Python Introduction Lab
Assignment 1

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Section: CSE-1 (8th Semester)

GitHub Repository: GithubLink

Q1. Create a program that asks the user to enter their name and their age. Print out a message addressed to them that tells them the year that they will turn 100 years old. Extras:

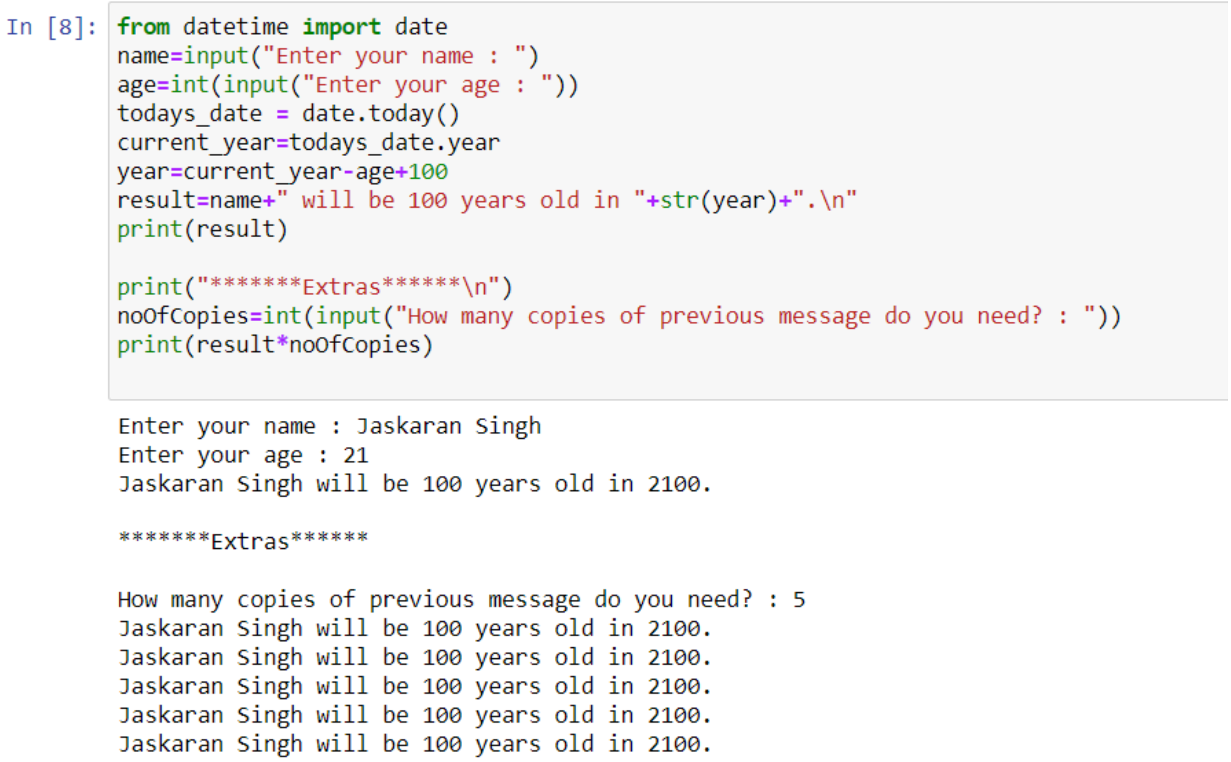
1. Add on to the previous program by asking the user for another number and printing out that many copies of the previous message.
2. Print out that many copies of the previous message on separate lines. (Hint: the string "\n is the same as pressing the ENTER button)

Sol:

Pseudocode:

```
input: name, age

output: year for turning into 100

initialise name

initialise age

initialise year to now.year + 100 - age

initialise result to name + will be 100 years old in + year  + \n

print result

print result * repeat_msg
```

