1. Write a Python program to perform arithmetic operations on integers.

Code:

```
import introJitendra
introJitendra.printIntro("Arithmetic Operators in python")
a = int(input("first number: "))
b = int(input("second number: "))
print("Sum: ", a+b)
print("Difference: ", a-b)
print("mod : ", a-b)
print("Product: ", a*b)
print("floating division: ", a/b)
print("integer division: ", a//b)
```

Output:

```
C:\Users\JitendraSahu\Py\Assign\programs~python 1arithmaticOp.py
Author : Jitendra Kumar Sahu
Topic :  Arithmetic Operators in python
first number: 5
second number: 4
Sum:  9
Difference:  1
mod :  1
Product:  20
floating division:  1.25
integer division:  1
```

2. Write a Python program to check and print the types of at least 5 different inbuilt objects.

Code:

```
#  check and print the types of at least 5 different inbuilt objects
import introJitendra
introJitendra.printIntro("check and print the types of at least 5 different inbuilt objects")

a = 5
print('a = ',a)
print('type of a = ',type(a))

a = 34.5
print('a = ',a)
print('type of a = ',type(a))

a = "jitendra sahu"
print('a = ',a)
print('type of a = ',type(a))

a = [6,4,6,6]
print('a = ',a)
print('type of a = ',type(a))

a = (5,67,8,"jitu")
print('a = ',a)
print('type of a = ',type(a))

a = {5,67,8,"jitu"}
print('a = ',a)
print('type of a = ',type(a))
```

Output:

```
C:\Users\JitendraSahu\Py\Assign\programs~python 2types.py
Author : Jitendra Kumar Sahu
Topic :  check and print the types of at least 5 different inbuilt objects
a =  5
type of a =  <class 'int'>
a =  34.5
type of a =  <class 'float'>
a =  jitendra sahu
type of a =  <class 'str'>
a =  [6, 4, 6, 6]
type of a =  <class 'list'>
a =  (5, 67, 8, 'jitu')
type of a =  <class 'tuple'>
a =  {8, 67, 5, 'jitu'}
type of a =  <class 'set'>
```

3. Write a Python program to check if a number is EVEN or ODD.

Code:

```
#  check if a number is EVEN or ODD
import introJitendra
introJitendra.printIntro(" check number is even or odd")

num = int(input("Enter a number: "))
if num % 2 == 0:
   print("EVEN")
else:
   print("ODD")
```

Output:

```
C:\Users\JitendraSahu\Py\Assign\programs~python 3evenOdd.py
Author : Jitendra Kumar Sahu
Topic :   check number is even or odd
Enter a number: 5
ODD

C:\Users\JitendraSahu\Py\Assign\programs~python 3evenOdd.py
Author : Jitendra Kumar Sahu
Topic :   check number is even or odd
Enter a number: 6
EVEN
```

4. Write a Python program to check if a number is Positive, Negative or Zero.

Code:

```
#  check if a number is Positive, Negative or Zero
    import introJitendra
    introJitendra.printIntro(" check if a number is Positive, Negative or Zero")

    num = int(input("Enter a number: "))
    if num > 0:
       print("Positive")
    elif num < 0:
       print("Negative")
    else:
       print("Zero")
```

Output:

```
C:\Users\JitendraSahu\Py\Assign\programs~python 4NegaPosZero.py
Author : Jitendra Kumar Sahu
Topic :   check if a number is Positive, Negative or Zero
Enter a number: 6
Positive

C:\Users\JitendraSahu\Py\Assign\programs~python 4NegaPosZero.py
Author : Jitendra Kumar Sahu
Topic :   check if a number is Positive, Negative or Zero
Enter a number: 0
Zero

C:\Users\JitendraSahu\Py\Assign\programs~python 4NegaPosZero.py
Author : Jitendra Kumar Sahu
Topic :   check if a number is Positive, Negative or Zero
Enter a number: -45
Negative
```

5. Write a Python program to check if a number is PRIME or NOT.

Code:

```
#  check if a number is PRIME or NOT
import introJitendra
introJitendra.printIntro(" check if a number is PRIME or NOT")

num = int(input("Enter a number: "))
if num > 1:
   for i in range(2, num):
      if (num % i) == 0:
         print(num, "is not a prime number")
         break
   else:
      print(num, "is a prime number")
else:
   print(num, "is not a prime number")
```

Output:

```
C:\Users\JitendraSahu\Py\Assign\programs~python 5primeOrNot.py
Author : Jitendra Kumar Sahu
Topic :   check if a number is PRIME or NOT
Enter a number: 7
7 is a prime number

C:\Users\JitendraSahu\Py\Assign\programs~python 5primeOrNot.py
Author : Jitendra Kumar Sahu
Topic :   check if a number is PRIME or NOT
Enter a number: 15
15 is not a prime number
```

6. Write a Python program to check whether a string entered by the user is a valid decimal number or not.

Code:

```
#  check whether a string entered by the user is a valid decimal number or not
import introJitendra
introJitendra.printIntro(" check whether a string entered by the user is a valid decimal number or not")

s = input("Enter a string: ")
isDecimal = True
for i in s :
    if not((i >= '0' and i <= '9') or i=='.'):
        isDecimal = False

if isDecimal : print(s , " is decimal")
else : print(s , " is not a decimal")
```

Output:

```
C:\Users\JitendraSahu\Py\Assign\programs~python 6numberOrNOt.py
Author : Jitendra Kumar Sahu
Topic :   check whether a string entered by the user is a valid decimal number or not
Enter a string: 3434j
3434j  is not a decimal

C:\Users\JitendraSahu\Py\Assign\programs~python 6numberOrNOt.py
Author : Jitendra Kumar Sahu
Topic :   check whether a string entered by the user is a valid decimal number or not
Enter a string: 45.64
45.64  is decimal
```

7. Write a Python program to check if a year entered by the user is a Leap Year or NOT.

Code:

```
#  check if a year entered by the user is a Leap Year or NOT
import introJitendra
introJitendra.printIntro(" check if a year entered by the user is a Leap Year or NOT")

year = int(input("Enter a year: "))
if (year % 4) == 0:
   if (year % 100) == 0:
      if (year % 400) == 0:
         print(year," is a leap year")
      else:
         print(year," is not a leap year")
   else:
      print(year," is a leap year")
else:
   print(year," is not a leap year")
```

Output:

```
C:\Users\JitendraSahu\Py\Assign\programs~python 7leapYearOrNot.py
Author : Jitendra Kumar Sahu
Topic :   check if a year entered by the user is a Leap Year or NOT
Enter a year: 2010
2010  is not a leap year

C:\Users\JitendraSahu\Py\Assign\programs~python 7leapYearOrNot.py
Author : Jitendra Kumar Sahu
Topic :   check if a year entered by the user is a Leap Year or NOT
Enter a year: 2004
2004  is a leap year
```

8. Write a Python program to check whether a string entered by the user is a palindrome or not.

Code:

```
#  check and print if entered string is palindrome or not
import introJitendra
introJitendra.printIntro("check and print if entered string is palindrom or not")


s = input("enter the string to be checked : ") ;
isPalindrome = s==s[::-1]
if  isPalindrome : print("Palindrome")
else  :   print("Not palindrome")
```

Output:

```
Author : Jitendra Kumar Sahu
Topic :  check and print if entered string is palindrom or not
enter the string to be checked : RACECAR
Palindrome

C:\Users\Jitendra Sahu GT\Nextcloud\MCA\SecondSem\Python\assignment\programs>copyToClip
AndExecutePy.bat palindromString.py
Author : Jitendra Kumar Sahu
Topic :  check and print if entered string is palindrom or not
enter the string to be checked : KUCHBHI
Not palindrome
```

