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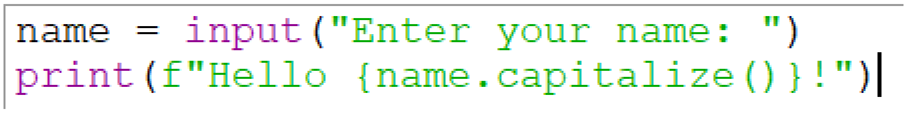
Program 1

Aim: Write a python program to input a welcome message and display it.

Modules used: N/A

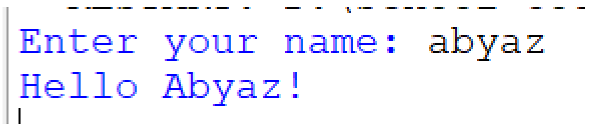
Data types used: String

Script:



```
name = input("Enter your name: ")
print(f"Hello {name.capitalize()}!")
```

Output:



```
Enter your name: abyaz
Hello Abyaz!
```

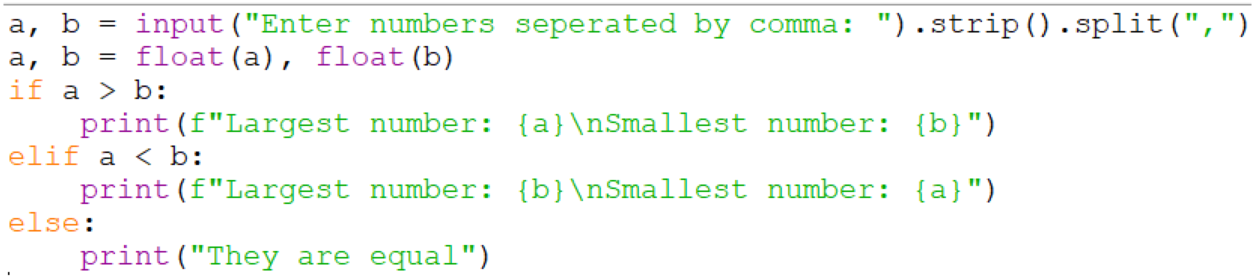
Program 2

Aim: Write a python program to input 2 numbers and display the largest & smallest number.

Modules used: N/A

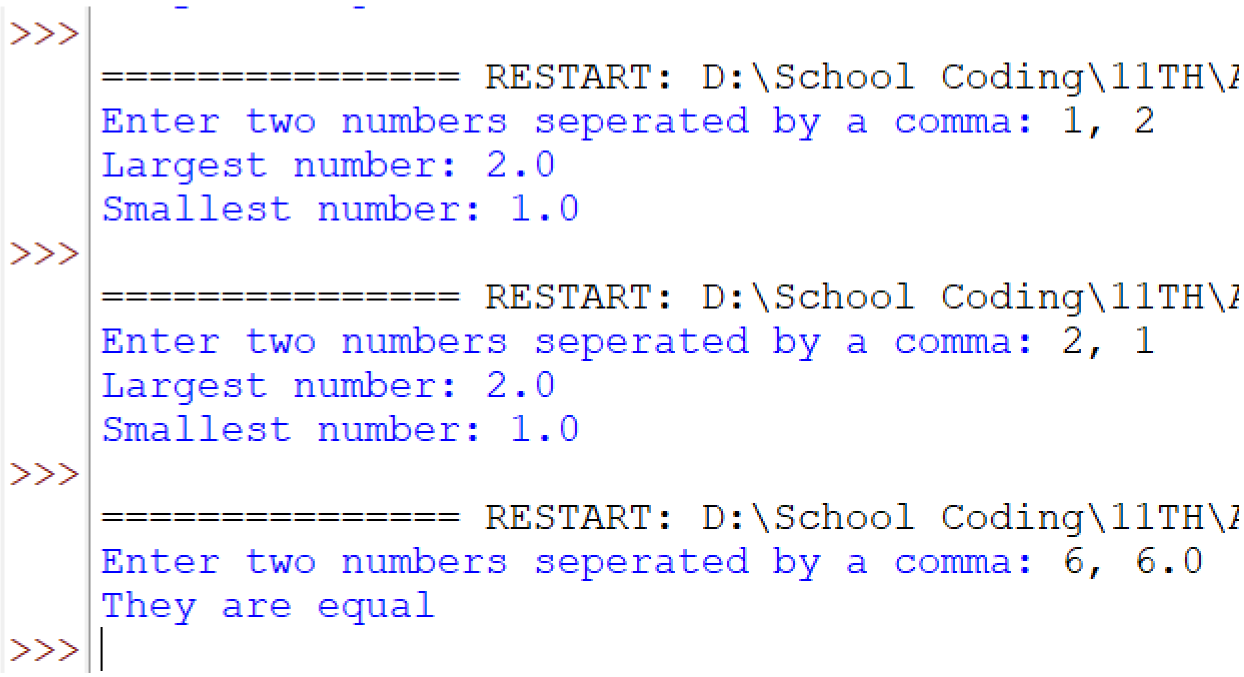
Data types used: String, float

Script:



```python
a, b = input("Enter numbers seperated by comma: ").strip().split(",")
a, b = float(a), float(b)
if a > b:
    print(f"Largest number: {a}\nSmallest number: {b}")
elif a < b:
    print(f"Largest number: {b}\nSmallest number: {a}")
else:
    print("They are equal")
```

Output:



```
>>>
=============== RESTART: D:\School Coding\11TH\
Enter two numbers seperated by a comma: 1, 2
Largest number: 2.0
Smallest number: 1.0
>>>
=============== RESTART: D:\School Coding\11TH\
Enter two numbers seperated by a comma: 2, 1
Largest number: 2.0
Smallest number: 1.0
>>>
=============== RESTART: D:\School Coding\11TH\
Enter two numbers seperated by a comma: 6, 6.0
They are equal
>>>
```

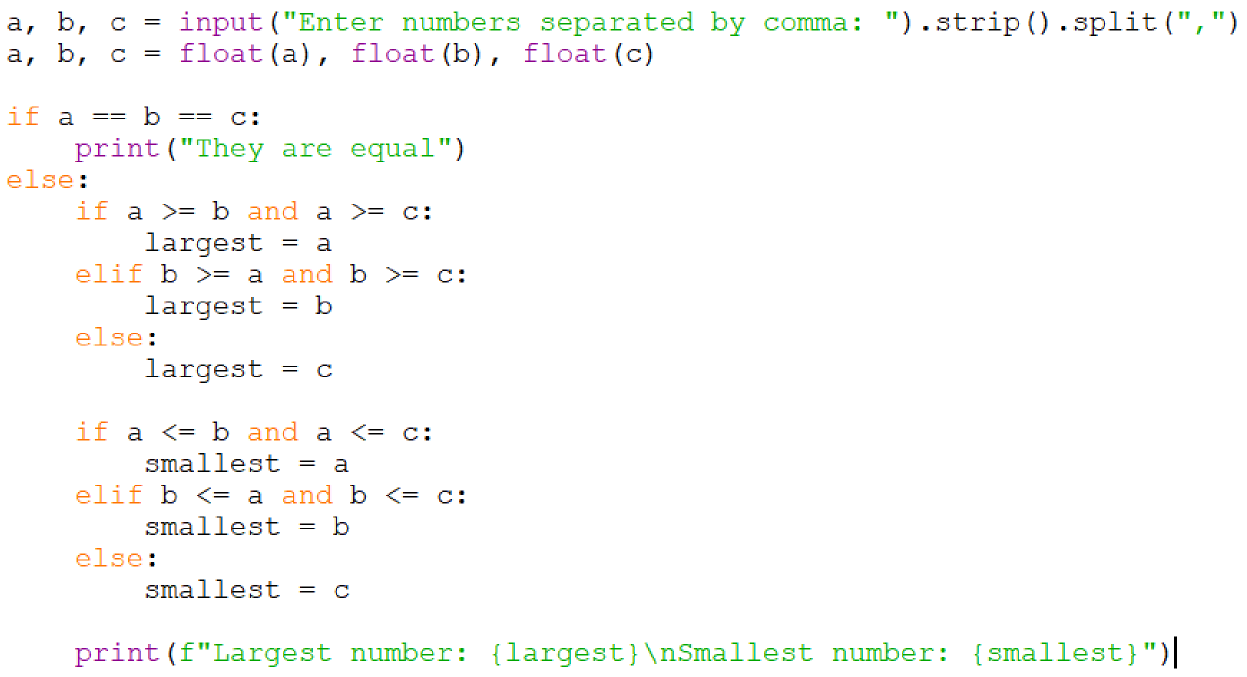
Program 3

Aim: Write a python program to input 3 numbers and display the largest & smallest number.

Modules used: N/A

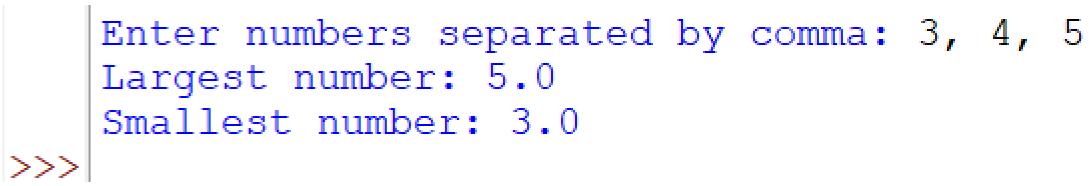
Data types used: String, float

Script:



```
a, b, c = input("Enter numbers separated by comma: ").strip().split(",")
a, b, c = float(a), float(b), float(c)

if a == b == c:
    print("They are equal")
else:
    if a >= b and a >= c:
        largest = a
    elif b >= a and b >= c:
        largest = b
    else:
        largest = c

    if a <= b and a <= c:
        smallest = a
    elif b <= a and b <= c:
        smallest = b
    else:
        smallest = c

    print(f"Largest number: {largest}\nSmallest number: {smallest}")
```

Output:



```
Enter numbers separated by comma: 3, 4, 5
Largest number: 5.0
Smallest number: 3.0
>>>
```

