numbers.

Ex A = [2, 3, -1, 0, -3, 8, 5, 4, 3, -2, -1, 3, 6]

```
ans = 0
curr = 0
for( i=0; i<N; i++)
{  if( A[i] ≥ 0)   curr++
   else
   {  ans = max(ans, curr)
      curr = 0
   }
```

```
Curr = 0
for( i=0; i<N; i++)                    (2)
{  if( arr[i] ≥ 0 )  curr++
   else   curr = 0
   if( curr == ans)
   {  Ending point = i
      Starting point = i - ans + 1
      return subarray
```

ans

3 | 4 | 5

5-2

maxi =

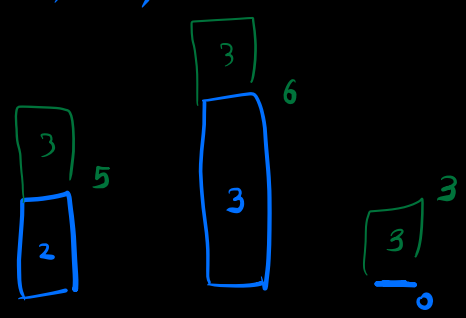
Q Bus dilemma

Bus capacity = B

A = [2 , 1 , -3]

B = 5

ans = 3



Starting = 0 ✓

Starting = 1 ✓

Starting = 2 ✓

Starting = 3 ✗

4 ✗

5 ✗

✗

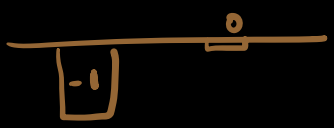
✗

B = 4

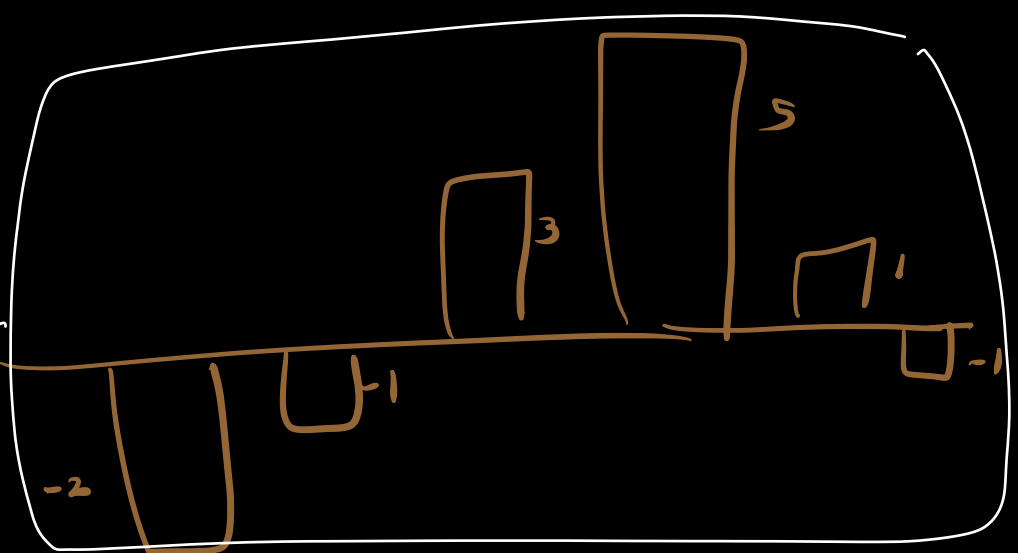
$0 \leq x \leq B$

A = [-1, 1]