9. Write a Python program to get a Decimal number from user and convert it into Binary, Octal and Hexadecimal.

Code:

```
#Convert a Decimal number into Binary, Octal and Hexadecimal:
import introJitendra
introJitendra.printIntro("Convert a Decimal number into Binary, Octal and
Hexadecimal")

def convert(num,base) :
   bn = ''
   while(num>0):
      dig = num % base
      if(dig<10):
         bn = bn + str(dig)
      else :
         alpha = chr(65 + dig%10)
         bn = bn + alpha
      num //= base
   # printing the number
   for i in range(len(bn)-1,-1,-1):
      print (bn[i],end='') ;
   print('')

num = int(input("Enter number to be converted : "))
print("Binary : ",end='')
convert(num=num,base=2)
print("Octal : ",end='')
convert(num=num,base=8)
print("Hexadecimal : ",end='')
convert(num=num,base=16)
```

Output:

```
C:\Users\JitendraSahu\Py\Assign\programs~python 9NumberSystem.py
Author : Jitendra Kumar Sahu
Topic :  Convert a Decimal number into Binary, Octal and Hexadecimal
Enter number to be converted : 16
Binary : 10000
Octal : 20
Hexadecimal : 10

C:\Users\JitendraSahu\Py\Assign\programs~python 9NumberSystem.py
Author : Jitendra Kumar Sahu
Topic :  Convert a Decimal number into Binary, Octal and Hexadecimal
Enter number to be converted : 15
Binary : 1111
Octal : 17
Hexadecimal : F
```

10. Write a Python program to find sum of natural numbers, up to N.

Code:

```
#Find sum of natural numbers, up to N:
import introJitendra
introJitendra.printIntro("Find sum of natural numbers, up to N:")

N = int(input("Enter a number: "))
sum = (N * (N + 1)) // 2
print("Sum of natural numbers up to N: ", sum)
```

Output:

```
C:\Users\JitendraSahu\Py\Assign\programs~python sumOfNaturalNumber.py
Author : Jitendra Kumar Sahu
Topic :  Find sum of natural numbers, up to N:
Enter a number: 6
Sum of natural numbers up to N:  21

C:\Users\JitendraSahu\Py\Assign\programs~python sumOfNaturalNumber.py
Author : Jitendra Kumar Sahu
Topic :  Find sum of natural numbers, up to N:
Enter a number: 5
Sum of natural numbers up to N:  15
```

11. Write a Python program to get marks in five subjects from user and calculate average marks, percentage and grade of a student.

Code:

```
# Calculate average marks, percentage and grade of a student:
import introJitendra

introJitendra.printIntro("Calculate average marks, percentage and grade of a student:")

n = 5
total = 0
for i in range(n):
    m = int(input(f"Enter marks for subject {i+1}: "))
    total += m
average = total / n
percentage = (total / (n * 100)) * 100
print("Average Marks: ", average)
print("Percentage: ", percentage)

# Grade
print("Grade : ", end="")
if percentage >= 90 : print("A+")
elif percentage >= 80 : print("A")
elif percentage >= 70 : print("B+")
elif percentage >= 60 : print("B")
elif percentage >= 50 : print("C")
else : print("D")
```

Output:

```
C:\Users\Jitendra Sahu GT\Nextcloud\MCA\python\Assignment\programss>python AveragePercentageOf.py
Author : Jitendra Kumar Sahu
Topic :  Calculate average marks, percentage and grade of a student:
Enter marks for subject 1: 87
Enter marks for subject 2: 78
Enter marks for subject 3: 89
Enter marks for subject 4: 87
Enter marks for subject 5: 78
Average Marks:  83.8
Percentage:  83.8
Grade : A
```

12. Write a Python program to get a number and find the sum and product of its digits.

Code:

```
#Find the sum and product of digits of a number:
import introJitendra
introJitendra.printIntro("Find the sum and product of digits of a number:")

num = input("Enter a number: ")
sum_of_digits = 0
for i in num :
   sum_of_digits += int(i)

product_of_digits = 1
for digit in num:
   product_of_digits *= int(digit)
print("Sum of digits: ", sum_of_digits)
print("Product of digits: ", product_of_digits)
```

Output:

```
C:\Users\Jitendra Sahu GT\Nextcloud\MCA\python\Assignment\programss>python sumAndProdOfDigit.py
Author : Jitendra Kumar Sahu
Topic :  Find the sum and product of digits of a number:
Enter a number: 343
Sum of digits:  10
Product of digits:  36
```

13. Write a Python program to get two integers and find their GCD and LCM.

Code:

```
#Find the sum and product of digits of a number:
import introJitendra
introJitendra.printIntro("GCD and LCM")

def getGCD(a,b):
    while(b!=0):
        temp = a
        a = b
        b = temp % b
    return a

def getLCM(a,b):
    max = a if a>b else b
    while True :
        if(max%a==0) and (max%b==0): break
        max+=1
    return max ;

x=int(input("enter namber 1 : "))
y=int(input("enter namber 2 : "))
print("x : ",x)
print("y : ",y)
print("GCD : ",getGCD(x,y))
print("LCM : ",getLCM(x,y))
```

Output:

```
C:\Users\JitendraSahu\python\Assignment\programss% python gcdAndLcm.py
Author :  Jitendra Kumar Sahu
Topic :   GCD and LCM
enter namber 1 : 15
enter namber 2 : 25
x :  15
y :  25
GCD :  5
LCM :  75
```

14. Write a Python program to find factorial of a number using while loop.

Code:

```
# factorial of a number
import introJitendra
introJitendra.printIntro("factorial of a number")

num = int(input("enter the number : "))
t = num
fact = 1
while num >= 1:
   fact *= num
   num -= 1
print("factorial of : ", t, " is : ", fact)
```

Output:

```
C:\Users\JitendraSahu\python\Assignment\programss% python factorialOfNumber.py
Author : Jitendra Kumar Sahu
Topic :  factorial of a number
enter the number : 5
factorial of :  5  is :  120
```

15. Write a Python program to print Fibonacci series up to N terms.

Code:

```
# Fibonacci series up to N terms:
import introJitendra
introJitendra.printIntro("Fibonacci series up to N terms:")

def fibonacci(n):
    a, b = -1, 1
    while n > 0:
        a, b = b, a + b
        print(b, " ", end="")
        n -= 1

n = int(input('enter length of fibonacci series: '))
fibonacci(n)
```

Output:

```
C:\Users\JitendraSahu\python\Assignment\programss% python fibonacySeries.py
Author : Jitendra Kumar Sahu
Topic :  Fibonacci series up to N terms:
enter length of fibonacci series: 15
0  1  1  2  3  5  8  13  21  34  55  89  144  233  377
```

16. Write a Python program to print multiplication table.

Code:

```
# Multiplication table:
import introJitendra
introJitendra.printIntro("Multiplication table:")
def multiplication_table(n):
    for i in range(1, 11):
        print(n, 'x', i, '=', n*i)

n = int(input('enter number : '))
multiplication_table(n)
```

Output:

```
C:\Users\JitendraSahu\python\Assignment\programss% python multiplicationTable.py
Author : Jitendra Kumar Sahu
Topic :  Multiplication table:
enter number : 5
5 x 1 = 5
5 x 2 = 10
5 x 3 = 15
5 x 4 = 20
5 x 5 = 25
5 x 6 = 30
5 x 7 = 35
5 x 8 = 40
5 x 9 = 45
5 x 10 = 50
```