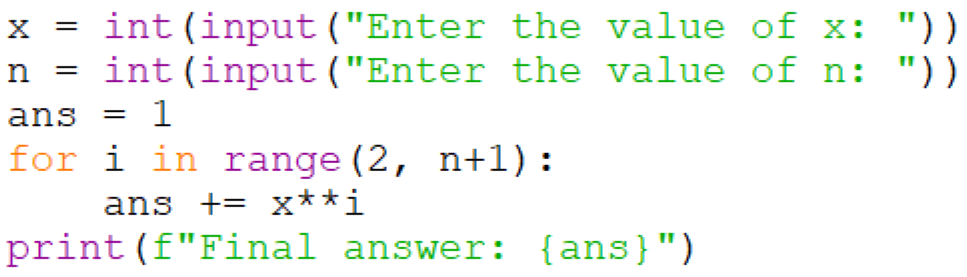
Program 4

Aim: Find the sum of the series: $1 + x^2 + x^3 \ldots + x^n$

Modules used: N/A

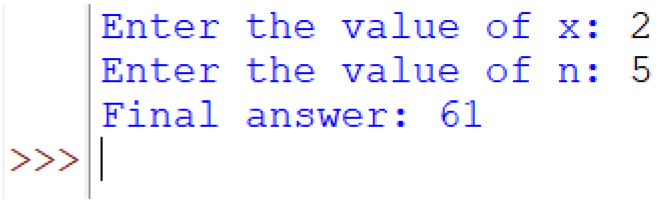
Data types used: Integer

Script:



```python
x = int(input("Enter the value of x: "))
n = int(input("Enter the value of n: "))
ans = 1
for i in range(2, n+1):
    ans += x**i
print(f"Final answer: {ans}")
```

Output:



```
Enter the value of x: 2
Enter the value of n: 5
Final answer: 61
>>>
```

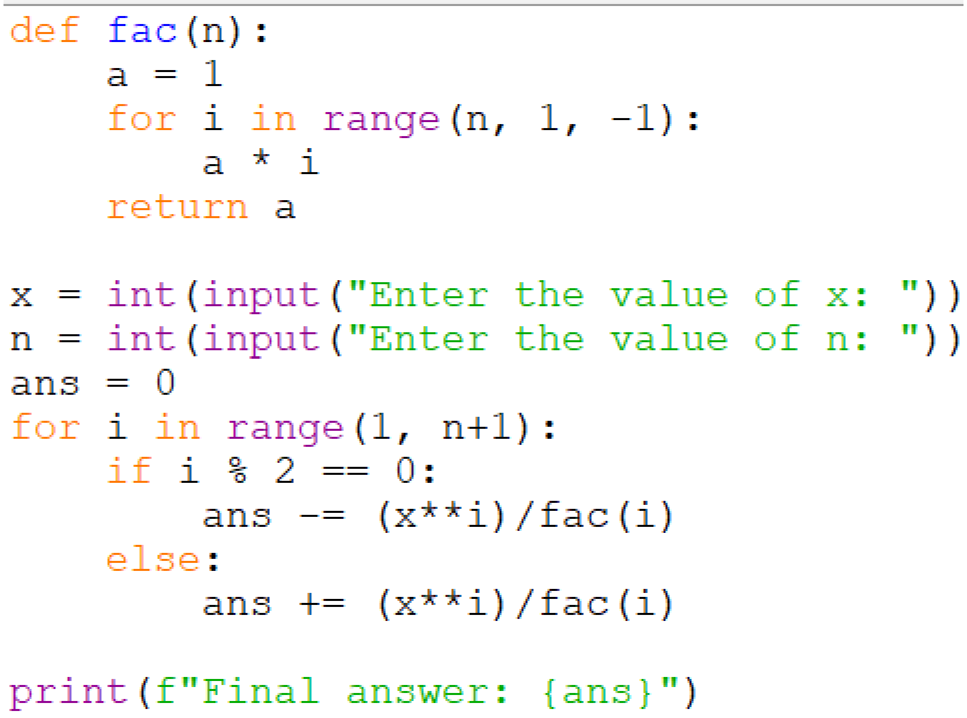
Program 4

Aim: Find the sum of the series: $x - \frac{x^2}{2!} + \frac{x^3}{3!} - \frac{x^4}{4!} \dots \pm \frac{x^n}{n!}$

Modules used: N/A

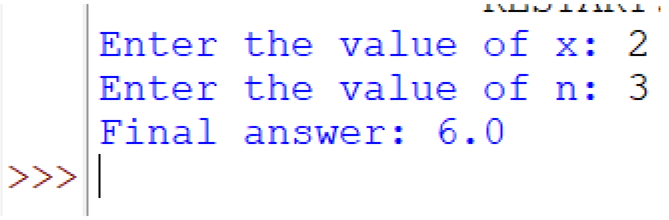
Data types used: Integer

Script:



```
def fac(n):
    a = 1
    for i in range(n, 1, -1):
        a * i
    return a

x = int(input("Enter the value of x: "))
n = int(input("Enter the value of n: "))
ans = 0
for i in range(1, n+1):
    if i % 2 == 0:
        ans -= (x**i)/fac(i)
    else:
        ans += (x**i)/fac(i)

print(f"Final answer: {ans}")
```

Output:



```
Enter the value of x: 2
Enter the value of n: 3
Final answer: 6.0
>>>
```

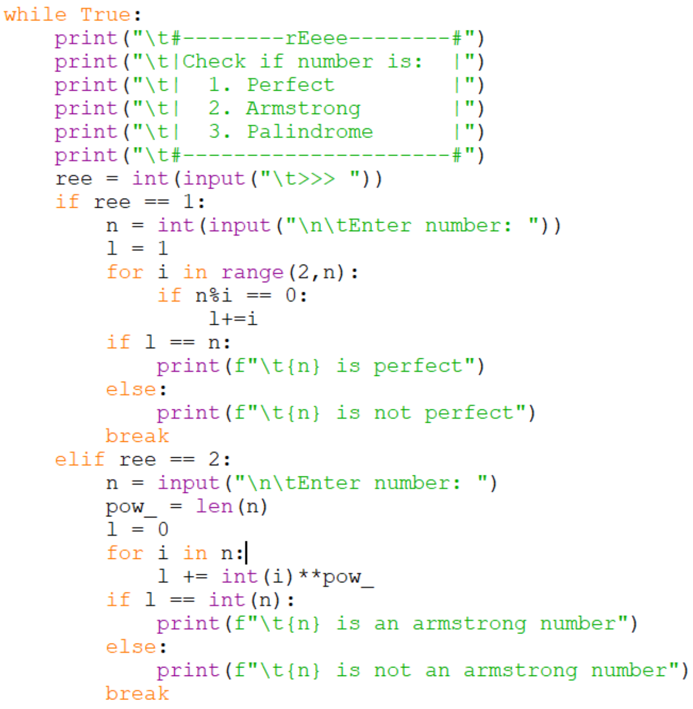
Program 5

Aim: A menu driven program that checks if the given number is perfect / Armstrong / Palindrome

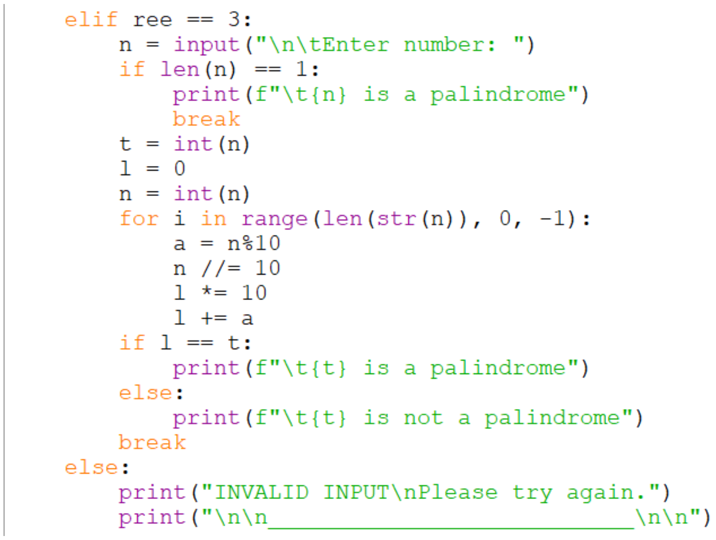
Modules used: N/A

Data types used: Integer

Script:

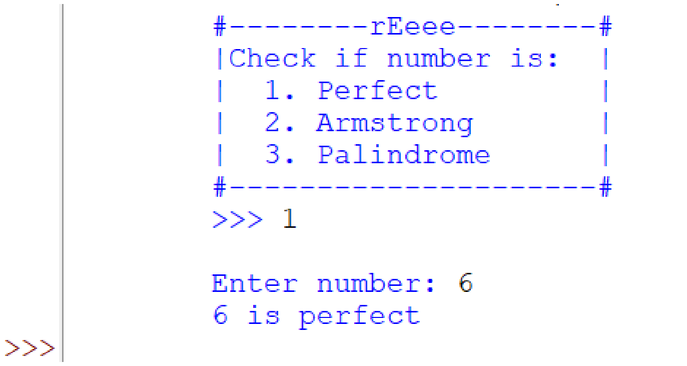


```
while True:
    print("\t#--------rEeee--------#")
    print("\t|Check if number is:  |")
    print("\t|  1. Perfect         |")
    print("\t|  2. Armstrong       |")
    print("\t|  3. Palindrome      |")
    print("\t#---------------------#")
    ree = int(input("\t>>> "))
    if ree == 1:
        n = int(input("\n\tEnter number: "))
        l = 1
        for i in range(2,n):
            if n%i == 0:
                l+=i
        if l == n:
            print(f"\t{n} is perfect")
        else:
            print(f"\t{n} is not perfect")
        break
    elif ree == 2:
        n = input("\n\tEnter number: ")
        pow_ = len(n)
        l = 0
        for i in n:
            l += int(i)**pow_
        if l == int(n):
            print(f"\t{n} is an armstrong number")
        else:
            print(f"\t{n} is not an armstrong number")
        break
```

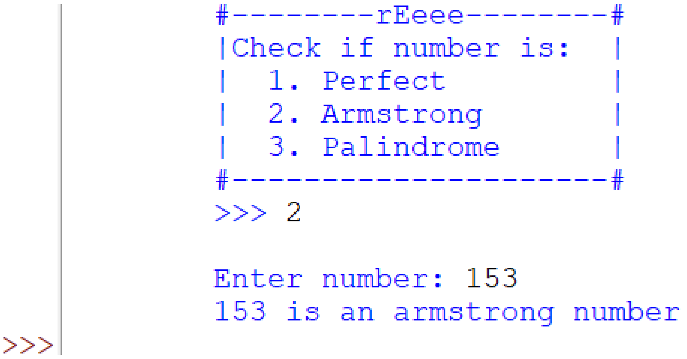


```
    elif ree == 3:
        n = input("\n\tEnter number: ")
        if len(n) == 1:
            print(f"\t{n} is a palindrome")
            break
        t = int(n)
        l = 0
        n = int(n)
        for i in range(len(str(n)), 0, -1):
            a = n%10
            n //= 10
            l *= 10
            l += a
        if l == t:
            print(f"\t{t} is a palindrome")
        else:
            print(f"\t{t} is not a palindrome")
        break
    else:
        print("INVALID INPUT\nPlease try again.")
        print("\n\n___________________________\n\n")
```

