

Q. Noble Integer (Distinct elements)
Amazon Zeta Given N elements, Count the no. of Noble Integers present in the Array.

Noble Integer :- for which the no. of elements $A[i] < A[i] = A[i]$

Arr:

0	1	2	3	4	5
1	-5	3	5	-10	4
↓	↓	↓	↓	↓	↓
2	1	3	5	0	4

 \Rightarrow 3

-ve element can't be a Noble integer.

Quiz

-3	0	2	5
↓	↓	↓	↓
0	1	2	3

 \Rightarrow 1

Brute force

for every i^{th} element:

Count the no. of elements $< a[i]$
 if (count == a[i]) ans++;

Ans = 0

for (i = 0; i < N; i++) {

Count = 0

for (j = 0; j < N; j++) {

if (a[j] < a[i]) count++

}

if (count == a[i]) ans++;

3

TC: $O(N^2)$

SC: $O(1)$

0	1	2	3
-3	0	2	5
↓	↓	↓	↓
0	1	2	3

 \Rightarrow SORTED.

0	1	2	3	4	5
1	-5	3	5	-10	4

		sort			
↓		↓			
0	1	2	3	4	5
-10	-5	1	3	4	5
↓	↓	↓	↓	↓	↓
0	1	2	3	4	5

Sort (Arr)

for ($i = 0$; $i < N$; $i++$) {

if ($Arr[i] == i$)

ans++

}

return ans;

TC: $O(N \log N)$ + $O(N)$ $\Rightarrow O(N \log N)$

 Sorting

SC: Depends on
 Sorting algo.

Quiz

A: $\begin{matrix} 0 & 1 & 2 & 3 & 4 \\ [-10 & 1 & 1 & 3 & 100] \\ \downarrow & \downarrow & \downarrow & \downarrow & \downarrow \\ 0 & 1 & 1 & 3 & 4 \end{matrix}$ \Rightarrow 3 Noble Integers

Quiz

A: $\begin{matrix} 0 & 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \\ [-10, & 1, & 1, & 2, & 4, & 4, & 4, & 8, & 10] \\ \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow \\ 0 & 1 & 1 & 3 & 4 & 4 & 4 & 7 & 8 \end{matrix}$

\Rightarrow 5 Noble integers.

Quiz

A: $\begin{matrix} 0 & 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 & 11 & 12 & 13 \\ [-3 & 0 & 2 & 2 & 5 & 5 & 5 & 5 & 8 & 8 & 10 & 10 & 10 & 14] \\ \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow \\ 0 & 1 & 2 & 2 & 4 & 4 & 4 & 4 & 8 & 8 & 10 & 10 & 10 & 13 \end{matrix}$

\Rightarrow 7 Noble integers.

TC: $O(N \log N)$

SC: Depends on sorting algo

Comparator :

Q. Sort an array in Ascending order based on the no. of factors. If the no. of factors are same then sort by value.

[9	3	10	6	4]
↓	↓	↓	↓	↓
3	2	4	4	3
↓ sort				

[3, 4, 4, 6, 10]

Comparator function :

⇒ Two arguments (Data (any type) that needs to) be compared.

⇒ Based on the arguments & rules it should tell us which argument should come first in the sorted array.

C++ : bool Comp(int a, int b) {
 T a comes first
 F b comes first.
}

```

bool comp (int a, int b) {
    int f1 = countfactors(a);
    int f2 = countfactors(b);
    if (f1 < f2) {
        return true;
    }
    → if (f1 == f2) {
        if (a < b) return true;
    }
    return false;
}

```

C++ :

```

sort (arr, arr + n, comp())

```

Array
Size
↓

Java :-

```

Arrays.sort (A, new Comparator<Integer>() {

```

```

    public int compare (a, b) {

```

```

        //
        //
        //

```

```

    }
}

```

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