17. Write a Python program to access each element of a string in forward and backward orders using the 'while' loop.

Code:

```
# Access each element of a string in forward and backward orders using the 'while' loop:
import introJitendra
introJitendra.printIntro("Access each element of a string in forward and backward orders using the 'while' loop:")
def access_string(s):
    i = 0
    while i < len(s):
        print(s[i],end='')
        i += 1

    i = len(s) - 1
    print('')
    while i >= 0:
        print(s[i],end='')
        i -= 1

str1 = input("enter a string ")
access_string(str1)
```

Output:

```
Author : Jitendra Kumar Sahu
Topic :  Access each element of a string in forward and backward orders using the 'while' loop:
enter a string IAmJitendraKumarSahu
IAmJitendraKumarSahu
uhaSramuKardnetiJmAI
```

18. Write a Python program to access each element of a string in forward and backward orders using the 'for' loop.

Code:

```
# Access each element of a string in forward and backward orders using the 'for' loop:
import introJitendra
introJitendra.printIntro("Access each element of a string in forward and backward orders using the 'for' loop:")
def access_string(s):
    for char in s:
        print(char,end='')

    print('')
    for char in reversed(s):
        print(char,end='')

str1 = input("enter a string ")
access_string(str1)
```

Output:

```
Author : Jitendra Kumar Sahu
Topic :  Access each element of a string in forward and bac
kward orders using the 'for' loop:
enter a string This is done using for loop
This is done using for loop
pool rof gnisu enod si sihT
```

19. Write a Python program to find whether a substring exists in main string or not.

Code:

```
# Find whether a substring exists in the main string or not:
import introJitendra

introJitendra.printIntro("Find whether a substring exists in the main string or not")
def substring_exists(s, sub):
    if sub in s:
        return True
    else:
        return False

s = input("enter string : ")
sb = input("enter substring : ")
print("`", sb, "` exist in `", s, "`: ", substring_exists(s, sb))
```

Output:

```
C:\Users\JitendraSahu\python\Assignment\programss% python substringExists.py
Author : Jitendra Kumar Sahu
Topic :  Find whether a substring exists in the main string or not
enter string : jitendra kumar
enter substring : dra
` dra ` exist in ` jitendra kumar `:  True

C:\Users\JitendraSahu\python\Assignment\programss% python substringExists.py
Author : Jitendra Kumar Sahu
Topic :  Find whether a substring exists in the main string or not
enter string : jitendra kumar
enter substring : sahu
` sahu ` exist in ` jitendra kumar `:  False
```

20. Write a Python program to find the first occurrence of a substring in the main string.

Code:

```
#  program to count the number of times a substring appears in the main string
import introJitendra
introJitendra.printIntro("program to count the number of times a substring appears in the main string")

mainString = input("enter main string : ")
substring = input("enter sub string : ")
occurrences = mainString.find(substring)
print(f"The substring '{substring}' appears at {occurrences} first in the main string.")
```

Output:

```
C:\Users\JitendraSahu\python\Assignment\programss% python findFirstOccurance.py
Author : Jitendra Kumar Sahu
Topic :  program to count the number of times a substring appears in the main string
enter main string : RaipurBilaspurRatanpur
enter sub string : pur
The substring 'pur' appears at 3 first in the main string.
```

21. Write a Python program to count the number of times a substring appears in the main string.

Code:

```
#  program to count the number of times a substring appears in the main string
import introJitendra
introJitendra.printIntro("program to count the number of times a substring appears in the main string")

mainString = input("enter main string : ")
substring = input("enter sub string : ")
occurrences = mainString.count(substring)
print(f"The substring '{substring}' appears {occurrences} times in the main string.")
```

Output:

```
C:\Users\JitendraSahu\python\Assignment\programss% python findFirstOccurance.py
Author : Jitendra Kumar Sahu
Topic :  program to count the number of times a substring appears in the main string
enter main string : howHowHowHowHow
enter sub string : owH
The substring 'owH' appears 4 times in the main string.
```

22. Write a Python program to demonstrate the use of all "casing" methods and display a string in different cases.

Code:

```
#  demonstrate the use of all 'casing' methods and display a string in different cases.
import introJitendra
introJitendra.printIntro("demonstrate the use of all 'casing' methods and display a string in different cases.")

text = input("enter string : ")
print("text in upper case : ",text.upper())
print("text in lower case : ",text.lower())
print("text in title case : ",text.title())
print("text in swap case : ",text.swapcase())
```

Output:

```
Author : Jitendra Kumar Sahu
Topic :  demonstrate the use of all "casing" methods and display a string in different cases.
enter string : JiTenDra KumAr sAhU
text in upper case :  JITENDRA KUMAR SAHU
text in lower case :  jitendra kumar sahu
text in title case :  Jitendra Kumar Sahu
text in swap case :  jItENdRA kUMaR SaHu
```

23. Write a Python program to demonstrate the use of all string testing {isXXX()} methods.

Code:

```
#  demonstrate the use of all string testing isXXX() methods
import introJitendra
introJitendra.printIntro("demonstrate the use of all string testing isXXX() methods")

test_string =  input("enter string : ")
print("isalnum : ",test_string.isalnum())
print("isalpha : ",test_string.isalpha())
print("isdigit : ",test_string.isdigit())
print("islower : ",test_string.islower())
print("isupper : ",test_string.isupper())
```

Output:

```
Author : Jitendra Kumar Sahu
Topic :  demonstrate the use of all string testing isXXX() methods
enter string : jitendra343
isalnum :  True
isalpha :  False
isdigit :  False
islower :  True
isupper :  False
```

24. Write a Python function to take a list of integers as input and return the average.

Code:

```
#Python function to take a list of integers as input and return the averageimport introJitendra
import introJitendra
introJitendra.printIntro("Python function to take a list of integers as input and return the average")
def calculate_average(numbers):
    total = 0
    for i in numbers:
        total += i
    return total / len(numbers)

num_list = list()
for i in range(5):
    num_list.append(int(input("enter number : ")))
print("list is : ", num_list)
avg = calculate_average(num_list)
print(f"The average of the list is: {avg}")
```

Output:

```
Author : Jitendra Kumar Sahu
Topic :  Python function to take a list of integers as input and return the average
enter number : 21
enter number : 23
enter number : 43
enter number : 21
enter number : 23
list is :  [21, 23, 43, 21, 23]
The average of the list is: 26.2
```

25. Write a Python function to take two distinct integers as input and print all prime numbers between them.

Code:

```
#  Python function print all prime numbers between two distinct number.
import introJitendra
introJitendra.printIntro("Python function print all prime numbers between two distinct number.")

def is_prime(num):
    if num < 2:
        return False
    for i in range(2, int(num**0.5) + 1):
        if num % i == 0:
            return False
    return True

def print_primes_between(start, end):
    print(f"prime between {start} and {end} are : ")
    for num in range(start, end + 1):
        if is_prime(num):
            print(num, end=" ")

start_num = int(input("enter from number : "))
end_num = int(input("enter end number : "))
print_primes_between(start_num, end_num)
```

Output:

```
Author : Jitendra Kumar Sahu
Topic :  Python function print all prime numbers between two distinct number.
enter from number : 5
enter end number : 25
prime between 5 and 25 are :
5 7 11 13 17 19 23
```

26. Write a Python function to take two integers as input and return both their sum and product.

Code:

```
# Function to take two integers as input and return their sum and product
import introJitendra
introJitendra.printIntro("function takes two integers and return their sum and product.")

def sum_and_product(a, b):
    return a + b, a * b

x=int(input("enter num1 : ")) ;
y=int(input("enter num2 : ")) ;

sum , prod = sum_and_product(x,y)
print("sum : " , sum)
print("product " , prod)
```