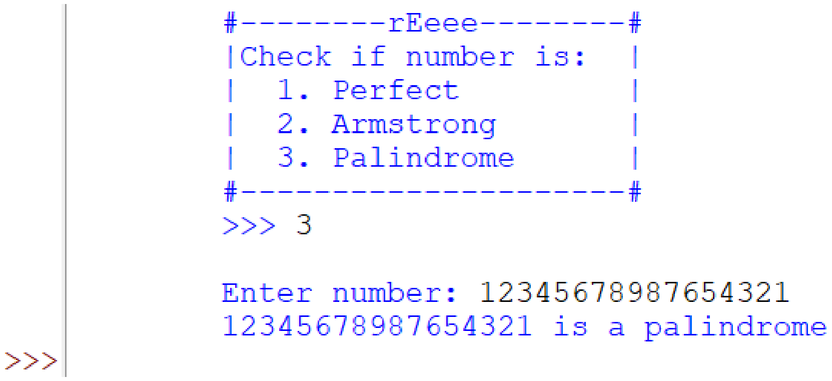
Output:



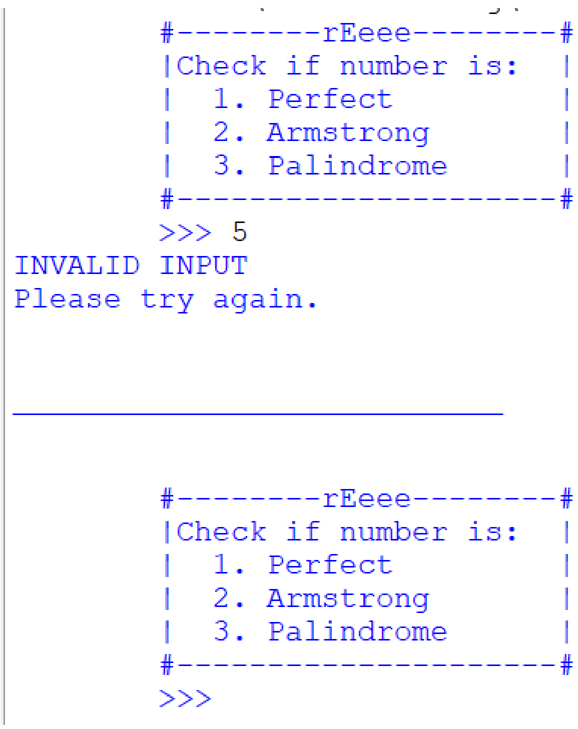
```
        #--------rEeee--------#
        |Check if number is:  |
        |   1. Perfect        |
        |   2. Armstrong      |
        |   3. Palindrome     |
        #---------------------#
        >>> 1

        Enter number: 6
        6 is perfect
>>>
```



```
        #--------rEeee--------#
        |Check if number is:  |
        |   1. Perfect        |
        |   2. Armstrong      |
        |   3. Palindrome     |
        #---------------------#
        >>> 2

        Enter number: 153
        153 is an armstrong number
>>>
```



```
        #--------rEeee--------#
        |Check if number is:  |
        |   1. Perfect        |
        |   2. Armstrong      |
        |   3. Palindrome     |
        #---------------------#
        >>> 3

        Enter number: 12345678987654321
        12345678987654321 is a palindrome
>>>
```



```
        #--------rEeee--------#
        |Check if number is:  |
        |   1. Perfect        |
        |   2. Armstrong      |
        |   3. Palindrome     |
        #---------------------#
        >>> 5
INVALID INPUT
Please try again.


___________________________


        #--------rEeee--------#
        |Check if number is:  |
        |   1. Perfect        |
        |   2. Armstrong      |
        |   3. Palindrome     |
        #---------------------#
        >>>
```

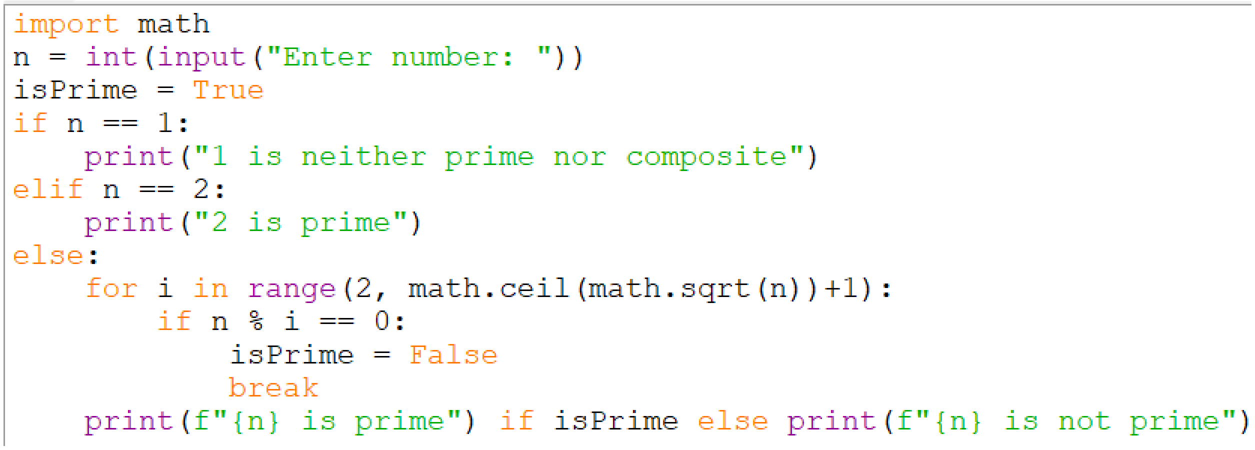
Program 6

Aim: Write a program to input a number and check if the number is a prime or composite number.

Modules used: math

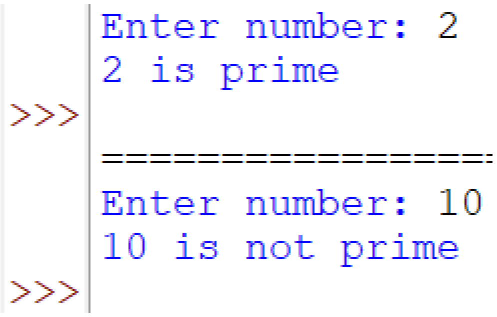
Data types used: Integer

Script:



```
import math
n = int(input("Enter number: "))
isPrime = True
if n == 1:
    print("1 is neither prime nor composite")
elif n == 2:
    print("2 is prime")
else:
    for i in range(2, math.ceil(math.sqrt(n))+1):
        if n % i == 0:
            isPrime = False
            break
    print(f"{n} is prime") if isPrime else print(f"{n} is not prime")
```

Output:



```
    Enter number: 2
    2 is prime
>>> 
    =================
    Enter number: 10
    10 is not prime
>>> 
```

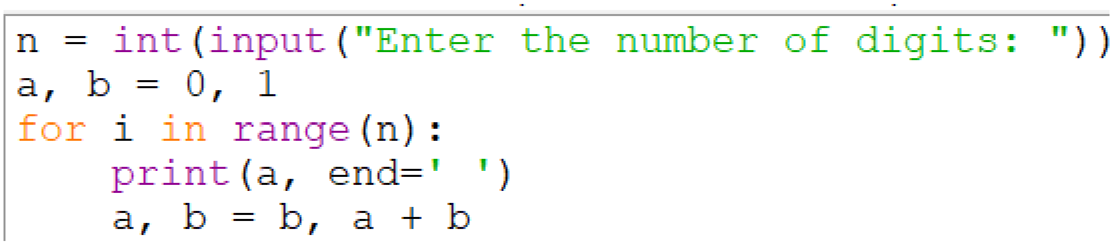
Program 7

Aim: Write a program to display the n terms of a Fibonacci series.

Modules used: N/A

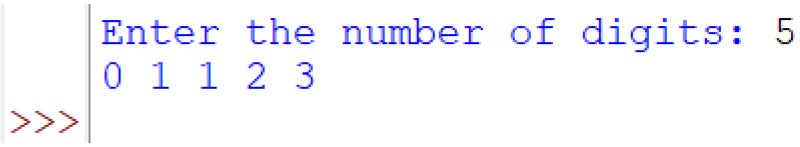
Data types used: Integer

Script:



```
n = int(input("Enter the number of digits: "))
a, b = 0, 1
for i in range(n):
    print(a, end=' ')
    a, b = b, a + b
```

Output:



```
Enter the number of digits: 5
0 1 1 2 3
>>>
```

Program 8

Aim: Generate the following patterns using for loop

Pattern-1	Pattern-2	Pattern-3
*	1 2 3 4 5	A
**	1 2 3 4	AB
***	1 2 3	ABC
****	1 2	ABCD
*****	1	ABCDE

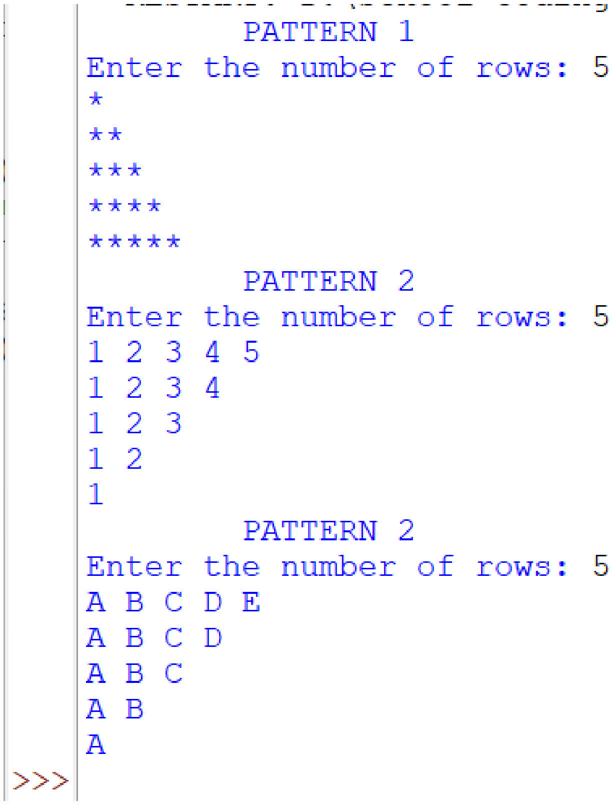
Modules used: N/A

Data types used: Integer / String

Script:

```
print("\tPATTERN 1")
n = int(input("Enter the number of rows: "))
for i in range(1, n+1):
    print("*" * i)

print("\tPATTERN 2")
n = int(input("Enter the number of rows: "))
for i in range(n, 0, -1):
    for j in range(1, n+1):
        print(j, end=" ")
    print()
    n -= 1

print("\tPATTERN 2")
n = int(input("Enter the number of rows: "))
for i in range(1, n+1):
    r = 65+n
    for j in range(65, r):
        print(chr(j), end=" ")
    print()
    n -=1
```

