Problem solving

Sunday, 3 October 2021 4:28 PM

1. All zero fair.
2. Frequent array.
3. Find N^{th} magic number.
4. Lexical permutation Rank
   → no repetition
   → with repetition
5. Lucky Numbers.

All zero fair.

We are given an array of (N) elements. (i, j)

Array → contains positive and negative array.

We have to return that another array → (N)

$b = [0, 0, 0]$ → N

100 10 (1+0) (1)

[0 0 0] → [ ] → Ordered pairs → (i, j) (0, 2)

0,0 0,0 0,0 / 0,0 0,0 0,0 / 0,0 0,0 0,0

→ Given array.

→ Summer sec prefixed but too given array.

$sum(A[i]\,A[j]) \le min(A[i], A[j])$

→ ① sort the array.

② Frequency Map

Find second largest No. due to the array itself.

return unordered.

$sum(3, 6)$

$sum(6, 9)$

$(9, 6, 3)$

$[9, 6, 3, 2, 2, 2, 9, 2]$

$[3, 6, 9]$

$2 \to$ ~~2~~ and $[3, 6, 9]$

$3 \to$ ~~3~~

$6 \to$ ~~6~~

$9 \to$ ~~9~~

$[10, 10, 10]$

$2 \to 4$

$4 \to 3$

$3 \to 1$

$6 \to 2$

ans: [0 2 4]

$sum(3, 6)$

$2 \leftarrow (3, 6)$

$10, 10 \to sum = (10, 10)$

$10, 12 \to$ ~~2~~

$12, 10 \to$ ~~2~~

$3, 6 \to$ ~~3~~

$3, 9 \to$ ~~3~~

$6, 9 \to$ ~~6~~

$3, 6 \to 6$

$3, 9 \to 9$

$6, 9 \to 9$

$[12, 10, 7, 5]$

$7, 7 \to 7$

$7, 10 \to 1$

$7, 12 \to 1$

$12, 7 \to 1$

$10, 7 \to 1$

$\to 4$ $\boxed{N \log N}$ $+ N$

$N \log N$

N

$5, 5$

$5, 10$

$10, 5$

$1 = \sqrt{N}$

$N = \binom{N}{2}$

$\sqrt{N} \times \boxed{2}$

FACTORIAL ARRAY

A → N size array.

B → Rank(A[i]) (N size array)

Total no of non empty subsequences of array B such that every element has same NOW every set of prime factor.

A [2, 3, 2, 3]

B = [2, 3, 2, 3]

$[2, 3] \to [2, 3]$, $[2, 3] \to [6, 6]$, $[2, 3] \to [6, 3]$, $[2, 3] \to [6]$

2 (2,3) (2) (2,3)

$[2]$, $[3, 4]$

$2 \times 3 \to (2, 3)$

Factorial 2 $\to$ $[2, 3]$

$[2]$, $[3, 4]$, $[2, 3]$, $[4]$

$[2, 3]$, $[3, 4]$, $[2, 3]$, $[4]$

$[6]$, $[24]$

$[6, 24]$

$[2]$ → 2^2

$1, 2, 3$

$1, 3$

$6, 24$

$24, 6$

$2^{-1} \to 1$

$5 = 1$

$[1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19]$

$[3, 5, 7, 11, 13, 17, 19]$

$[3, 4]$

2^{n-1}

$i = 0$ $j = 0$

$2^{n-1} - 1$

$2^n - 1$

come out of prime factors

Find N^{th} Magic Number

Given no → Rank of C

& sum of unique prime of C

$5, 25, 30, 125, 130$

(2×5) (5^3) (2×5^3)

$155, 160, 625, 630$

(5×31) (2^5) (5^4) (2×5^4)

650

$(2 \times 5^3 \times 31)$

$5^{N-1} \times 5^0 \times \ldots \times (N-1)$

5^2 $5^1 + 5^2$ 5^3 $5^3 + 5^2$ $5^2 + 5^1$ $5^3 + 5^1 + 5^2$

5^4 $5^4 + 5^1$ $5^4 + 5^2$ $5^4 + 5^3$ $5^4 + 5^3 + 5^1$ $5^4 + 5^3 + 5^2$ $5^4 + 5^2 + 5^1$