Output:

```
roduct.py
Author : Jitendra Kumar Sahu
Topic :  function takes two integers and return their sum and product.
enter num1 : 15
enter num2 : 8
sum :  23
product  120
```

27. Write a Python program to demonstrate the positional arguments of a function.

Code:

```
# Program to demonstrate positional arguments of a function
import introJitendra
introJitendra.printIntro("Python program to demonstrate the positional arguments of a function.")

def positional_demo(x, y):
    print("Positional arguments demo:")
    print("x:", x)
    print("y:", y)

positional_demo(3, 5)
```

Output:

```
Author : Jitendra Kumar Sahu
Topic :  Python program to demonstrate the positional arguments of a function.
Positional arguments demo:
x: 3
y: 5
```

28. Write a Python program to demonstrate the keyword arguments of a function.

Code:

```
# Program to demonstrate keyword arguments of a function
import introJitendra
introJitendra.printIntro("Python program to demonstrate the keyword arguments of a function.")

def keyword_demo(x, y):
    print("Keyword arguments demo:")
    print("x:", x)
    print("y:", y)

keyword_demo(y=5, x=3)
```

Output:

```
Author : Jitendra Kumar Sahu
Topic :  Python program to demonstrate the keyword arguments of a function.
Keyword arguments demo:
x: 3
y: 5
```

29. Write a Python program to demonstrate the default arguments of a function.

Code:

```
# Program to demonstrate default arguments of a function
import introJitendra
introJitendra.printIntro("Python program to demonstrate the default arguments of a function.")

def default_demo(x=1, y=1):
    print("Default arguments demo:")
    print("x:", x)
    print("y:", y)

default_demo()
default_demo(3)
default_demo(3, 5)
```

Output:

```
Author : Jitendra Kumar Sahu
Topic :  Python program to demonstrate the default arguments of a function.
Default arguments demo:
x: 1
y: 1
Default arguments demo:
x: 3
y: 1
Default arguments demo:
x: 3
y: 5
```

30. Write a Python function to demonstrate variable length arguments.

Code:

```
# Function to demonstrate variable length arguments
import introJitendra
introJitendra.printIntro("Python function to demonstrate variable length arguments.")

def variable_length_args(*args):
    print("Variable length arguments demo:")
    for arg in args:
        print(arg)

variable_length_args(1, 2, 3, 4, 5)
```

Output:

```
py
Author : Jitendra Kumar Sahu
Topic :  Python function to demonstrate variable length arguments.
Variable length arguments demo:
1
2
3
4
5
```

31. Write a Python function to demonstrate keyword variable length arguments.

Code:

```
# Function to demonstrate keyword variable length arguments
import introJitendra
introJitendra.printIntro("Python function to demonstrate keyword variable length arguments.")

def keyword_variable_length_args(**kwargs):
    print("Keyword variable length arguments demo:")
    for key, value in kwargs.items():
        print(key, ":", value)

keyword_variable_length_args(name="Jitendra", age=30, city="Jitendra")
```

Output:

```
Author : Jitendra Kumar Sahu
Topic :  Python function to demonstrate keyword variable length arguments.
Keyword variable length arguments demo:
name : Jitendra
age : 30
city : Jitendra
```

32. Write a Python program to demonstrate global and local variables.

Code:

```
# Program to demonstrate global and local variables
import introJitendra
introJitendra.printIntro("demonstrate global and local variables.")

global_var = "I am a global variable"

def local_demo():
    local_var = "I am a local variable"
    print("Inside the function:", local_var)
    print("Inside the function accessing global variable:", global_var)

local_demo()
print("Outside the function accessing global variable:", global_var)
```

Output:

```
Author : Jitendra Kumar Sahu
Topic :  demonstrate global and local variables.
Inside the function: I am a local variable
Inside the function accessing global variable: I am a global variable
Outside the function accessing global variable: I am a global variable
```

33. Write a Python function that takes an integer as input and calculates its factorial using recursion.

Code:

```
# Python function that takes an integer as input and calculates its factorial using recursion
import introJitendra
introJitendra.printIntro("calculates factorial using recursion.")

def factorial(n):
    if n == 0:
        return 1
    else:
        return n * factorial(n - 1)

num = int(input("Enter an integer to calculate its factorial: "))
print("Factorial of", num, "is", factorial(num))
```

Output:

```
Author : Jitendra Kumar Sahu
Topic :  calculates factorial using recursion.
Enter an integer to calculate its factorial: 6
Factorial of 6 is 720
```

34. Write a Python program to demonstrate the use of lambda functions.

Code:

```
# Python program to demonstrate the use of lambda functions
import introJitendra
introJitendra.printIntro("program to demonstrate the use of lambda functions.")

addition = lambda x, y :  x + y

print("Sum using lambda function:", addition(3, 5))
```

Output:

```
Author : Jitendra Kumar Sahu
Topic :  program to demonstrate the use of lambda functions.
Sum using lambda function: 8
```

35. Write a Python program to demonstrate the use of lambda functions and map.

Code:

```
# Python program to demonstrate the use of lambda functions and map
import introJitendra
introJitendra.printIntro("program to demonstrate the use of lambda functions and map.")

nums = [1, 2, 3, 4, 5]
squared_nums = list(map(lambda x: x**2, nums))
print("Squared numbers:", squared_nums)
```

Output:

```
Author : Jitendra Kumar Sahu
Topic :  program to demonstrate the use of lambda functions and map.
Squared numbers: [1, 4, 9, 16, 25]
```

36. Write a Python program to demonstrate the use of lambda functions and reduce.

Code:

```
# Python program to demonstrate the use of lambda functions and reduce
import introJitendra
from functools import reduce
introJitendra.printIntro("program to demonstrate the use of lambda functions and reduce.")

nums = [1, 2, 3, 4, 5]
product = reduce(lambda x, y: x * y, nums)
print("Product of numbers:", product)
```

Output:

```
Author : Jitendra Kumar Sahu
Topic :  program to demonstrate the use of lambda functions and reduce.
Product of numbers: 120
```

37. Write a Python program to demonstrate the various list processing methods.

Code:

```
# Python program to demonstrate the various list processing methods
import introJitendra
introJitendra.printIntro("program to demonstrate the various list processing methods.")

nums = [1, 2, 3, 4, 5]
print("Original list:", nums)
nums.append(6)
print("After appending 6:", nums)
nums.insert(2, 7)
print("After inserting 7 at index 2:", nums)
nums.pop()
print("After popping the last element:", nums)
nums.reverse()
print("After reversing:", nums)
```

Output:

```
Author : Jitendra Kumar Sahu
Topic :  program to demonstrate the various list processing methods.
Original list: [1, 2, 3, 4, 5]
After appending 6: [1, 2, 3, 4, 5, 6]
After inserting 7 at index 2: [1, 2, 7, 3, 4, 5, 6]
After popping the last element: [1, 2, 7, 3, 4, 5]
After reversing: [5, 4, 3, 7, 2, 1]
```

38. Write a Python program to find the biggest and smallest numbers in a list of integers.

Code:

```
# Python program to find the biggest and smallest numbers in a list of integers
import introJitendra
introJitendra.printIntro("program to find the biggest and smallest numbers in a list of integers.")

nums = [3, 1, 7, 2, 5]
print("List:", nums)
print("Maximum number:", max(nums))
print("Minimum number:", min(nums))
```

Output:

```
Author : Jitendra Kumar Sahu
Topic :  program to find the biggest and smallest numbers in a list of integers.
List: [3, 1, 7, 2, 5]
Maximum number: 7
Minimum number: 1
```