Output:



```
        PATTERN 1
Enter the number of rows: 5
*
**
***
****
*****
        PATTERN 2
Enter the number of rows: 5
1 2 3 4 5
1 2 3 4
1 2 3
1 2
1
        PATTERN 2
Enter the number of rows: 5
A B C D E
A B C D
A B C
A B
A
>>>
```

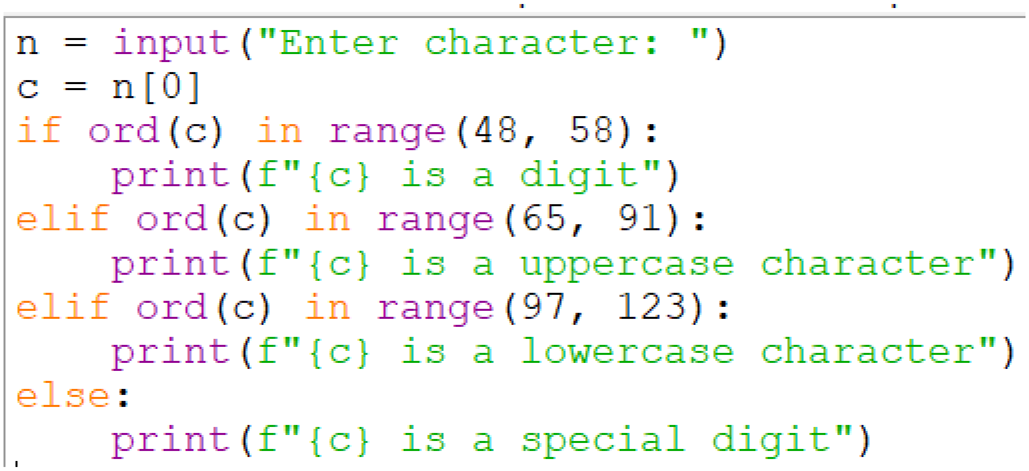
Program 9

Aim: Write a program to input a character and print whether it is an upper-case alphabet, lower-case alphabet, a digit, or special character

Modules used: N/A

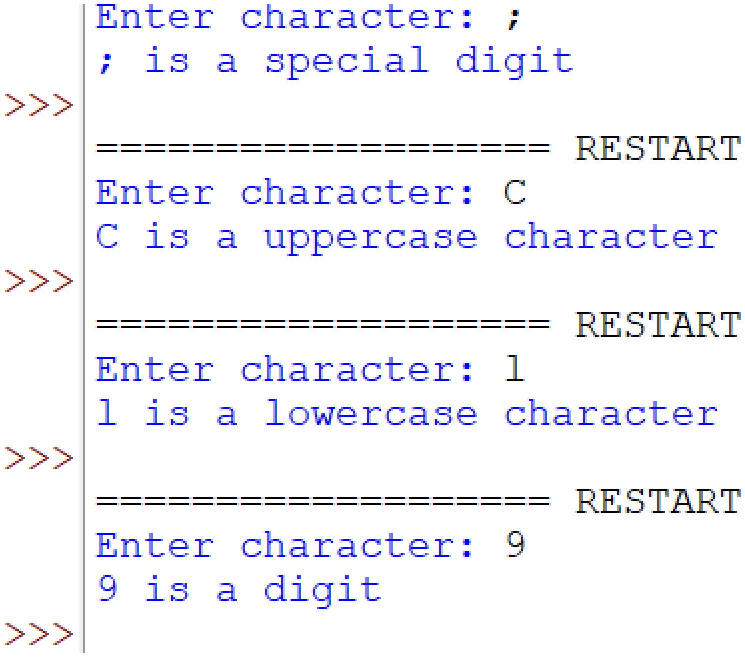
Data types used: String

Script:



```
n = input("Enter character: ")
c = n[0]
if ord(c) in range(48, 58):
    print(f"{c} is a digit")
elif ord(c) in range(65, 91):
    print(f"{c} is a uppercase character")
elif ord(c) in range(97, 123):
    print(f"{c} is a lowercase character")
else:
    print(f"{c} is a special digit")
```

Output:



```
    Enter character: ;
    ; is a special digit
>>> 
    ==================== RESTART
    Enter character: C
    C is a uppercase character
>>> 
    ==================== RESTART
    Enter character: l
    l is a lowercase character
>>> 
    ==================== RESTART
    Enter character: 9
    9 is a digit
>>> 
```

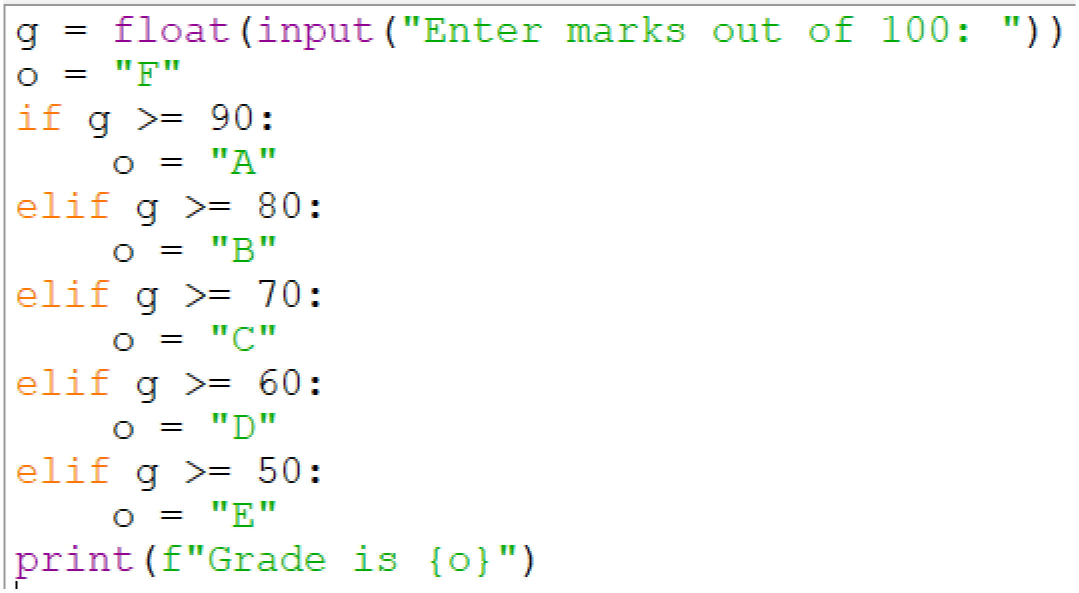
Program 10

Aim: To write a program to input percentage marks of a student and find the grade as per mark.

Modules used: N/A

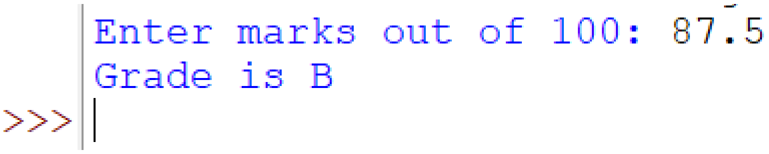
Data types used: Integer

Script:



```
g = float(input("Enter marks out of 100: "))
o = "F"
if g >= 90:
    o = "A"
elif g >= 80:
    o = "B"
elif g >= 70:
    o = "C"
elif g >= 60:
    o = "D"
elif g >= 50:
    o = "E"
print(f"Grade is {o}")
```

Output:



```
    Enter marks out of 100: 87.5
    Grade is B
>>> 
```

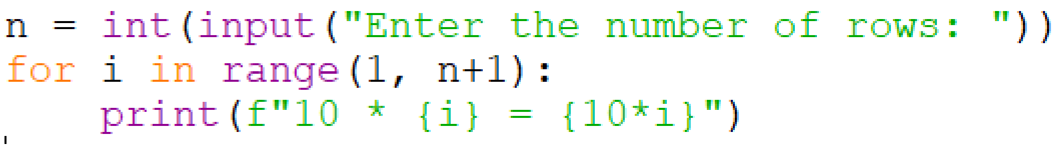
Program 11

Aim: Write a program to print the table of ten

Modules used: N/A

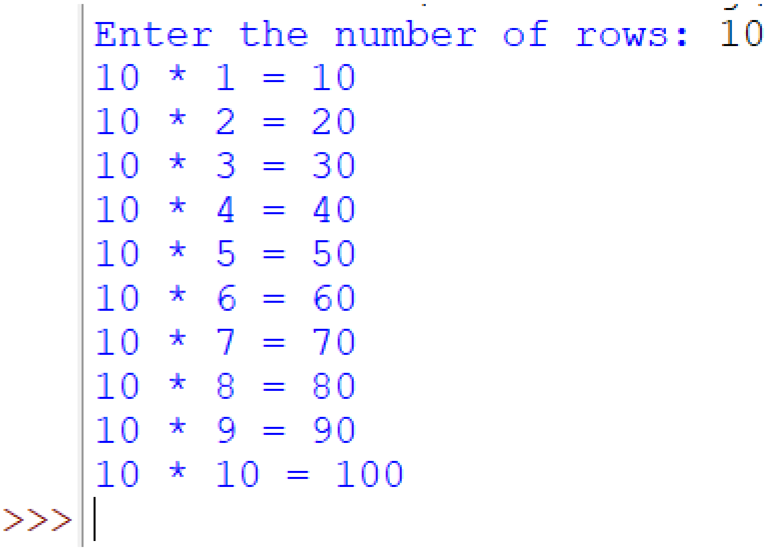
Data types used: Integer, String

Script:



```
n = int(input("Enter the number of rows: "))
for i in range(1, n+1):
    print(f"10 * {i} = {10*i}")
```

Output:



```
Enter the number of rows: 10
10 * 1 = 10
10 * 2 = 20
10 * 3 = 30
10 * 4 = 40
10 * 5 = 50
10 * 6 = 60
10 * 7 = 70
10 * 8 = 80
10 * 9 = 90
10 * 10 = 100
>>> 
```