Program screenshot and Output:



```python
from datetime import date
name=input("Enter your name : ")
age=int(input("Enter your age : "))
todays_date = date.today()
current_year=todays_date.year
year=current_year-age+100
result=name+" will be 100 years old in "+str(year)+".\n"
print(result)

print("*******Extras******\n")
noOfCopies=int(input("How many copies of previous message do you need? : "))
print(result*noOfCopies)
```

```
Enter your name : Jaskaran Singh
Enter your age : 21
Jaskaran Singh will be 100 years old in 2100.

*******Extras******

How many copies of previous message do you need? : 5
Jaskaran Singh will be 100 years old in 2100.
Jaskaran Singh will be 100 years old in 2100.
Jaskaran Singh will be 100 years old in 2100.
Jaskaran Singh will be 100 years old in 2100.
Jaskaran Singh will be 100 years old in 2100.
```

Q2. Take a list, say for example this one: a = [1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89] and write a program that prints out all the elements of the list that are less than 5.

Extras:

1. Instead of printing the elements one by one, make a new list that has all the elements less than 5 from this list in it and print out this new list.

2. Write this in one line of Python.

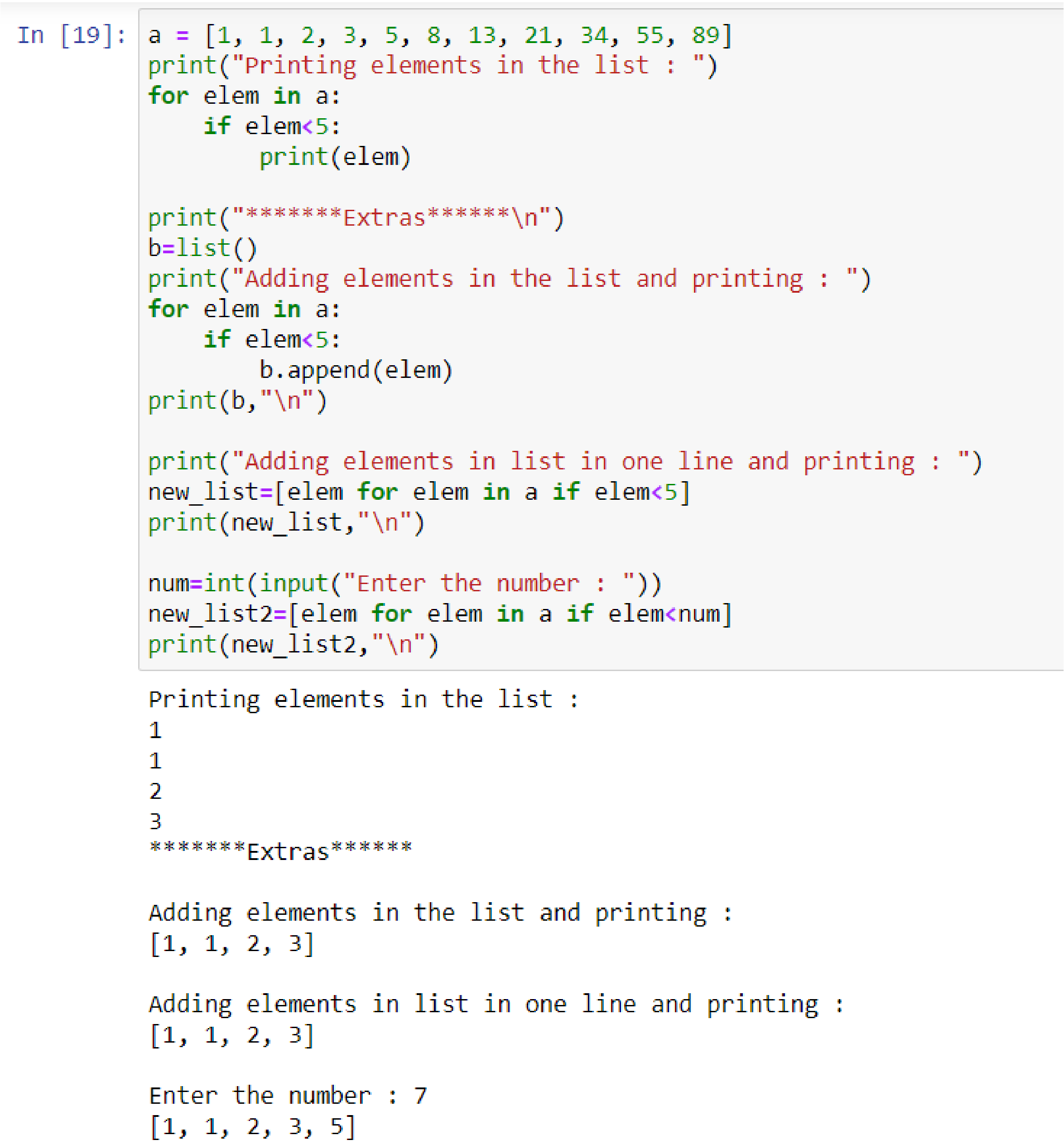
3. Ask the user for a number and return a list that contains only elements from the original list a that are smaller than that number given by the user.