39. Write a Python program to find common elements in two lists.

Code:

```
# Python program to find common elements in two lists
import introJitendra
introJitendra.printIntro("program to find common elements in two lists.")

list1 = list()
list2 = list()

print("enter 5 values for list 1 ")
for i in range(5):
    list1.append(int(input()))


print("enter 5 values for list 2 ")
for i in range(5):
    list2.append(int(input()))

common_elements = list(set(list1) & set(list2))
print("Common elements:", common_elements)
```

Output:

```
Author : Jitendra Kumar Sahu
Topic :  program to find common elements in two lists.
enter 5 values for list 1
12
324
34
32
55
enter 5 values for list 2
78
76
9856
34
32
Common elements: [32, 34]
```

40. Write a Python program to demonstrate the various tuple processing methods.

Code:

```
# Python program to demonstrate the various tuple processing methods
import introJitendra
introJitendra.printIntro("Python program to demonstrate the various tuple processing methods.")

my_tuple = (1, 2, 3, 4, 5)
print("Original tuple:", my_tuple)
print("Length of tuple:", len(my_tuple))
print("Index of 3:", my_tuple.index(3))
print("Count of 4:", my_tuple.count(4))
```

Output:

```
Author : Jitendra Kumar Sahu
Topic :  Python program to demonstrate the various tuple processing methods.
Original tuple: (1, 2, 3, 4, 5)
Length of tuple: 5
Index of 3: 2
Count of 4: 1
```

41. Write a Python program to demonstrate the use of dictionaries.

Code:

```
# Python program to demonstrate the use of dictionaries
import introJitendra
introJitendra.printIntro("Write a Python program to demonstrate the use of
dictionaries.")

my_dict = {'name': 'Alice', 'age': 30, 'city': 'New York'}
print("Dictionary:", my_dict)
print("Value for 'name':", my_dict['name'])
print("Keys:", my_dict.keys())
print("Values:", my_dict.values())
```

Output:

```
Author : Jitendra Kumar Sahu
Topic :  Write a Python program to demonstrate the use of dictionaries.
Dictionary: {'name': 'Alice', 'age': 30, 'city': 'New York'}
Value for 'name': Alice
Keys: dict_keys(['name', 'age', 'city'])
Values: dict_values(['Alice', 30, 'New York'])
```

42. Write a Python program to find the number of occurrences of each letter in a string using dictionaries.

Code:

```
# Python program to find the number of occurrences of each letter in a string using dictionaries
import introJitendra
introJitendra.printIntro("Write a Python program to find the number of occurrences of each letter in a string using dictionaries.")

string = input("Enter a string: ")
letter_count = {}
for char in string:
    if char in letter_count:
        letter_count[char] += 1
    else:
        letter_count[char] = 1

print("Occurrences of each letter:")
for char, count in letter_count.items():
    print(char, ":", count)
```

Output:

```
Topic :  Write a Python program to find the number of occurrences of each letter in a string usin
g dictionaries.
Enter a string: how you jumped over the horzon
Occurrences of each letter:
h : 3
o : 5
w : 1
  : 5
y : 1
u : 2
j : 1
m : 1
p : 1
e : 3
d : 1
v : 1
r : 2
t : 1
z : 1
n : 1
```

43. Write a Python program to print the CWD and change the CWD.

Code:

```
# Python program to print the CWD and change the CWD
import introJitendra
import os
introJitendra.printIntro("Write a Python program to print the CWD and change the CWD.")

print("Current working directory:", os.getcwd())
new_dir = input("Enter the path for the new directory: ")
os.chdir(new_dir)
print("Changed working directory to:", os.getcwd())
```

Output:

```
Author : Jitendra Kumar Sahu
Topic :  Write a Python program to print the CWD and change the CWD.
Current working directory: c:\Users\Jitendra Sahu GT\Nextcloud\MCA\python\Assignment\programs
s
Enter the path for the new directory: KuchBhiDir
Changed working directory to: c:\Users\Jitendra Sahu GT\Nextcloud\MCA\python\Assignment\progr
amss\KuchBhiDir
```

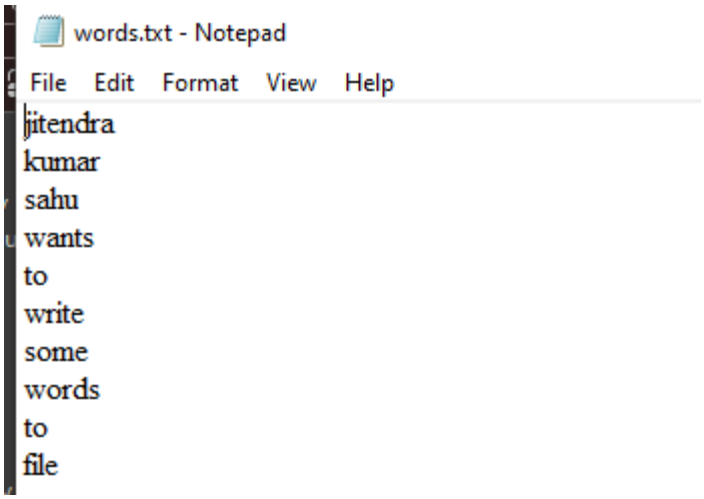
44. Write a Python program that takes a list of words from the user and writes them into a file. The program should stop when the user enters the word ‘quit’.

Code:

```
# Python program that takes a list of words from the user and writes them into a file
import introJitendra
introJitendra.printIntro("Write a Python program that takes a list of words from the user and writes them into a file. The program should stop when the user enters the word ΓÇÿquitΓÇÖ.")

words = []
while True:
    word = input("Enter a word (or type 'quit' to stop): ")
    if word == 'quit':
        break
    words.append(word)

with open("words.txt", "w") as file:
    for word in words:
        file.write(word + "\n")

print("Words have been written to 'words.txt'.")
```

Output:

```
Author : Jitendra Kumar Sahu
Topic :  Write a Python program that takes a list of words from the user and writes them into
 a file. The program should stop when the user enters the word ‘quit’.
Enter a word (or type 'quit' to stop): jitendra
Enter a word (or type 'quit' to stop): kumar
Enter a word (or type 'quit' to stop): sahu
Enter a word (or type 'quit' to stop): wants
Enter a word (or type 'quit' to stop): to
Enter a word (or type 'quit' to stop): write
Enter a word (or type 'quit' to stop): some
Enter a word (or type 'quit' to stop): words
Enter a word (or type 'quit' to stop): to
Enter a word (or type 'quit' to stop): file
Enter a word (or type 'quit' to stop): quit
Words have been written to 'words.txt'.
```


words.txt - Notepad
File Edit Format View Help
jitendra
kumar
sahu
wants
to
write
some
words
to
file

45. Write a Python program that reads a file in text mode and counts the number of words that contain anyone of the letters [‘w’, ‘o’, ‘r’, ‘d’, ‘s’].