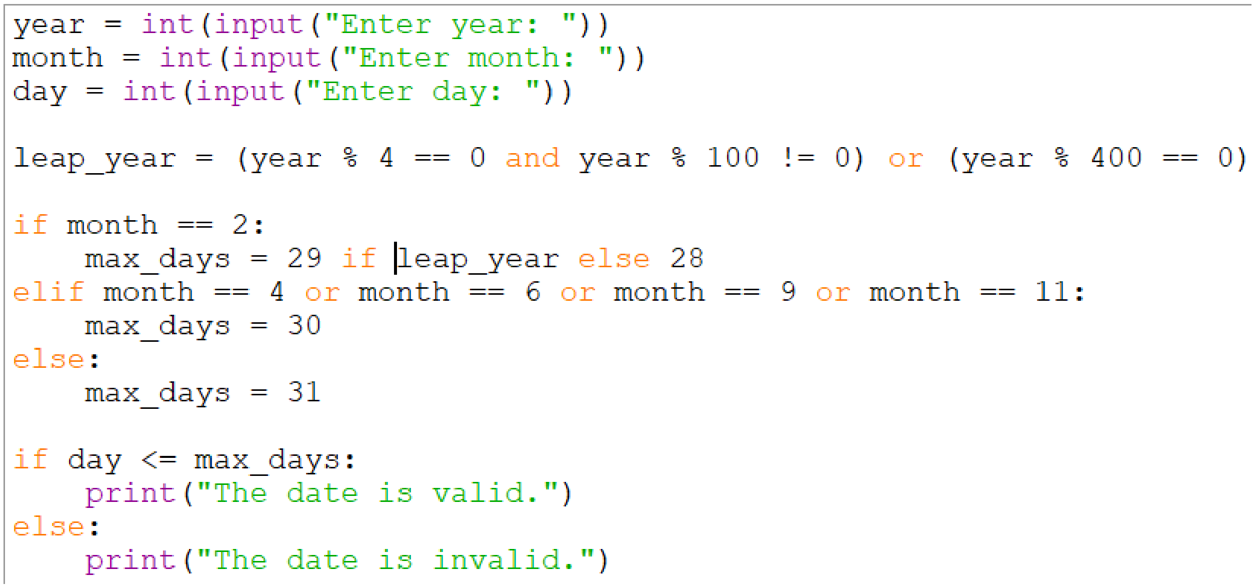
Program 12

Aim: Write a program to check validity of date

Modules used: N/A

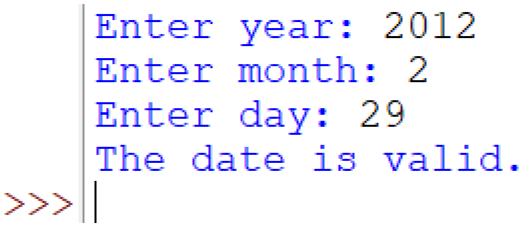
Data types used: Integer

Script:



```
year = int(input("Enter year: "))
month = int(input("Enter month: "))
day = int(input("Enter day: "))

leap_year = (year % 4 == 0 and year % 100 != 0) or (year % 400 == 0)

if month == 2:
    max_days = 29 if leap_year else 28
elif month == 4 or month == 6 or month == 9 or month == 11:
    max_days = 30
else:
    max_days = 31

if day <= max_days:
    print("The date is valid.")
else:
    print("The date is invalid.")
```

Output:



```
Enter year: 2012
Enter month: 2
Enter day: 29
The date is valid.
>>>
```

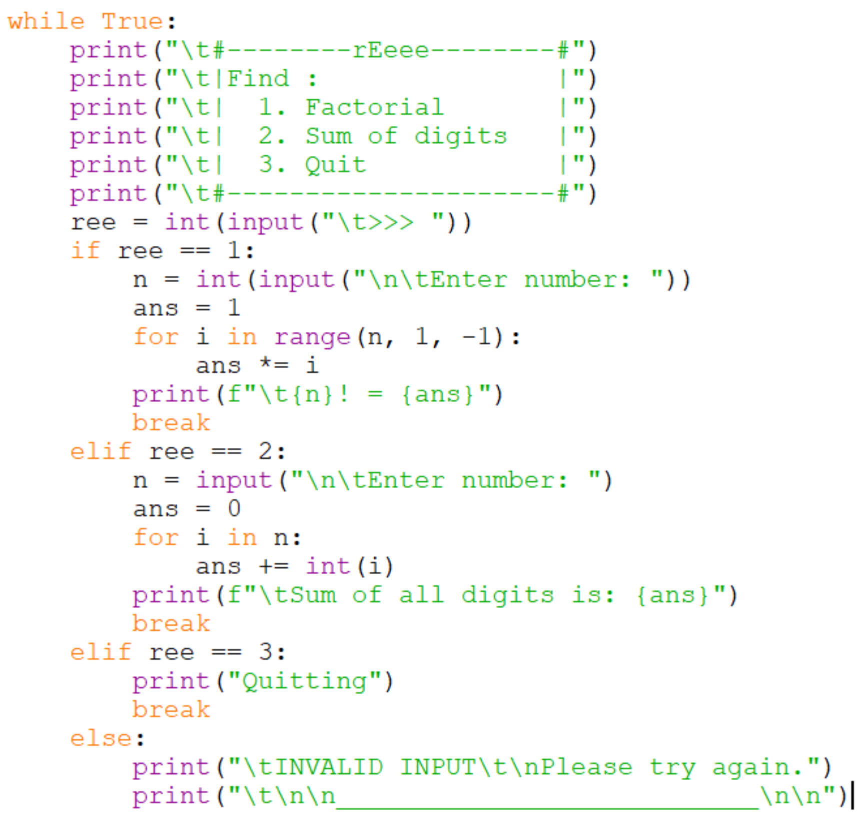
Program 13

Aim: Write a menu driven program to find a) factorial of a number b) Sum of digits of a number

Modules used: N/A

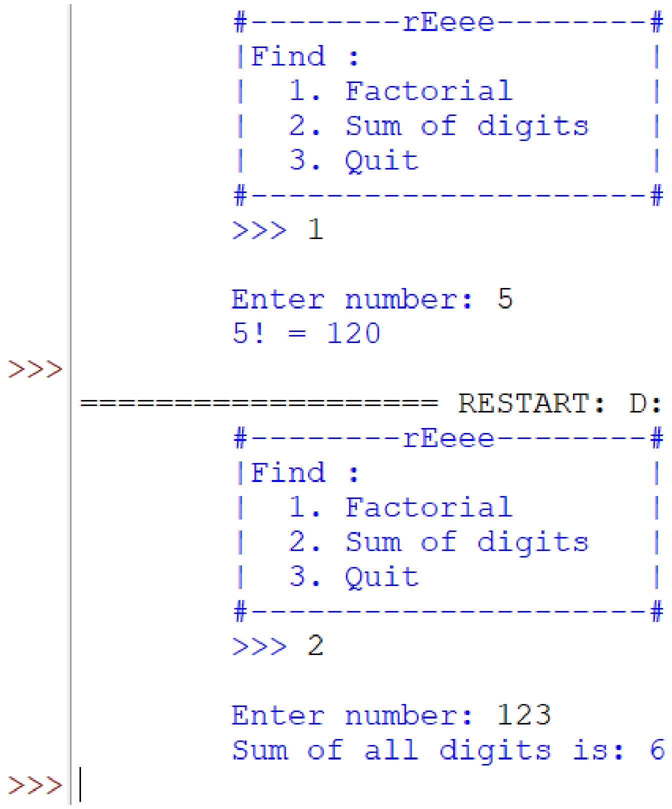
Data types used: Integer / String

Script:



```
while True:
    print("\t#--------rEeee--------#")
    print("\t|Find :               |")
    print("\t|  1. Factorial       |")
    print("\t|  2. Sum of digits   |")
    print("\t|  3. Quit            |")
    print("\t#---------------------#")
    ree = int(input("\t>>> "))
    if ree == 1:
        n = int(input("\n\tEnter number: "))
        ans = 1
        for i in range(n, 1, -1):
            ans *= i
        print(f"\t{n}! = {ans}")
        break
    elif ree == 2:
        n = input("\n\tEnter number: ")
        ans = 0
        for i in n:
            ans += int(i)
        print(f"\tSum of all digits is: {ans}")
        break
    elif ree == 3:
        print("Quitting")
        break
    else:
        print("\tINVALID INPUT\t\nPlease try again.")
        print("\t\n\n___________________________\n\n")
```

Output:



```
            #--------rEeee--------#
            |Find :               |
            |  1. Factorial       |
            |  2. Sum of digits   |
            |  3. Quit            |
            #---------------------#
            >>> 1

            Enter number: 5
            5! = 120
>>>
=================== RESTART: D:
            #--------rEeee--------#
            |Find :               |
            |  1. Factorial       |
            |  2. Sum of digits   |
            |  3. Quit            |
            #---------------------#
            >>> 2

            Enter number: 123
            Sum of all digits is: 6
>>>
```

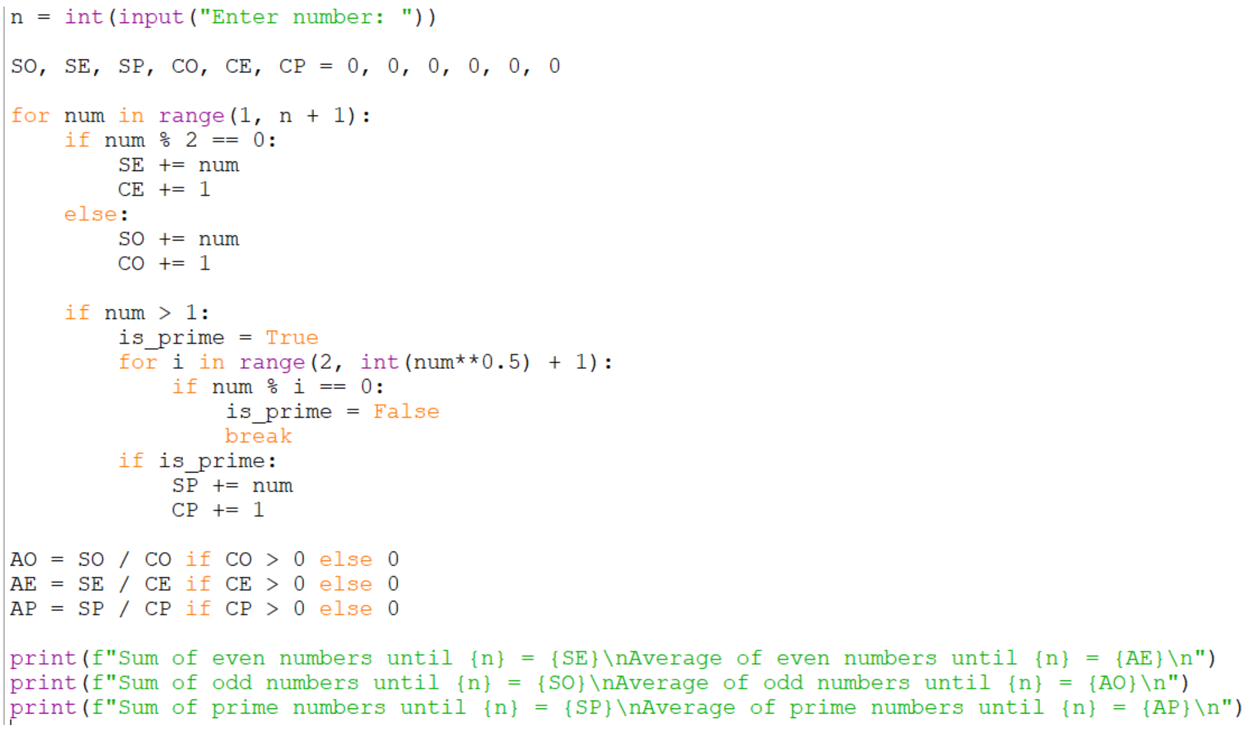
Program 14

Aim: Write a program to calculate sum and average of odd, even and prime no.