B = 0



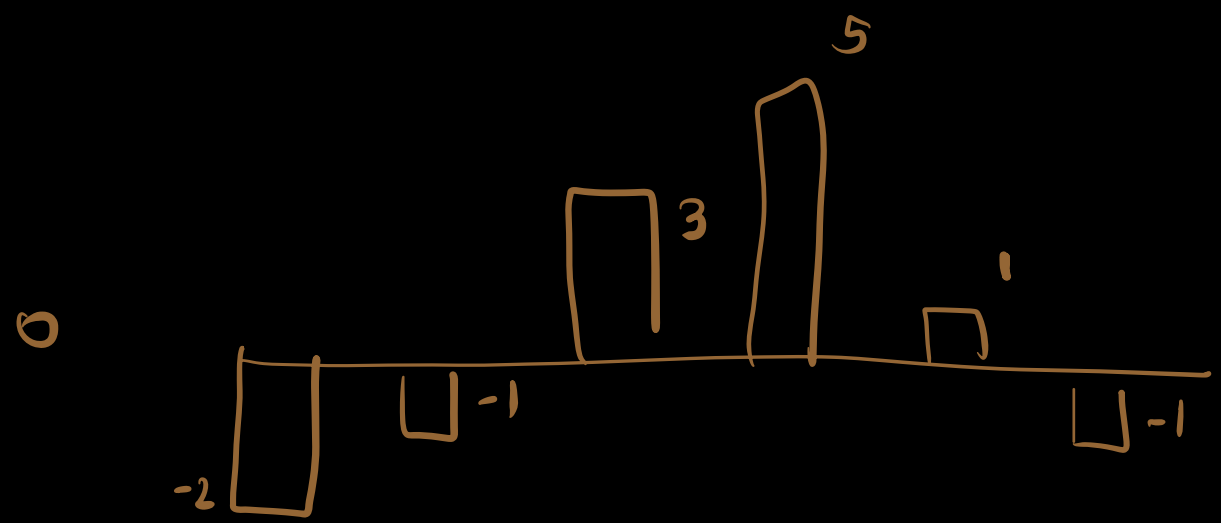
B = 10



$0 \leq x \leq B$

Arr: [-2, 1, 4, 2, -4, -2]

Arr: [-2, 1 4 2 -4 -2]



min = (must negative in PF

max positive + x ≤ B

x ≤ B - max positive

maxi = B - max positive in PF.

if (maxi > B) return 0

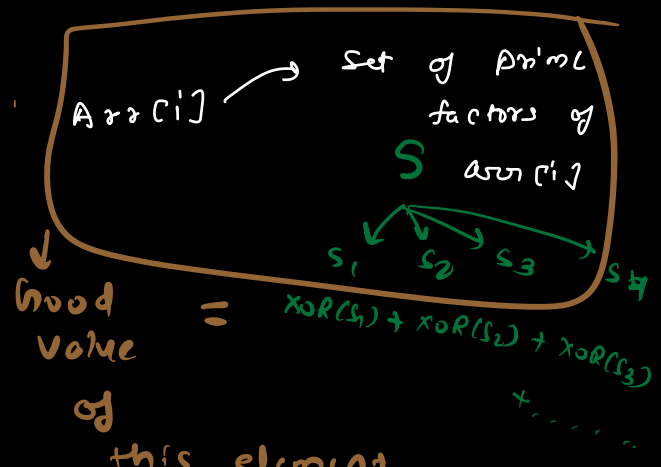
return maxi - mini + 1

mini = 2 maxi = 5

2 3 4 5 b-a+1

6 -6

Q Given Array.



Good value of array = Good value of element 1 + Good value of 2 + Good value of 3 + ...

Ex [10, 45]

Good value of 10 + Good value of 45 = 14 + 14 = 28

10 → {2,5}

{} {2} {5} {2,5}

0 + 2 + 5 + 7

= 14

45 → {3,5}

{} {3} {5} {3,5}

0 + 3 + 5 + 6

= 14

Good value of element

{ prime factors of elements }

10

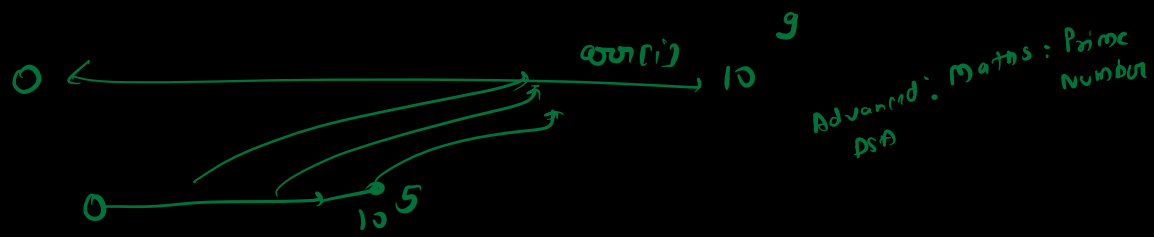
2^{10} subsets = 1000

elements $\leq 10^9$

$2 \times 3 \times 5 \times 7 \times 11 \times 13 \times 17 \times 19 \times 23 \times 29$