Code:

```
# Python program that reads a file in text mode and counts the number of words that contain any one of the letters ['w', 'o', 'r', 'd', 's']
import introJitendra
introJitendra.printIntro("reads a file in text mode and \ncounts the number of words that\ncontain any one of the letters ['w', 'o', 'r', 'd', 's'].")

letters = set(['w', 'o', 'r', 'd', 's'])
word_count = 0

with open("words.txt", "r") as file:
    content = file.read();
    print(content)
    file.seek(0)
    for line in file:
        words = line.split()
        for word in words:
            if any(char in letters for char in word):
                word_count += 1

print("Number of words containing any one of the letters ['w', 'o', 'r', 'd', 's']:", word_count)
```

Output:

```
Author : Jitendra Kumar Sahu
Topic :  reads a file in text mode and
counts the number of words that
contain any one of the letters ['w', 'o', 'r', 'd', 's'].
jitendra
kumar
sahu
wants
to
write
some
words
to
file

Number of words containing any one of the letters ['w', 'o', 'r', 'd', 's']: 9
```

46. Python programs to demonstrate the creation and use of "modules".

Code:

VEHICLE.PY

```
class Vehicle :
   def __init__(self,owner,numberOfWheels,type):
      self.numberOfWheels=numberOfWheels
      self.type=type
      self.owner=owner


class Car(Vehicle):
   def __init__(self,brand,model,owner):
      super().__init__(type='CAR',numberOfWheels=4,owner=owner)
      self.brand = brand
      self.model = model

   def print(self):
      print(f"vehicle model : {self.model}")
      print(f"vehicle type : {self.type}")
      print(f"vehicle owner : {self.owner}")
      print(f"number of wheels : {self.numberOfWheels}")
      print(f"vehicle brand : {self.brand}")
```

DRIVER.py

```
import introJitendra
from Vehicle import Car
introJitendra.printIntro("demonstration of module")

c1 = Car("Rolls Royal","WKD-47","Jitendra") ;
c1.print()
```

Output:

```
Author : Jitendra Kumar Sahu
Topic :  demonstration of module
vehicle model : WKD-47
vehicle type : CAR
vehicle owner : Jitendra
number of wheels : 4
vehicle brand : Rolls Royal
```

47. Exception Handling Program that uses try and except.

Code:

```
# Exception Handling Program that uses try and except
import introJitendra
introJitendra.printIntro("Exception Handling Program that uses try and except.")

try:
    result = 10 / 0
except ZeroDivisionError:
    print("Error: Division by zero occurred.")
```

Output:

```
Author : Jitendra Kumar Sahu
Topic :  Exception Handling Program that uses try and except.
Error: Division by zero occurred.
```

48. Exception Handling Program that handles multiple types of exceptions.

Code:

```
# Exception Handling Program that handles multiple types of exceptions
import introJitendra
introJitendra.printIntro("Exception Handling Program that handles multiple types of exceptions.")

try:
    result = 10 / 'a'
except ZeroDivisionError:
    print("Error: Division by zero occurred.")
except TypeError:
    print("Error: Unsupported operation. Type mismatch.")
```

Output:

```
Author : Jitendra Kumar Sahu
Topic :  Exception Handling Program that handles multiple types of exceptions.
Error: Unsupported operation. Type mismatch.
```

49. Exception Handling Program that uses try, except and else.

Code:

```
# Exception Handling Program that uses try, except and else
import introJitendra
introJitendra.printIntro("Exception Handling Program that uses try, except and else.")

try:
    result = 10 / 2
except ZeroDivisionError:
    print("Error: Division by zero occurred.")
else:
    print("Result:", result)
```

Output:

```
Author : Jitendra Kumar Sahu
Topic :  Exception Handling Program that uses try, except and else.
Result: 5.0
```

50. Exception Handling Program that uses finally with try.

Code:

```
# Exception Handling Program that uses finally with try
import introJitendra
introJitendra.printIntro("Exception Handling Program that uses finally with try.")

try:
    result = 10 / 2
except ZeroDivisionError:
    print("Error: Division by zero occurred.")
finally:
    print("This will always execute, regardless of an exception.")
```

Output:

```
Author : Jitendra Kumar Sahu
Topic :  Exception Handling Program that uses finally with try.
This will always execute, regardless of an exception.
```

51. Write a Python program that creates a class “Person”, with attributes [aadhar, name, DoB]

Code:

```
# Python program that creates a class “Person”, with attributes [aadhar, name, DoB]
    import introJitendra
    introJitendra.printIntro("Write a Python program that creates a class “Person”, with
    attributes [aadhar, name, DoB].")

    class Person:
       def __init__(self, aadhar, name, dob):
          self.aadhar = aadhar
          self.name = name
          self.dob = dob

       def print(self):
          print(f"name :{self.name}\ndob : {self.dob}\naadhar : {self.aadhar}\n")

    name=input("enter name : ")
    dob=input("enter dob : ")
    aadhar=input("enter aadhar : ")

    p1 = Person(name=name,dob=dob,aadhar=aadhar)

    print("\nPrinting details")
    p1.print()
```

Output:

```
Author : Jitendra Kumar Sahu
Topic :  Write a Python program that creates a class “Person”, with attributes [aadhar, name, DoB].
enter name : Jitendra Kumar
enter dob : 02-02-2002
enter aadhar : 3232-3433-3433

Printing details
name :Jitendra Kumar
dob : 02-02-2002
aadhar : 3232-3433-3433
```

52. Write a Python program that creates classes “Point” and “Rectangle” where the Rectangle class has a Point object as its attribute.

Code:

```
# Python program that creates classes “Point” and “Rectangle” where the Rectangle class has a Point object as its attribute
import introJitendra

introJitendra.printIntro("Write a Python program that creates classes “Point” and “Rectangle” where the Rectangle class has a Point object as its attribute.")

class Point:
    def __init__(self, x, y):
        self.x = x
        self.y = y

    def __eq__(self, other) -> bool:
        return (self.x == other.x) and (self.y == other.y)

    def printPoint(self):
        print("x = ", self.x)
        print("y = ", self.y)


class Rectangle:

    def __init__(self, point1, point2):
        self.point1 = point1
        self.point2 = point2

    def print(self):
        self.point1.printPoint()
        self.point2.printPoint()


x = float(input("enter x for point 1 : "))
y = float(input("enter y for point 1 : "))
p1 = Point(x, y)
x = float(input("enter x for point 2 : "))
y = float(input("enter y for point 2 : "))
```

```
    p2 = Point(x, y)

    if (not(p1==p2)):
        rect1 = Rectangle(p1,p2)
        print("created rectangle!\nPrinting points...")
        rect1.print()
    else : print("both point should not be same")
```

Output:

```
C:\Jitendra Sahu\MCA\python\Assignment\programs> copyToClipAndExecute.py pointAndRect.py
Author : Jitendra Kumar Sahu
Topic :  Write a Python program that creates classes “Point” and “Rectangle” where the Rectangle class
 has a Point object as its attribute.
enter x for point 1 : 2
enter y for point 1 : 2
enter x for point 2 : 12
enter y for point 2 : 11
created rectangle!
Printing points...
x =  2.0
y =  2.0
x =  12.0
y =  11.0
```

53. Write a Python program that creates a class Students which inherits the properties of the "Person" class; add attributes [roll_no, class].

Code:

```
#Python program that creates a class Students which inherits the properties of the
'Person' class; add attributes [roll_no, class]
import introJitendra
introJitendra.printIntro("Write a Python program that \ncreates a class Students which
inherits the properties of \nthe 'Person' class; add attributes [roll_no, class].")

class Person:
    def __init__(self, name, age, city):
        self.name = name
        self.age = age
        self.city = city
class Student(Person):
    def __init__(self, name, age, city, roll_no, class_name):
        super().__init__(name,age,city)
        self.roll_no = roll_no
        self.class_name = class_name

    def print(self):
        print("\nDetails of the student:")
        print("Name:", self.name)
        print("Roll:", self.roll_no)
        print("class:", self.class_name)
        print("Age:", self.age)
        print("City:", self.city)
name = input("Enter the name of the student : ")
roll = input("Enter the roll of the student : ")
class_name = input("Enter the class of the student : ")
age = int(input("Enter the age of the student : "))
city = input("Enter the city of the student : ")
s1 = Student(name=name, age=age,city=city,roll_no=roll,class_name=class_name)

# Print the details of the person
s1.print()
```