	3	2	1	
				0 0 0 1
			X	0 0 1 0
		X	X	0 0 1 1
	X			0 1 0 0
	X		X	0 1 0 1
	X	X		0 1 1 0
	X	X	X	0 1 1 1
X				1 0 0 0
X			X	1 0 0 1
X		X		1 0 1 0
X		X	X	1 0 1 1
X	X			1 1 0 0
X	X		X	1 1 0 1
X	X	X		1 1 1 0
X	X	X	X	1 1 1 1

K^{th}

$K \to 0111$

① return < int → primes

MAX, NO → from the given array

Given Exit MAX_NO

② Sort

③ $i = 0$ $j = 0$

primes array prime

count = 0

Map

while (j < N) {

if (arr[j] ≤ primes[i])

continue count++

i++

arr = (2^count − 1)

count = 0

}

is prime

for (i → 0 → MAX)

if (i % primes[i] == 0)

for (i^2 → i, i += i)

is prime = false

8847433272

Lexical Permutation Rank

Strings → distinct characters

a b c
a c b
b a c
b c a
c a b
c b a

$a < b < c$

$[a b c]$ → 6

$[a c b]$ → 6

$[b a c]$ → 6

$[b c a]$ → 6

$[c a b]$ → 6

$[c b a]$ → 6

$[a b c]$ → 0

$[a c b]$ → 1

$[b a c]$ → 2

$[b c a]$ → 3

$[c a b]$ → 4

$[c b a]$ → 5

$(N-1)!$

$(N-1)! \times 1$

$(N-1)! \times 2$

$(N-1)! \times 3$

$(N-1)! \times 4$

$(N-1)! \times 5$

$(N-1)! \times 6$

$[c a b]$ → 3

$[c a d]$ → 3

$c a b$

$c a d$

$3! + 3!$

$3! + 3!$

c a b

c a d

ans = 0

for (i = 0 → N)

N length of given string

$(i+1)$

for (j = i+1 → N)

→ character rank from $A[i] \to (N-i-1)!$

ans += ans

return ans + 1

② → Reference of character

T a a b c c → Total permutations

$3!$

a b c c d d $3!$ $3!$

b a

b a a d c c c

c c e d

Rank

$\frac{3!}{2!}$ $\frac{3!}{2!}$ $+1$ (1×4)

$\frac{3!}{2!}$ $\frac{3!}{2!}$ $+1$

acc

Given node

$\frac{3!}{2!}$

ans = 61

N = 1000

999!

(999!) % MOD

(1000!) % MOD

$\frac{999!}{1000!}$ % MOD

$= \frac{999!}{1000!} \times \text{pow}(1000, MOD-2, MOD)$ % MOD

$999! \times 999$ % MOD

$999! \times 999 \times 998$ % MOD

C a a a _ _ _ _

$9!$ $9!$ $+1$

$3!\,3!\,2!$

$3!\,3!\,2!$

$3!\,3!\,2!$

$N-1$

$N-i-1$

for (i = 0 → N)

for (i = 1 → N)

ans ← A[i]

for (j = i+1 → N)

ans

Lucky Numbers

→ Exactly 2 prime divisor

(N) count of lucky nos from 1 → N

N = 8

1 2 3 4 5 6 7 8 9 10 11 12

1 1 1 1 1 1 1 1 1 1 1 1

1 2 3 2* 5 (2,3) 3 4,5 1 2,3

for (2 → N)

1 2 3 4 5 6 7 8 9 10 11 12

0 0 1 0 2 0 1 1 0 2

if (is prime)

$\frac{N}{2}$ $\frac{N}{3}$ $\frac{N}{5}$

$N \log(\log N)$

$N\left[\frac{1}{2} + \frac{1}{3} + \frac{1}{5} + \frac{1}{6} - \cdots\right] \approx \left(\frac{1}{x}\right) + \frac{1}{\log x}$

$N \log 2$

$\frac{N}{\log N}$