Modules used: N/A

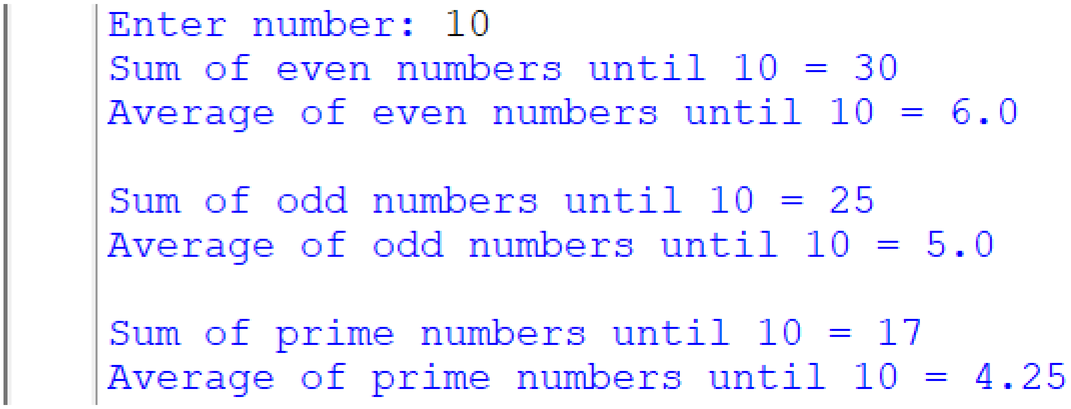
Data types used: Integer / Float

Script:



```
n = int(input("Enter number: "))

SO, SE, SP, CO, CE, CP = 0, 0, 0, 0, 0, 0

for num in range(1, n + 1):
    if num % 2 == 0:
        SE += num
        CE += 1
    else:
        SO += num
        CO += 1

    if num > 1:
        is_prime = True
        for i in range(2, int(num**0.5) + 1):
            if num % i == 0:
                is_prime = False
                break
        if is_prime:
            SP += num
            CP += 1

AO = SO / CO if CO > 0 else 0
AE = SE / CE if CE > 0 else 0
AP = SP / CP if CP > 0 else 0

print(f"Sum of even numbers until {n} = {SE}\nAverage of even numbers until {n} = {AE}\n")
print(f"Sum of odd numbers until {n} = {SO}\nAverage of odd numbers until {n} = {AO}\n")
print(f"Sum of prime numbers until {n} = {SP}\nAverage of prime numbers until {n} = {AP}\n")
```

Output:



```
Enter number: 10
Sum of even numbers until 10 = 30
Average of even numbers until 10 = 6.0

Sum of odd numbers until 10 = 25
Average of odd numbers until 10 = 5.0

Sum of prime numbers until 10 = 17
Average of prime numbers until 10 = 4.25
```

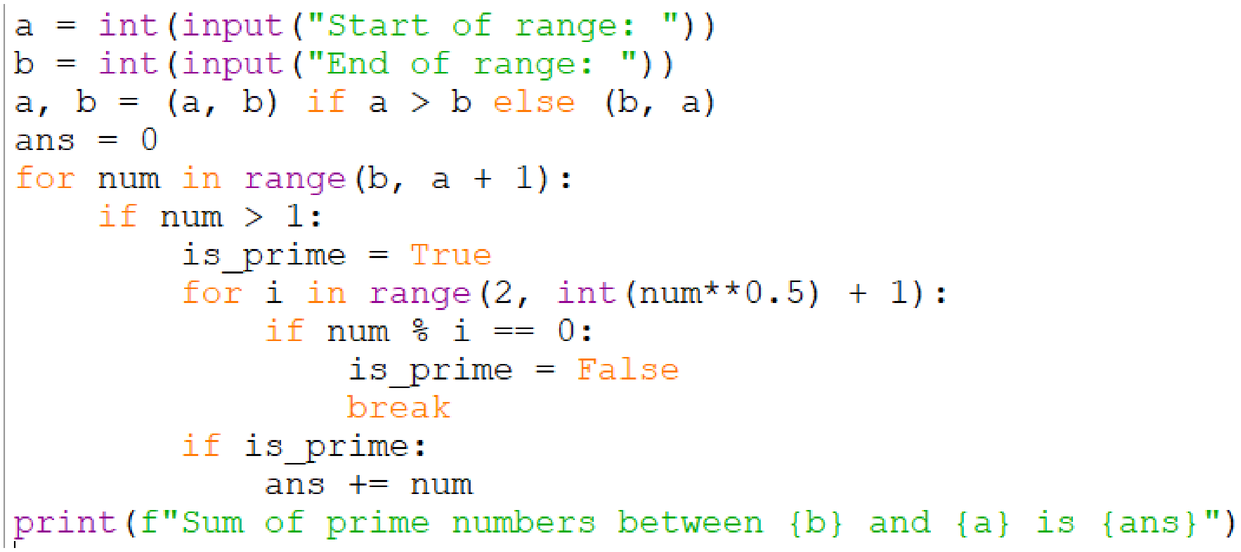
Program 15

Aim: Write a program to find sum of prime no. between 2 ranges

Modules used: N/A

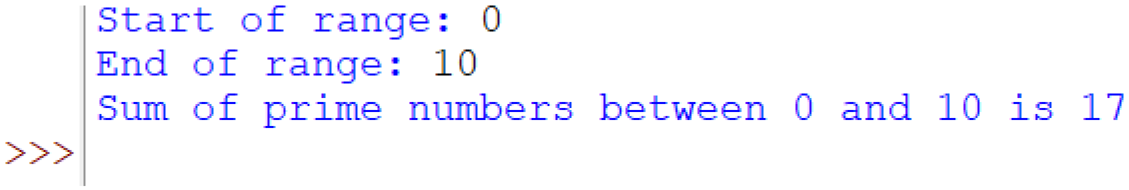
Data types used: Integer / Float

Script:



```
a = int(input("Start of range: "))
b = int(input("End of range: "))
a, b = (a, b) if a > b else (b, a)
ans = 0
for num in range(b, a + 1):
    if num > 1:
        is_prime = True
        for i in range(2, int(num**0.5) + 1):
            if num % i == 0:
                is_prime = False
                break
        if is_prime:
            ans += num
print(f"Sum of prime numbers between {b} and {a} is {ans}")
```

Output:



```
    Start of range: 0
    End of range: 10
    Sum of prime numbers between 0 and 10 is 17
>>>
```

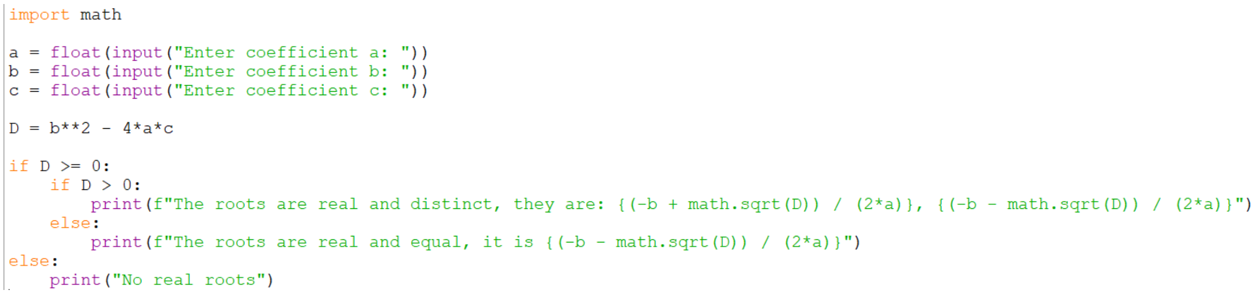
Program 16

Aim: Write a program to calculate the roots of a quadratic equation

Modules used: math

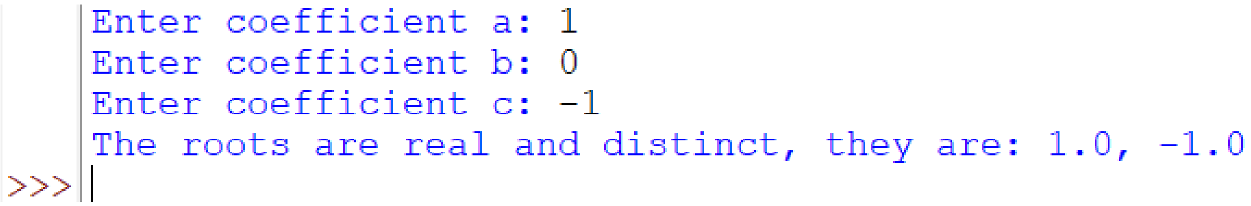
Data types used: Integer / Float

Script:



```
import math

a = float(input("Enter coefficient a: "))
b = float(input("Enter coefficient b: "))
c = float(input("Enter coefficient c: "))

D = b**2 - 4*a*c

if D >= 0:
    if D > 0:
        print(f"The roots are real and distinct, they are: {(-b + math.sqrt(D)) / (2*a)}, {(-b - math.sqrt(D)) / (2*a)}")
    else:
        print(f"The roots are real and equal, it is {(-b - math.sqrt(D)) / (2*a)}")
else:
    print("No real roots")
```

Output:



```
Enter coefficient a: 1
Enter coefficient b: 0
Enter coefficient c: -1
The roots are real and distinct, they are: 1.0, -1.0
>>>
```

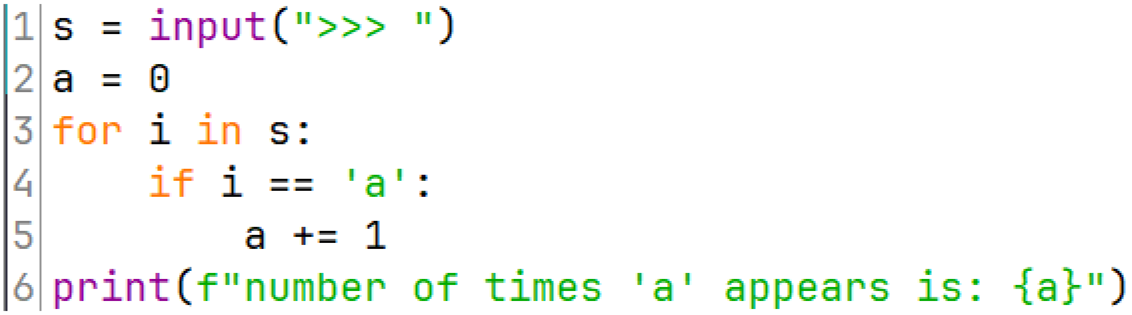
Program 17

Aim: Write a program to input a sentence and count the number of times ‘a’ appears