Output:

```
Author : Jitendra Kumar Sahu
Topic :  Write a Python program that
creates a class Students which inherits the properties of
the “Person” class; add attributes [roll_no, class].
Enter the name of the student : Jitendra Sahu
Enter the roll of the student : 18
Enter the class of the student : MCA
Enter the age of the student : 27
Enter the city of the student : Bilaspur

Details of the student:
Name: Jitendra Sahu
Roll: 18
class: MCA
Age: 27
City: Bilaspur
```

54. Write a Python program to demonstrate "Multiple Inheritance".

Code:

```
# Python program to demonstrate 'Multiple Inheritance'
import introJitendra
introJitendra.printIntro("Write a Python program to demonstrate 'Multiple
Inheritance'.")

class A:
    def show_parent1(self):
        print("Parent Father")

class B:
    def show_parent2(self):
        print("Parent Mother")

class C(A, B):
    def show_child(self):
        print("Am child\n")

obj = C()
obj.show_parent1()
obj.show_parent2()
obj.show_child()
```

Output:

```
Author : Jitendra Kumar Sahu
Topic :  Write a Python program to demonstrate "Multiple Inheritance".
Parent Father
Parent Mother
Am child
```

55. Write a Python program to demonstrate "Method Overriding".

Code:

```
# Python program to demonstrate 'Method Overriding'
import introJitendra
introJitendra.printIntro("Write a Python program to demonstrate 'Method
Overriding'.")

class Parent:
    def show(self):
        print("Parent's show method")

class Child(Parent):
    def show(self):
        print("Child's show method")

obj = Child()
obj.show()
```

Output:

```
Author : Jitendra Kumar Sahu
Topic :  Write a Python program to demonstrate "Method Overriding".
Child's show method
```

56. Write a Python program to demonstrate "Method Overloading".

Code:

```
# Python program to demonstrate 'Method Overloading'
import introJitendra

introJitendra.printIntro("Write a Python program to demonstrate 'Method
Overloading'.")

class Adder:
    def total(self, a=None, b=None, c=None):
        if c != None:
            return a + b + c
        if b != None:
            return a + b
        if a != None:
            return a

# Create an instance of the class
obj = Adder()

# Call the sum method with different numbers of arguments
print("enter two numbers : ")
x = int(input())
y = int(input())
print(f"Sum of {x} and {y} = {obj.total(x, y)}")

print("enter three numbers : ")
x = int(input())
y = int(input())
z = int(input())
print(f"Sum of {x}, {y} and {z}= {obj.total(x, y, z)}")
```

Output:

```
Author : Jitendra Kumar Sahu
Topic :  Write a Python program to demonstrate “Method Overloading”.
enter two numbers :
12
23
Sum of 12 and 23 = 35
enter three numbers :
12
34
23
Sum of 12, 34 and 23= 69
```

57. Write a Python program to demonstrate "Operator Overloading" [+ and -] using a class "Book".

Code:

```
# Python program to demonstrate 'Operator Overloading' [+ and -] using a class 'Book'
import introJitendra
introJitendra.printIntro("Write a Python program to demonstrate\n'Operator Overloading' [+ and -] using a class 'Book'.")

class Book:
    def __init__(self, pages):
        self.pages = pages

    def __add__(self, other):
        return self.pages + other.pages

    def __sub__(self, other):
        return self.pages - other.pages

book1 = Book(int(input("enter of pages in book 1 ")))
book2 = Book(int(input("enter of pages in book 2 ")))
print("Total pages after addition:", book1 + book2)
print("Difference in pages after subtraction:", book2 - book1)
```

Output:

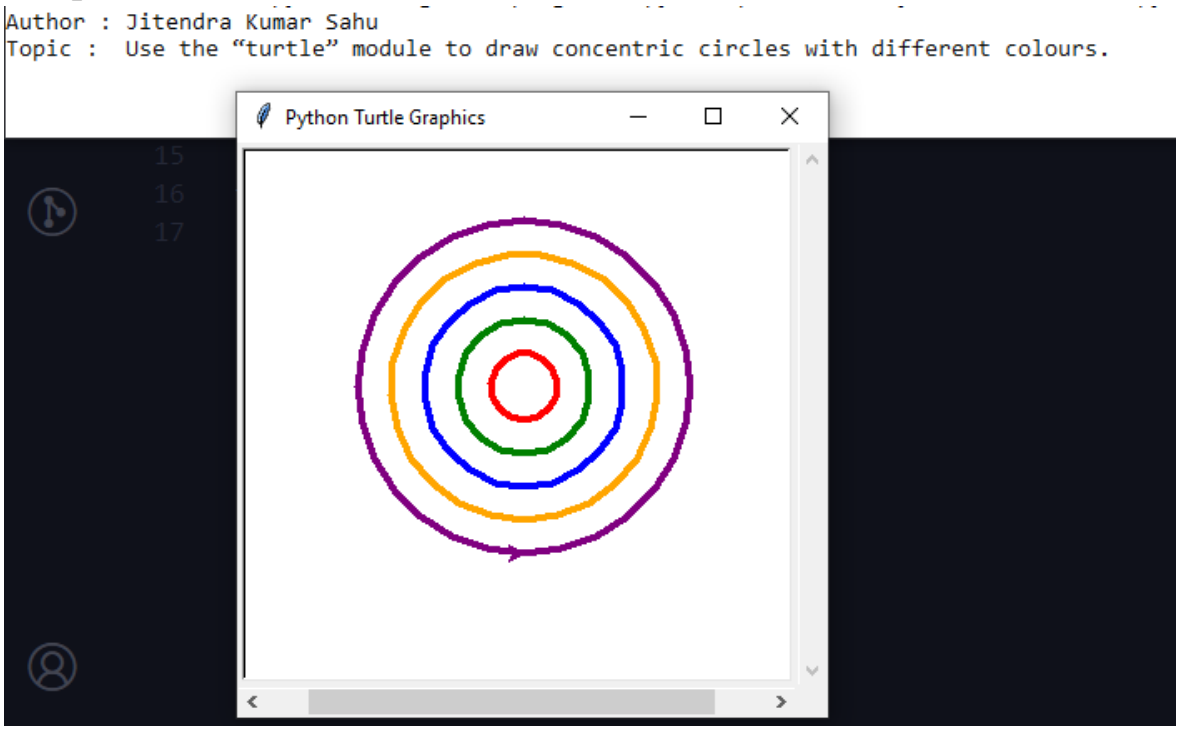
```
Author : Jitendra Kumar Sahu
Topic :  Write a Python program to demonstrate
"Operator Overloading" [+ and -] using a class "Book".
enter of pages in book 1 200
enter of pages in book 2 500
Total pages after addition: 700
Difference in pages after subtraction: 300
```

58. Use the "turtle" module to draw concentric circles with different colours.

Code:

```
# Use the 'turtle' module to draw concentric circles with different colours.
import turtle
import introJitendra
introJitendra.printIntro("Use the 'turtle' module to draw concentric circles with different colours.")

colors = ['red', 'green', 'blue', 'orange', 'purple']
turtle.pensize(4)

for i in range(5):
    turtle.color(colors[i])
    turtle.penup()
    turtle.goto(0, -i * 20)
    turtle.pendown()
    turtle.circle(20 + i * 20)

turtle.done()
```

Output:

