

## **04 - Iteration Control Structures**



**Ex. No. : 4.1**

**Date: 13.04.24**

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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.

NOTE: Fibonacci series looks like –

0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, . . . and so on.

i.e. Fibonacci series starts with 0 and 1, and continues generating the next number as the sum of the previous two numbers.

- first Fibonacci number is 0,
- second Fibonacci number is 1,
- third Fibonacci number is 1,
- fourth Fibonacci number is 2,
- fifth Fibonacci number is 3,
- sixth Fibonacci number is 5,
- seventh Fibonacci number is 8, and so on.

**For example:**

| Input | Result |
|-------|--------|
| 1     | 0      |
| 4     | 2      |
| 7     | 8      |



**Program:**

```
a=int(input())
```

```
b=0
```

```
c=1
```

```
if(a==1):
```

```
    print("0")
```

```
elif(a==2):
```

```
    print("1")
```

```
else:
```

```
    for i in range (3,a+1):
```

```
        d=b+c
```

```
        b=c
```

```
        c=d
```

```
    print(d)
```

|   | Input | Expected | Got |   |
|---|-------|----------|-----|---|
| ✓ | 1     | 0        | 0   | ✓ |
| ✓ | 4     | 2        | 2   | ✓ |
| ✓ | 7     | 8        | 8   | ✓ |



Ex. No. : 4.2

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## Factors of a number

Determine the factors of a number (i.e., all positive integer values that evenly divide into a number).

**For example:**

| Input | Result           |
|-------|------------------|
| 20    | 1 2 4 5 10<br>20 |

**Program:**

```
a=int(input())
for i in range(1,a+1):
    if(a%i==0):
        print(i,end=" ")
```

|   | Input | Expected      | Got           |   |
|---|-------|---------------|---------------|---|
| ✓ | 20    | 1 2 4 5 10 20 | 1 2 4 5 10 20 | ✓ |
| ✓ | 5     | 1 5           | 1 5           | ✓ |
| ✓ | 13    | 1 13          | 1 13          | ✓ |



**Ex. No. : 4.3**

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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.

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

### **Program:**

```
a=int(input())
c=0
for i in range(1,10): for j in range(1,10):
    if i*j==a:
        c=1
if(c==1):
    print("Yes")
▼else:
    print("No")
```



|   | Input | Expected | Got |   |
|---|-------|----------|-----|---|
| ✓ | 14    | Yes      | Yes | ✓ |
| ✓ | 13    | No       | No  | ✓ |



Ex. No. : 4.4

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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'.

**For example:**

| Input | Result |
|-------|--------|
| 292   | 2      |
| 1015  | 3      |

**Program:**

```
a=input()
```

```
b=len(set(a))
```

```
print(b)
```

|   | Input | Expected | Got |   |
|---|-------|----------|-----|---|
| ✓ | 292   | 2        | 2   | ✓ |
| ✓ | 1015  | 3        | 3   | ✓ |
| ✓ | 123   | 3        | 3   | ✓ |



## **Non Repeated Digit Count**

Write a program to find the count of non-repeated 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  $\leq 25000$ .

Some examples are as below.

If the given number is 292, the program should return 1 because there is only 1 non-repeated digit '9' in this number

If the given number is 1015, the program should return 2 because there are 2 non-repeated digits in this number, '0', and '5'.

If the given number is 108, the program should return 3 because there are 3 non-repeated digits in this number, '1', '0', and '8'.

If the given number is 22, the function should return 0 because there are NO non-repeated digits in this number.

**For example:**

| Input | Result |
|-------|--------|
| 292   | 1      |
| 1015  | 2      |
| 108   | 3      |
| 22    | 0      |





**Program:**

```
a={}
```

```
for i in input:
```

```
    if i in a:a[i]+=1
```

```
    else:a[i]=1
```

```
print(sum([1 for i in a if a[i]==1]))
```

|   | Input | Expected | Got |   |
|---|-------|----------|-----|---|
| ✓ | 292   | 1        | 1   | ✓ |
| ✓ | 1015  | 2        | 2   | ✓ |
| ✓ | 108   | 3        | 3   | ✓ |
| ✓ | 22    | 0        | 0   | ✓ |



Ex. No. : 4.6

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## Next Perfect Square

Given a number N, find the next perfect square greater than N.

Input Format:

Integer input from stdin.

Output Format:

Perfect square greater than N.

Example Input:

10

Output:

16

### **Program:**

```
import math
a=int(input())
b = a + 1
while b > 0 :
    m=math.sqrt(b)
    if(m==int(m)):
        print(b)
        break
    else:
        b = b + 1
```

|   | Input | Expected | Got |   |
|---|-------|----------|-----|---|
| ✓ | 10    | 16       | 16  | ✓ |





**Ex. No. : 4.7**

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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)

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    |



**Program:**

```
a=int(input())
```

```
t=1
```

```
s=0
```

```
for i in range(a)
```

```
    s+=t
```

```
    t=t*10+1
```

```
print(s)
```

|   | Input | Expected | Got    |   |
|---|-------|----------|--------|---|
| ✓ | 4     | 1234     | 1234   | ✓ |
| ✓ | 6     | 123456   | 123456 | ✓ |



Ex. No. : 4.8

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## **Prime Checking**

Write a program that finds whether the given number N is Prime or not. If the number is prime, the program should return 2 else it must return 1.

Assumption:  $2 \leq N \leq 5000$ , where N is the given number.

Example1: if the given number N is 7, the method must return 2

Example2: if the given number N is 10, the method must return 1

**For example:**

| Input | Result |
|-------|--------|
| 7     | 2      |
| 10    | 1      |

### **Program:**

```
a=int(input())
c=0
for i in range(2,a):
    if(a%i==0):
        c=1
if(c==1):
    print("1")
elif(c==0): print("2")
```



|   | Input | Expected | Got |   |
|---|-------|----------|-----|---|
| ✓ | 7     | 2        | 2   | ✓ |
| ✓ | 10    | 1        | 1   | ✓ |



**Ex. No. : 4.9**

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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.

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:**

| Input | Result |
|-------|--------|
| 175   | Yes    |
| 123   | No     |





**Program:**

```
a=input()
n=len(a)
r=0
for i,d in enumerate(a):
    r+=int(d)**(i+1)
    if r==int(a):
        print("Yes")
    else:
        print("No")
```

|   | Input | Expected | Got |   |
|---|-------|----------|-----|---|
| ✓ | 175   | Yes      | Yes | ✓ |
| ✓ | 123   | No       | No  | ✓ |



**Ex. No. : 4.10**

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## **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.

Input Format:

Single integer input.

Output Format:

Yes or No.

Example Input:

24

Output:

Yes

Example Input:

26

Output:

No

**For example:**

| <b>Input</b> | <b>Result</b> |
|--------------|---------------|
| 24           | Yes           |



**Program:**

```
import math

a=int(input())

b=a+1

c=math.sqrt(b)

if(c==int(c)):

    print("Yes")

else:

    print("No")
```

|   | Input | Expected | Got |   |
|---|-------|----------|-----|---|
| ✓ | 24    | Yes      | Yes | ✓ |
| ✓ | 26    | No       | No  | ✓ |