Modules used: N/A

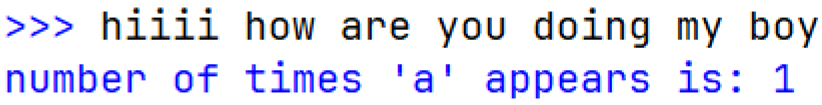
Data types used: String

Script:



```
s = input(">>> ")
a = 0
for i in s:
    if i == 'a':
        a += 1
print(f"number of times 'a' appears is: {a}")
```

Output:



```
>>> hiiii how are you doing my boy
number of times 'a' appears is: 1
```

Program 18

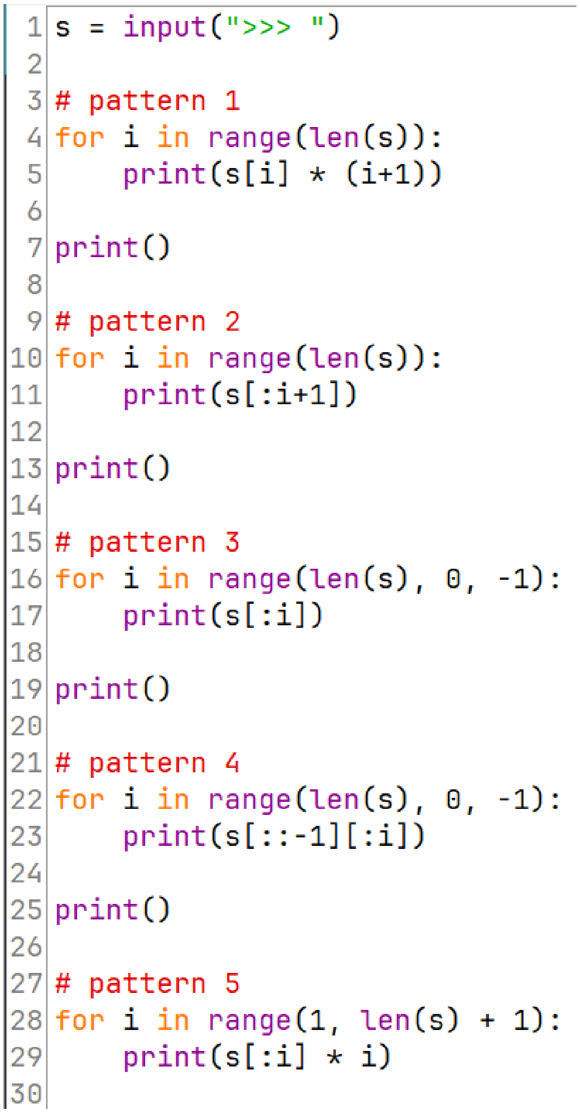
Aim: Write a program to take in a string and print out the following patterns

a	a	abc	cba	a
bb	ab	ab	cb	abab
ccc	abc	a	c	abcabcabc

Modules used: N/A

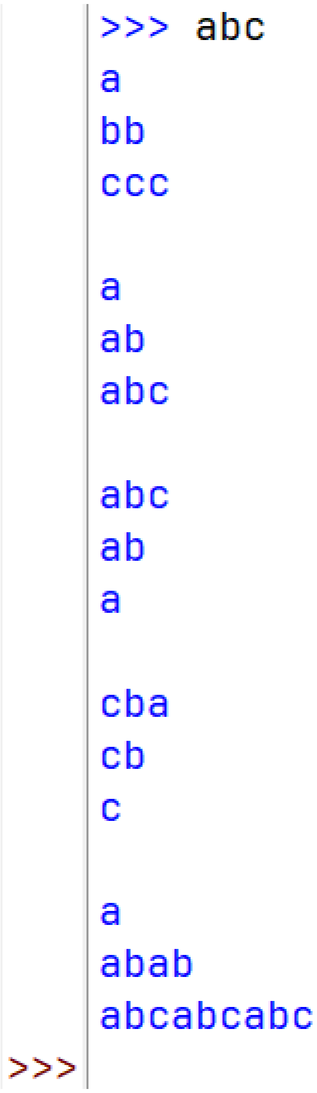
Data types used:

Script:



```python
s = input(">>> ")

# pattern 1
for i in range(len(s)):
    print(s[i] * (i+1))

print()

# pattern 2
for i in range(len(s)):
    print(s[:i+1])

print()

# pattern 3
for i in range(len(s), 0, -1):
    print(s[:i])

print()

# pattern 4
for i in range(len(s), 0, -1):
    print(s[::-1][:i])

print()

# pattern 5
for i in range(1, len(s) + 1):
    print(s[:i] * i)

```

Output:



```
>>> abc
a
bb
ccc

a
ab
abc

abc
ab
a

cba
cb
c

a
abab
abcabcabc
>>>
```

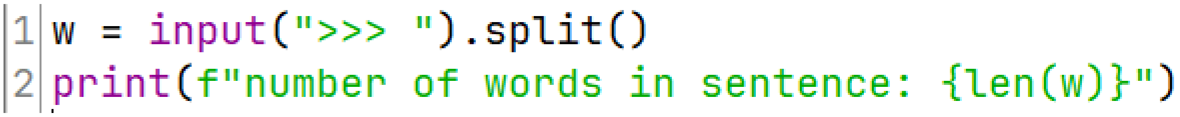
Program 19

Aim: Write a program to input a sentence and count the number of words

Modules used: N/A

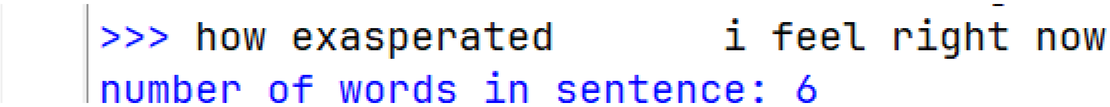
Data types used: String

Script:



```python
w = input(">>> ").split()
print(f"number of words in sentence: {len(w)}")
```

Output:



```
>>> how exasperated       i feel right now
number of words in sentence: 6
```

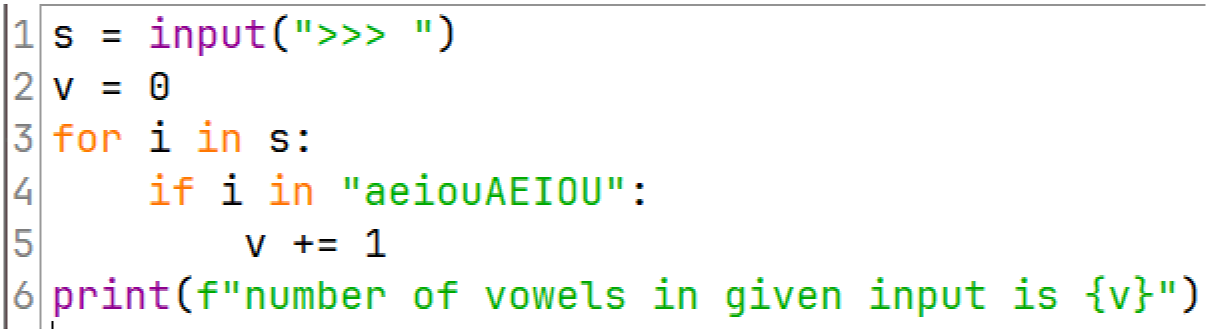
Program 20

Aim: Write a program to input a word and count the number of vowels in the word

Modules used: N/A

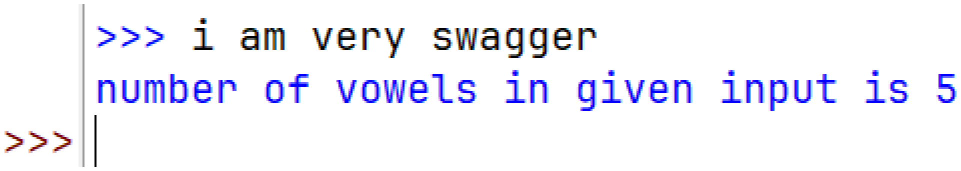
Data types used: String

Script:



```
s = input(">>> ")
v = 0
for i in s:
    if i in "aeiouAEIOU":
        v += 1
print(f"number of vowels in given input is {v}")
```

Output:



```
    >>> i am very swagger
    number of vowels in given input is 5
>>> 
```

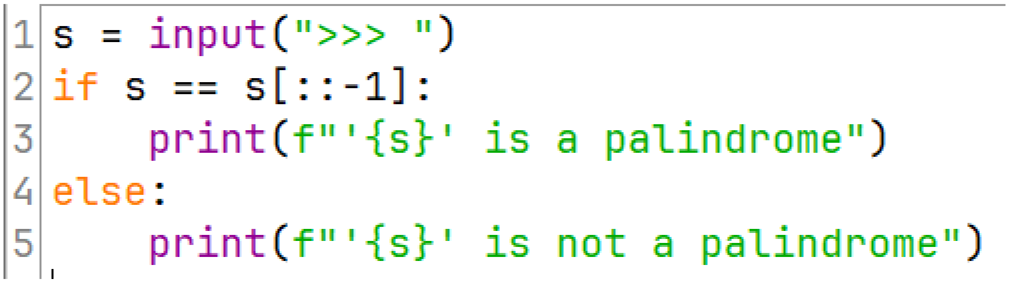
Program 21

Aim: Write a program to input a word and check if it is a palindrome

Modules used: N/A

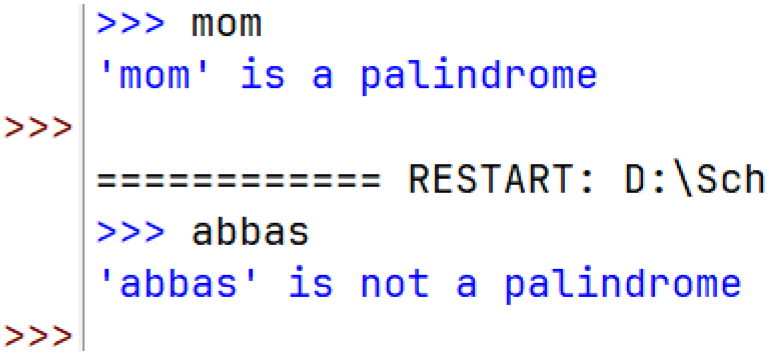
Data types used: String

Script:



```python
s = input(">>> ")
if s == s[::-1]:
    print(f"'{s}' is a palindrome")
else:
    print(f"'{s}' is not a palindrome")
```