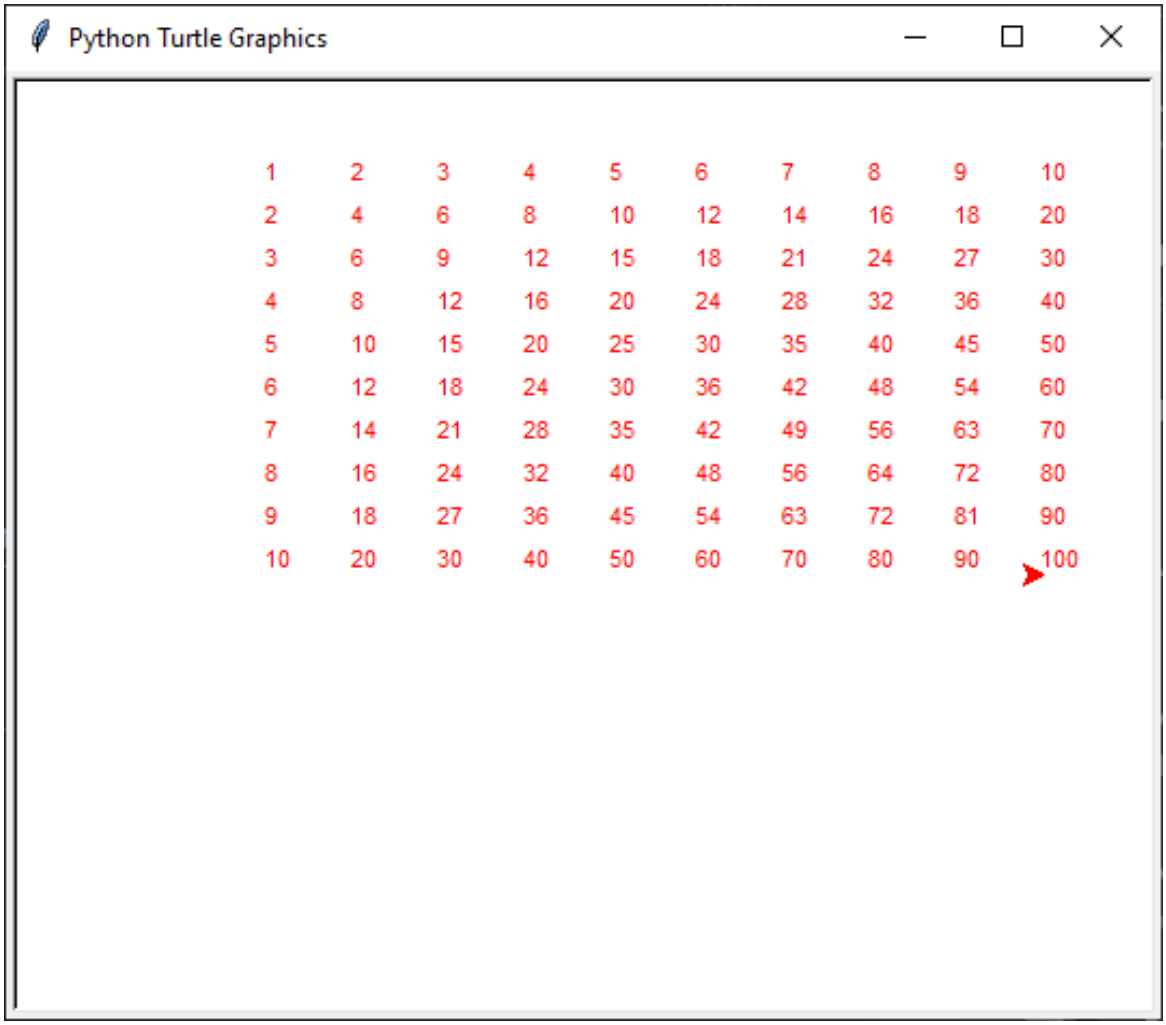


59. Use the "turtle" module to print the multiplication table.

Code:

```
import turtle
# Create a turtle object
pen = turtle.Turtle()
# pen.speed(0)  # Set the drawing speed to fastest

# Function to write text at a given position
def write_text(x, y, text):
    pen.penup()
    pen.goto(x, y)
    pen.pendown()
    pen.write(text)

# Function to draw the multiplication table
def draw_table(rows, cols):
    for i in range(1, rows + 1):
        for j in range(1, cols + 1):
            # Calculate position
            x = -200 + j * 40
            y = 200 - i * 20
            pen.color("red")
            write_text(x + 10, y - 10, str(i * j))
draw_table(10, 10)

turtle.mainloop()
```

Output:


Python Turtle Graphics
1 2 3 4 5 6 7 8 9 10
2 4 6 8 10 12 14 16 18 20
3 6 9 12 15 18 21 24 27 30
4 8 12 16 20 24 28 32 36 40
5 10 15 20 25 30 35 40 45 50
6 12 18 24 30 36 42 48 54 60
7 14 21 28 35 42 49 56 63 70
8 16 24 32 40 48 56 64 72 80
9 18 27 36 45 54 63 72 81 90
10 20 30 40 50 60 70 80 90 100

60. Use the "turtle" module to draw (not write) your name.

Code:

```
import turtle

screen = turtle.Screen()
screen.bgcolor("white")

pen = turtle.Turtle()
pen.pensize(5)  # Set the pen size

def draw_J():
    pen.up()
    pen.setheading(180)
    pen.fd(200)
    pen.fd(100)
    pen.setheading(0)
    pen.down()
    pen.fd(80)
    pen.rt(90)
    pen.fd(160)
    pen.circle(-40,180)
    pen.fd(20)
    pen.up()
    pen.setheading(0)
    pen.fd(120)

def draw_I():
    pen.up()
    pen.fd(20)
    pen.setheading(90)
    pen.fd(140)
    pen.setheading(180)
    pen.down()
    pen.fd(30)
    pen.backward(90)
    pen.fd(45)
    pen.setheading(270)
    pen.fd(200)
    pen.setheading(180)
```

```
    pen.fd(45)
    pen.bk(90)
    pen.up()
    pen.bk(30)

def draw_T():
    pen.up()
    pen.bk(35)
    pen.setheading(90)
    pen.fd(200)
    pen.setheading(180)
    pen.fd(45)
    pen.down()
    pen.bk(90)
    pen.fd(45)
    pen.setheading(270)
    pen.fd(200)
    pen.up()
    pen.setheading(0)
    pen.up()
    pen.fd(60)

def draw_U():
    pen.setheading(90)
    pen.fd(200)
    pen.down()
    pen.bk(150)
    pen.down()
    pen.circle(60,-180)
    pen.undo()
    pen.setheading(270)
    pen.circle(60,-180)
    pen.undo()
    pen.circle(60,180)
    pen.fd(150)

def drawSmiley():
    pen.pensize(3)
    pen.color('orange')
    pen.setheading(90)
```

```
    pen.up()
    pen.setheading(0)
    pen.fd(50)
    pen.down()
    pen.circle(80)
    pen.up()
    pen.setheading(90)
    pen.fd(10)
    pen.fd(30)
    pen.fd(60)
    pen.setheading(180)
    pen.fd(30)
    pen.fd(10)
    pen.circle(5)
    pen.down()
    pen.circle(5)
    pen.up()
    pen.bk(60)
    pen.bk(20)
    pen.down()
    pen.circle(5)
    pen.setheading(270)
    pen.up()
    pen.fd(80)
    pen.undo()
    pen.fd(60)
    pen.circle(-100,40)
    pen.undo()
    pen.setheading(180)
    pen.down()
    pen.circle(-100,40)
    pen.undo()
    pen.setheading(210)
    pen.circle(-100,40)
    pen.undo()
    pen.circle(-80,50)

draw_J()
pen.color('blue')
draw_I()
```

```
pen.pensize(2)
pen.color('red')
draw_T()
pen.pensize(5)
pen.color("green")
draw_U()
drawSmiley()
pen.hideturtle()
screen.mainloop()
```

Output: