

**Ex. No. : 4.5**

**Date:**

**Register No.: 230701358**

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### **Nth Fibonacci**

Write a program to return the nth number in the fibonacci series. The value of N will be passed to the program as input.

**Program:**

```
n=int(input())  
  
if n==1:  
    print("0")  
  
else:  
    fib=[0,1]  
    for i in range(2,n):  
        fib.append(fib[-1]+fib[-2])  
    print(fib[-1])
```

Input Format:

Single Integer Input from stdin.

Output Format:

Yes or No.

Example Input:

175

Output:

Yes

Explanation

$$1^1 + 7^2 + 5^3 = 175$$

Example Input:

123

Output:

No

**For example:**

**InputResult**

175    Yes

123    No

**Ex. No. : 4.6**

**Date:**

**Register No.: 230701358**

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---

## **Disarium Number**

A Number is said to be Disarium number when the sum of its digit raised to the power of their respective positions becomes equal to the number itself. Write a program to print number is Disarium or not.

**Program:**

```
a=input()
b=0
c=1
for i in a:
    b+=int(i)**c
    c+=1
if b==int(a):
    print("Yes")
else:
    print("No")
```

## Sample Test Cases

### Test Case 1

Input

4

Output

1234

Explanation:

as input is 4, have to take 4 terms.

$1 + 11 + 111 + 1111$

### Test Case 2

Input

6

Output

123456

**For example:**

Input	Result
3	123

**Ex. No.** : 4.7

**Date:**

**Register No.:** 230701358

**Name:** TARUN C

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### **Sum of Series**

Write a program to find the sum of the series  $1 + 11 + 111 + 1111 + \dots + n$  terms (n will be given as input from the user and sum will be the output)

**Program:**

```
a=int(input())
b=c=1
for i in range(1,a):
    a=b
    b=(a*10)+1
    c+=b
print(c)
```

**For example:**

<b>Input</b>	<b>Result</b>
292	2
1015	3

**Ex. No. : 4.8**

**Date:**

**Register No.: 230701358**

**Name: TARUN C**

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## **Unique Digit Count**

Write a program to find the count of unique digits in a given number N. The number will be passed to the program as an input of type int.

Assumption: The input number will be a positive integer number  $\geq 1$  and  $\leq 25000$ .

For e.g.

If the given number is 292, the program should return 2 because there are only 2 unique digits '2' and '9' in this number

If the given number is 1015, the program should return 3 because there are 3 unique digits in this number, '1', '0', and '5'.

**Program:**

```
a=int(input())
b=set()
c=str(a)
for digit in c:
    b.add(digit)
print(len(b))
```

Input Format:

Single Integer input.

Output Format:

Output displays Yes if condition satisfies else prints No.

Example Input:

14

Output:

Yes

Example Input:

13

Output:

No



**Ex. No. : 4.9**

**Date:**

**Register No.: 230701358**

**Name: TARUN C**

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### **Product of single digit**

Given a positive integer N, check whether it can be represented as a product of single digit numbers.

**Program:**

```
r=int(input())
flag=0
for i in range(1,10):
    if r%i==0:
        if r//i<10:
            flag=1
if flag:
    print("Yes")
else:
    print("No")
```

Input Format:

Single integer input.

Output Format:

Yes or No.

Example Input:

24

Output:

Yes

Example Input:

26

Output:

No

**For example:**

Input	Result
24	Yes

**Ex. No. : 4.10**

**Date:**

**Register No.: 230701358**

**Name: TARUN C**

---

### **Perfect Square After adding One**

Given an integer N, check whether N the given number can be made a perfect square after adding 1 to it.

**Program:**

```
n=int(input())
n+=1
a=int(n**0.5)
if(a**2==n):
    print("Yes")
else:
    print("No")
```



## **05 - List in Python**

Sample Case 0  
Sample Input 0

4  
1  
2  
3  
3

Sample Output 0  
2

Explanation 0

- The sum of the first two elements,  $1+2=3$ . The value of the last element is 3.
- Using zero based indexing,  $\text{arr}[2]=3$  is the pivot between the two subarrays.
- The index of the pivot is 2.

Sample Case 1  
Sample Input 1

3  
1  
2  
1

Sample Output 1  
1

Explanation 1

- The first and last elements are equal to 1.
- Using zero based indexing,  $\text{arr}[1]=2$  is the pivot between the two subarrays.
- The index of the pivot is 1.

**For example:**

Input	Result
4 1 2 3 3	2
3 1 2 1	1

Ex. No. : 5.1

Date:

Register No.: 230701358

Name: TARUN C

---

### **Balanced Array**

Given an array of numbers, find the index of the smallest array element (the pivot), for which the sums of all elements to the left and to the right are equal. The array may not be reordered.