Output:



```
    >>> mom
    'mom' is a palindrome
>>> 
    ============ RESTART: D:\Sch
    >>> abbas
    'abbas' is not a palindrome
>>> 
```

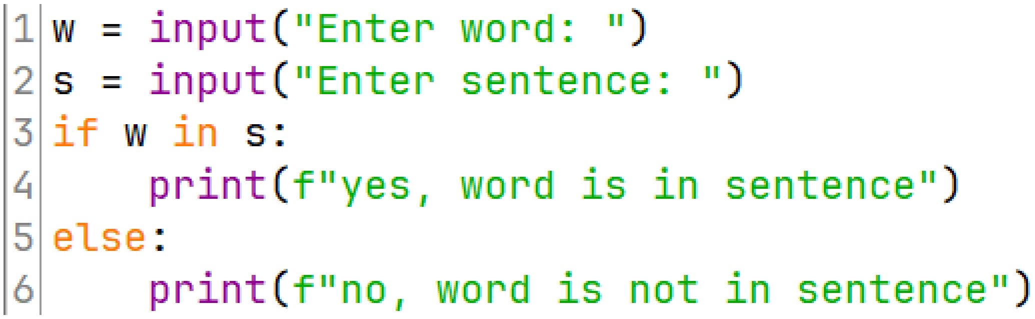
Program 22

Aim: Write a program to input a word and a sentence and check whether the word is present in sentence

Modules used: N/A

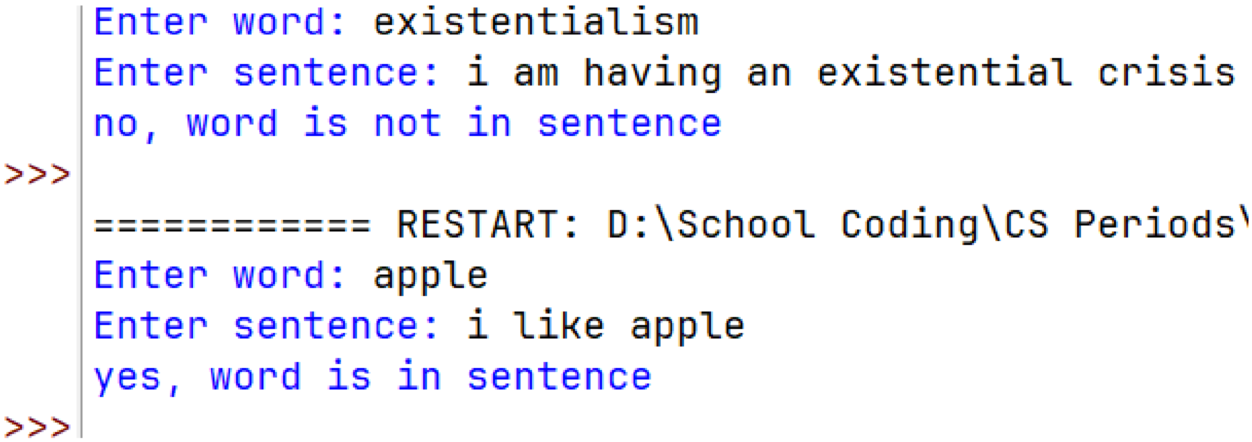
Data types used: String

Script:



```python
w = input("Enter word: ")
s = input("Enter sentence: ")
if w in s:
    print(f"yes, word is in sentence")
else:
    print(f"no, word is not in sentence")
```

Output:



```
    Enter word: existentialism
    Enter sentence: i am having an existential crisis
    no, word is not in sentence
>>> 
    ============ RESTART: D:\School Coding\CS Periods\
    Enter word: apple
    Enter sentence: i like apple
    yes, word is in sentence
>>> 
```

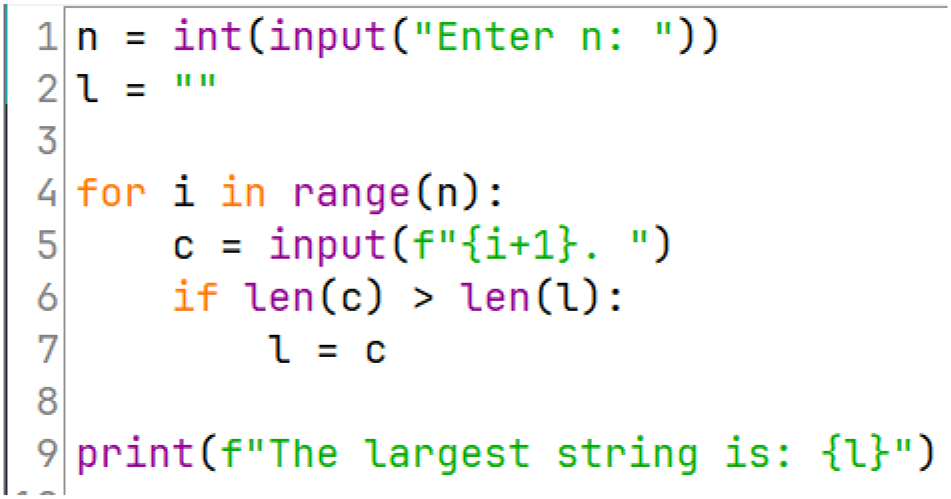
Program 23

Aim: Write a program to input n names and print the largest name

Modules used: N/A

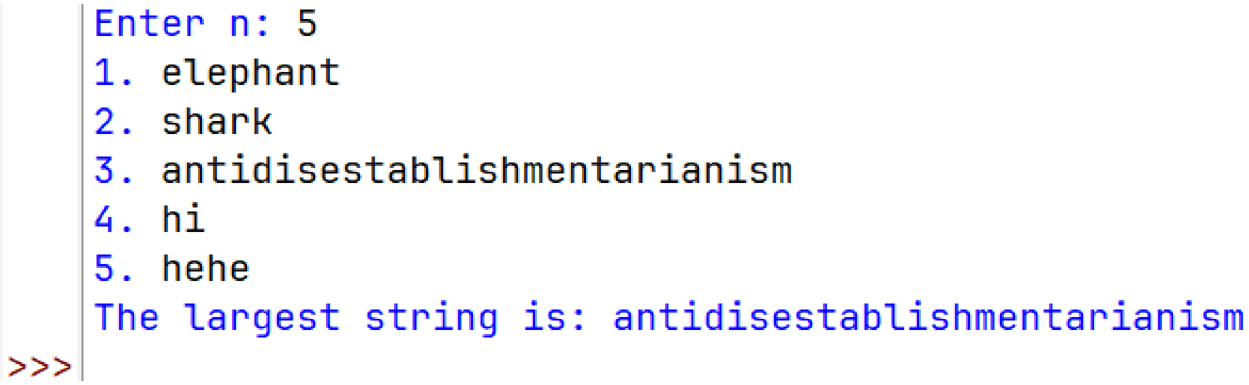
Data types used: String

Script:



```python
n = int(input("Enter n: "))
l = ""

for i in range(n):
    c = input(f"{i+1}. ")
    if len(c) > len(l):
        l = c

print(f"The largest string is: {l}")
```

Output:



```
Enter n: 5
1. elephant
2. shark
3. antidisestablishmentarianism
4. hi
5. hehe
The largest string is: antidisestablishmentarianism
>>>
```

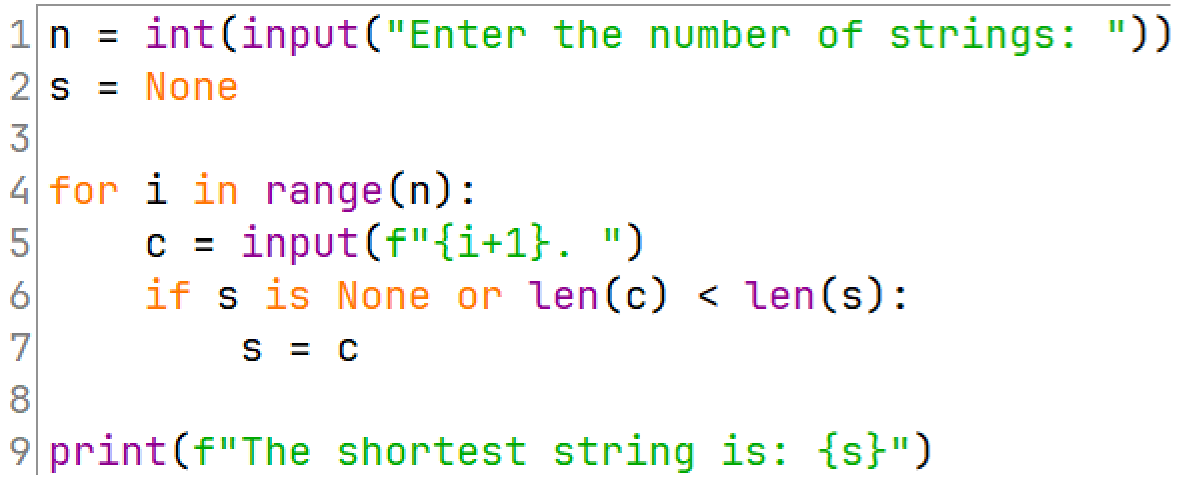
Program 24

Aim: Write a program to input n names and print the shortest name

Modules used: N/A

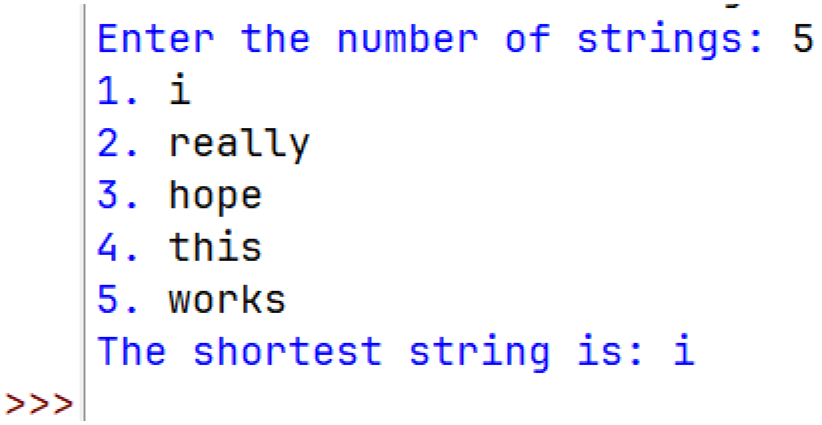
Data types used: String

Script:



```python
n = int(input("Enter the number of strings: "))
s = None

for i in range(n):
    c = input(f"{i+1}. ")
    if s is None or len(c) < len(s):
        s = c

print(f"The shortest string is: {s}")
```

Output:



```
Enter the number of strings: 5
1. i
2. really
3. hope
4. this
5. works
The shortest string is: i
>>>
```