Sol:

Pseudocode:

```
input: list
output: elements greater than 5

initialise a to [1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89]

for each element in a
    if element is smaller than 5
        print element + "\n"

print Extras

initialise new_list to elem for elem in a if elem is smaller than 5

print New List is  new_list

initialise num

print elem for each elem in a if elem is smaller than num
```

Program screenshot and Output:



```
In [19]: a = [1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89]
         print("Printing elements in the list : ")
         for elem in a:
             if elem<5:
                 print(elem)

         print("*******Extras******\n")
         b=list()
         print("Adding elements in the list and printing : ")
         for elem in a:
             if elem<5:
                 b.append(elem)
         print(b,"\n")

         print("Adding elements in list in one line and printing : ")
         new_list=[elem for elem in a if elem<5]
         print(new_list,"\n")

         num=int(input("Enter the number : "))
         new_list2=[elem for elem in a if elem<num]
         print(new_list2,"\n")
```

```
Printing elements in the list :
1
1
2
3
*******Extras******

Adding elements in the list and printing :
[1, 1, 2, 3]

Adding elements in list in one line and printing :
[1, 1, 2, 3]

Enter the number : 7
[1, 1, 2, 3, 5]
```

Q3. Write a program that asks the user how many Fibonacci numbers to generate and then generates them. Take this opportunity to think about how you can use functions. Make sure to ask the user to enter the number of numbers in the sequence to generate. (Hint: The Fibonacci seqence is a sequence of numbers where the next number in the sequence is the sum of the previous two numbers in the sequence. The sequence looks like this: 1, 1, 2, 3, 5, 8, 13, ...).

Sol:

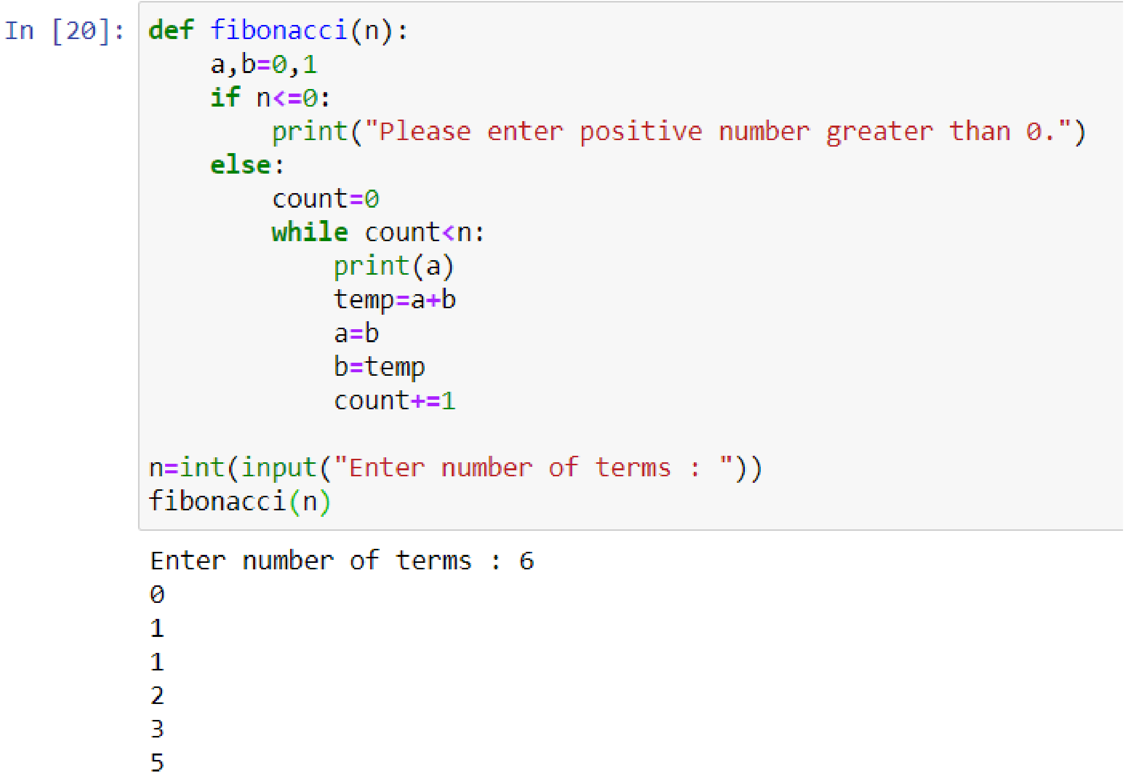
Pseudocode:

input: limit for fibonacci sequence

output: fibonacci sequence upto n terms

```
function fibonacci(n)
    initialise a to 0
    initialise b to 1
    initialise count to 0
    if n is less than or equal to 0
        print Please enter a positive integer greater than 0
    else:
        while count is smaller than n
            print a
            initialise temp to a+b
            set a to b
            set b to temp
            set count += 1
initialise n
print fibonacci(n)
```

Program screenshot and Output:



```
def fibonacci(n):
    a,b=0,1
    if n<=0:
        print("Please enter positive number greater than 0.")
    else:
        count=0
        while count<n:
            print(a)
            temp=a+b
            a=b
            b=temp
            count+=1

n=int(input("Enter number of terms : "))
fibonacci(n)
```

```
Enter number of terms : 6
0
1
1
2
3
5
```

Q4. Write a program (function!) that takes a list and returns a new list that contains all the elements of the first list minus all the duplicates.

Extras:

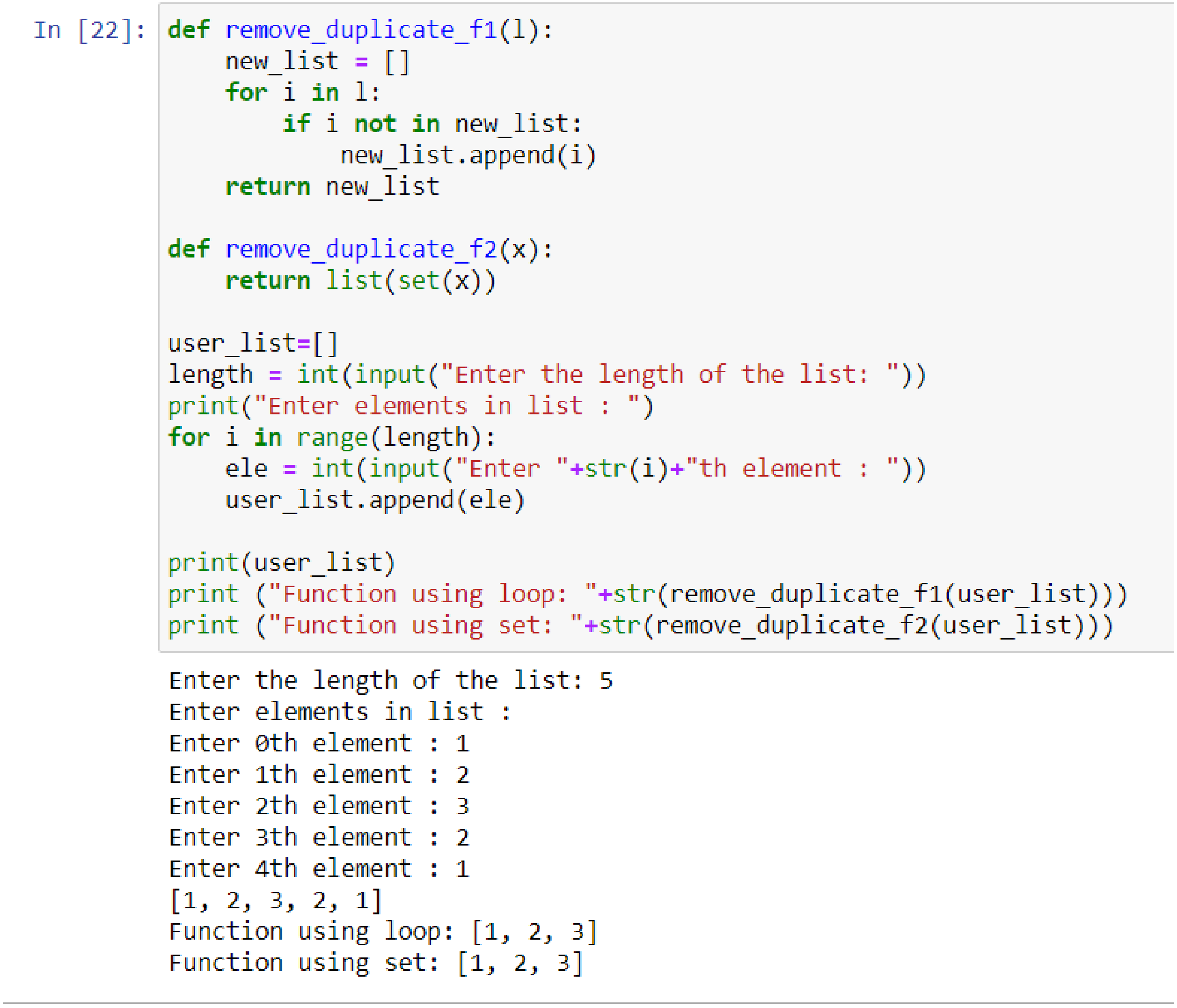
● Write two different functions to do this - one using a loop and constructing a list, and another using sets.

Sol:

Pseudocode:

```
function remove_duplicate_f1(list)
    initialise new_list
    for each i in list
        if i not is in new_list
            new_list.append(i)
    return new_list

function remove_duplicate_f2(list)
    return list(set(x))

initialise user_list
initialise limit

for each i in range limit
    initialise ele
    append ele in user_list
print user_list
print Function using loop remove_duplicate_f1(user_list)
print Function using set remove_duplicate_f2(user_list)
```

Program screenshot and Output:



In [22]:

```
def remove_duplicate_f1(l):
    new_list = []
    for i in l:
        if i not in new_list:
            new_list.append(i)
    return new_list

def remove_duplicate_f2(x):
    return list(set(x))

user_list=[]
length = int(input("Enter the length of the list: "))
print("Enter elements in list : ")
for i in range(length):
    ele = int(input("Enter "+str(i)+"th element : "))
    user_list.append(ele)

print(user_list)
print ("Function using loop: "+str(remove_duplicate_f1(user_list)))
print ("Function using set: "+str(remove_duplicate_f2(user_list)))
```

```
Enter the length of the list: 5
Enter elements in list :
Enter 0th element : 1
Enter 1th element : 2
Enter 2th element : 3
Enter 3th element : 2
Enter 4th element : 1
[1, 2, 3, 2, 1]
Function using loop: [1, 2, 3]
Function using set: [1, 2, 3]
```