Example

arr=[1,2,3,4,6]

- the sum of the first three elements,  $1+2+3=6$ . The value of the last element is 6.
- Using zero based indexing, arr[3]=4 is the pivot between the two subarrays.
- The index of the pivot is 3.

Constraints

- $3 \leq n \leq 10^5$
- $1 \leq \text{arr}[i] \leq 2 \times 10^4$ , where  $0 \leq i < n$
- It is guaranteed that a solution always exists.

The first line contains an integer n, the size of the array arr.

Each of the next n lines contains an integer, arr[i], where  $0 \leq i < n$ .

**Program:**

```
def find(arr):
    total_sum = sum(arr)
    left_sum = 0
    for i in range(len(arr)):
        total_sum -= arr[i]
        if left_sum == total_sum:
            return i
        left_sum += arr[i]
    return -1
n = int(input())
arr = []
for _ in range(n):
    arr.append(int(input()))
p = find(arr)
print(p)
```





Input

1

3

1

3

5

4

Output:

1

Input

1

3

1

3

5

99

Output

0

**For example:**

Input	Result
1	1
3	
1	
3	
5	
4	
1	0
3	
1	
3	
5	
99	

Ex. No. : 5.2

Date:

Register No.: 230701358

Name: TARUN C

---

### **Check pair with difference k**

Given an array A of sorted integers and another non negative integer k, find if there exists 2 indices i and j such that  $A[i] - A[j] = k$ ,  $i \neq j$ .

Input Format

1. First line is number of test cases T. Following T lines contain:
2. N, followed by N integers of the array
3. The non-negative integer k

Output format

Print 1 if such a pair exists and 0 if it doesn't.

**Program:**

```
a=int(input())
for i in range(a):
    b=int(input())
    c=[]
    flag=0
    for i in range(b):
        c.append(int(input()))
    k=int(input())
    for i in c:
        for j in c:
            if i!=j:
                if i-j==k or j-i==k:
                    flag=1
print(flag)
```

## Sample Test Cases

### Test Case 1

#### Input

7

23

45

23

56

45

23

40

#### Output

23 occurs 3 times

45 occurs 2 times

56 occurs 1 times

40 occurs 1 times

**Ex. No. : 5.3**

**Date:**

**Register No.: 230701358**

**Name: TARUN C**

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### **Count Elements**

Complete the program to count frequency of each element of an array. Frequency of a particular element will be printed once.

**Program:**

```
n = int(input())
frequency = {}
for _ in range(n):
    num = int(input())
    frequency[num] = frequency.get(num, 0) + 1
for num, freq in frequency.items():
    print(f"{num} occurs {freq} times")
```

Example Input:

5

1

2

2

3

4

Output:

1 2 3 4

Example Input:

6

1

1

2

2

3

3

Output:

1 2 3

For example:

Input Result

5

1

2

2

3

4

1 2 3 4

6

1

1

2

2

3

3

1 2 3

**Ex. No. : 5.4**

**Date:**

**Register No.: 230701358**

**Name: TARUN C**

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### **Distinct Elements in an Array**

Program to print all the distinct elements in an array. Distinct elements are nothing but the unique (non-duplicate) elements present in the given array.

Input Format:

First line take an Integer input from stdin which is array length n.

Second line take n Integers which is inputs of array.

Output Format:

Print the Distinct Elements in Array in single line which is space Separated

**Program:**

```
n = int(input())
arr = [int(input()) for i in range(n)]
d= set()
for num in arr:
    d.add(num)
print(*d)
```

### Sample Test Cases

#### Test Case 1

##### Input

1  
3  
4  
5  
6  
7  
8  
9  
10  
11  
2

##### Output

ITEM to be inserted:2  
After insertion array is:

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11

#### Test Case 2

##### Input

11  
22  
33  
55  
66  
77  
88  
99  
110  
120  
44

##### Output

ITEM to be inserted:44  
After insertion array is:

11  
22  
33  
44  
55  
66  
77  
88  
99  
110  
120

Ex. No. : 5.5

Date:

Register No.: 230701358

Name: TARUN C

---

### **Element Insertion**

Consider a program to insert an element / item in the sorted array. Complete the logic by filling up required code in editable section. Consider an array of size 10. The eleventh item is the data is to be inserted.

**Program:**

```
a=[]
for i in range(10):
    a.append(int(input()))
c=int(input())
for i in range(10):
    if c<a[i]:
        a.insert(i,c)
        break
print("ITEM to be inserted:", end="")
print(c)
print("After insertion array is:")
for i in a:
    print(i)
```



**Sample Case 0****Sample Input 0**

10

3

**Sample Output 0**

5

**Explanation 0**

Factoring  $n = 10$  results in  $\{1, 2, 5, 10\}$ . Return the  $p = 3^{\text{rd}}$  factor, 5, as the answer.

**Sample Case 1****Sample Input 1**

10

5

**Sample Output 1**

0

**Explanation 1**

Factoring  $n = 10$  results in  $\{1, 2, 5, 10\}$ . There are only 4 factors and  $p = 5$ , therefore 0 is returned as the answer.

**Sample Case 2****Sample Input 2**

1

1

**Sample Output 2**

1

**Explanation 2**

Factoring  $n = 1$  results in  $\{1\}$ . The  $p = 1^{\text{st}}$  factor of 1 is returned as the answer.

**For example:**

Input	Result
10 3	5
10 5	0
1 1	1

**Ex. No.** : 5.6

**Date:**

**Register No.:** 230701358

**Name:** TARUN C

---

### **Find the Factor**

Determine the factors of a number (i.e., all positive integer values that evenly divide into a number) and then return the  $p^{\text{th}}$  element of the [list](#), sorted ascending. If there is no  $p^{\text{th}}$  element, return 0.

#### **Constraints**

$$1 \leq n \leq 10^{15}$$

$$1 \leq p \leq 10^9$$

The first line contains an integer  $n$ , the number to factor.

The second line contains an integer  $p$ , the 1-based index of the factor to return.

#### **Program:**

```
n = int(input())
p = int(input())
factors = []
for i in range(1, n + 1):
    if n % i == 0:
        factors.append(i)
factors.sort()
if p <= len(factors):
    print(factors[p - 1])
else:
    print(0)
```

Sample test case

Sample input

2  
2  
1  
3  
5  
7  
2  
4  
6  
8

Sample Output

[[1, 3, 2, 4], [5, 7, 6, 8]]

**Ex. No.** : 5.7

**Date:**

**Register No.:** 230701358

**Name:** TARUN C

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## **Merge List**

Write a Python program to Zip two given lists of lists.

Input:

m : row size

n: column size

list1 and list 2 : Two lists

Output

Zipped List : List which combined both list1 and list2

### **Program:**

```
a=int(input())
b=int(input())
a1=[]
b1=[]
a2=[]
b2=[]
c2=[]
for i in range(a*b):
    a1.append(int(input()))
for i in range(b*a):
    b1.append(int(input()))
a2.extend(a1[:b])
a2.extend(b1[:b])
b2.extend(a1[b:])
b2.extend(b1[b:])
c2.append(a2)
c2.append(b2)
print(c2)
```

Sample Input 1

5  
1  
2  
3  
6  
9  
4  
2  
4  
5  
10

Sample Output 1

1 2 3 4 5 6 9 10

Ex. No. : 5.8

Date:

Register No.: 230701358

Name: TARUN C

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## **Merge Two Sorted Arrays Without Duplication**

Output is a merged array without duplicates.

Input Format

N1 - no of elements in array 1

Array elements for array 1

N2 - no of elements in array 2

Array elements for array2

Output Format

Display the merged array

**Program:**

```
n1 = int(input())
array1 = [int(input()) for i in range(n1)]
n2 = int(input())
array2 = [int(input()) for j in range(n2)]
a = []
for num in array1:
    if num not in a:
        a.append(num)
for num in array2:
    if num not in a:
        a.append(num)
a.sort()
print(*a)
```

For example, if there are 4 elements in the array:

5  
6  
5  
7

If the element to search is 5 then the output will be:

5 is present at location 1

5 is present at location 3

5 is present 2 times in the array.

Sample Test Cases

Test Case 1

Input

4  
5  
6  
5  
7  
5

Output

5 is present at location 1.

5 is present at location 3.

5 is present 2 times in the array.

Test Case 2

Input

5  
67  
80  
45  
97  
100  
50

Output

50 is not present in the array.

Ex. No. : 5.9

Date:

Register No.: 230701358

Name: TARUN C

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### **Print Element Location**

Write a program to print all the locations at which a particular element (taken as input) is found in a list and also print the total number of times it occurs in the list. The location starts from 1.

**Program:**

```
n = int(input())
arr = [int(input()) for _ in range(n)]
element = int(input())
count = 0
for i in range(n):
    if arr[i] == element:
        count += 1
        print(f'{element} is present at location {i+1}.')
if count > 0:
    print(f'{element} is present {count} times in the array.')
else:
    print(f'{element} is not present in the array.')
```