$> 10^9$

10



Advanced: Maths: Prime Number DSA

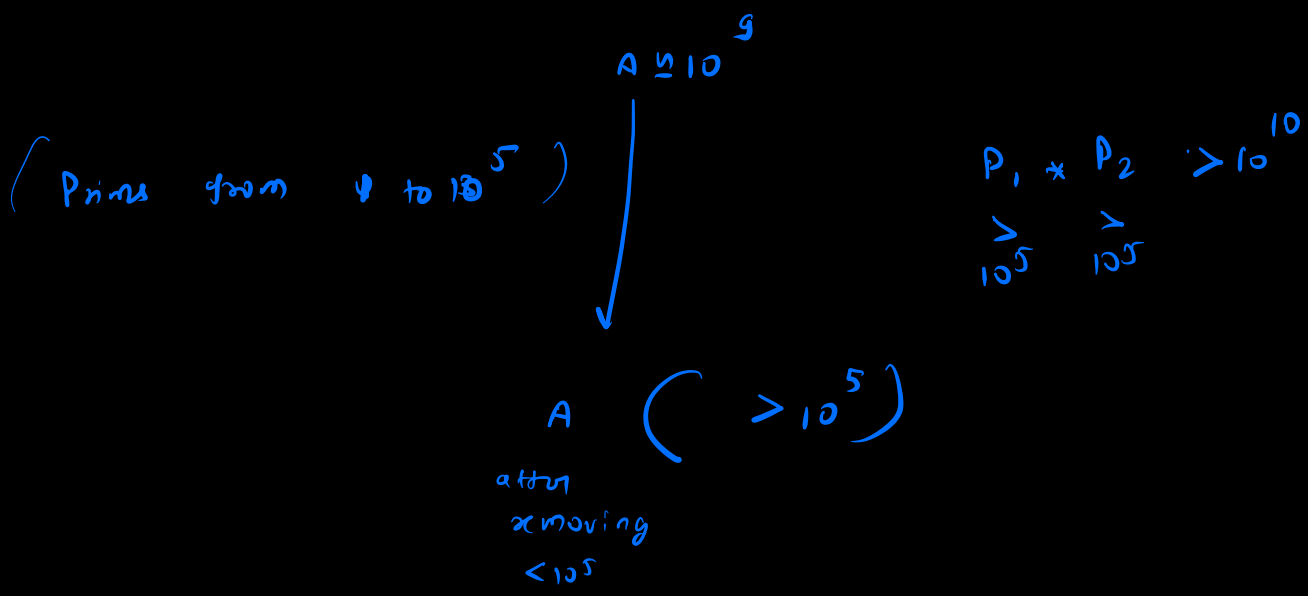
Prime Sieve

$N \log(\log N)$

prime

arr[i] ($> 10^5$)

prime number.



Numbers ($\leq 10^9$)

↓

you can only have atmost one prime between 10^5 to 10^9

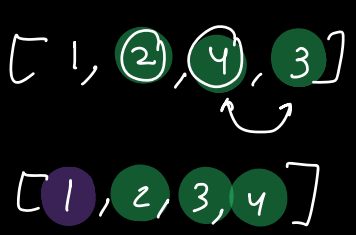
N

↓

greater ($\sqrt{N}$)

Q. Permutation is given. You can swap same color only.
Find max no of color needed.

A = [1, 4, 2, 3]



[1, 2, 4, 3] max = 2

[1, 2, 3, 4]

A = [1, 5, 2, 4, 3]

[1, 2, 5, 4, 3] ans = 3

[1, 2, 3, 4, 5]

ans: y

ans: no of cycles.

Maths: Modular Arithmatic

first 20min

-36 % 7

A can't have 2 prime factors in range 10^5 to 10^9

A $\leq 10^9$

100

more than 1 prime factor ≥ 10

$2 \times 2 \times 5 \times 5$

N

$\sqrt{N} \times \sqrt{N} \times \_$