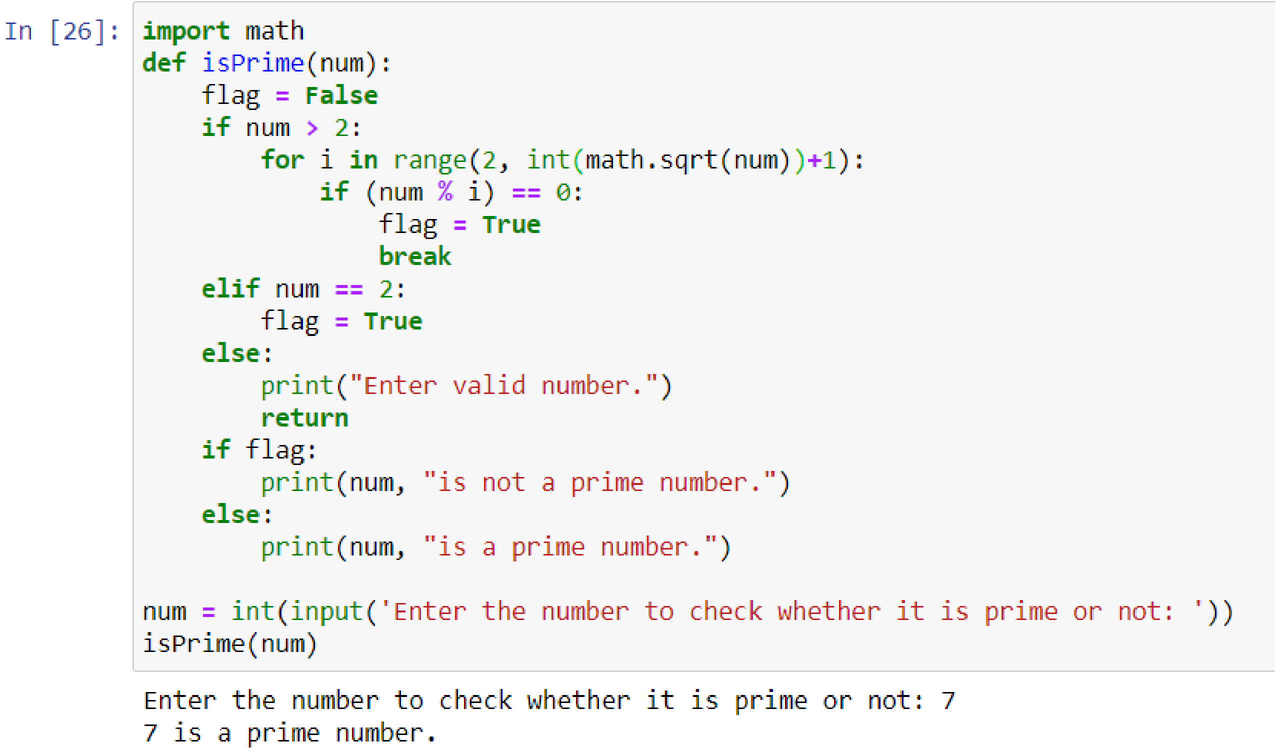
Q5. Ask the user for a number and determine whether the number is prime or not. (For those who have forgotten, a prime number is a number that has no divisors.). Use functions.

Sol:

Pseudocode:

```
input: number
output: number is prime or not
function prime(number)
    initialise flag to false
    if number is greater than 2
        for each i from 2 to sqrt(number)+1
            if i modulus number is 0
                set flag to true
                break
        end for loop
    if number==2
           set flag=true
    if flag is true
        print number is a prime number.
    else
        print number is not a prime number.
end
```

Program screenshot and Output:



```python
import math
def isPrime(num):
    flag = False
    if num > 2:
        for i in range(2, int(math.sqrt(num))+1):
            if (num % i) == 0:
                flag = True
                break
    elif num == 2:
        flag = True
    else:
        print("Enter valid number.")
        return
    if flag:
        print(num, "is not a prime number.")
    else:
        print(num, "is a prime number.")

num = int(input('Enter the number to check whether it is prime or not: '))
isPrime(num)
```

```
Enter the number to check whether it is prime or not: 7
7 is a prime number.
```