Practical No. 2: Practical based on assigning values to variables, by accepting the values from the user, and then performing basic operations on them.

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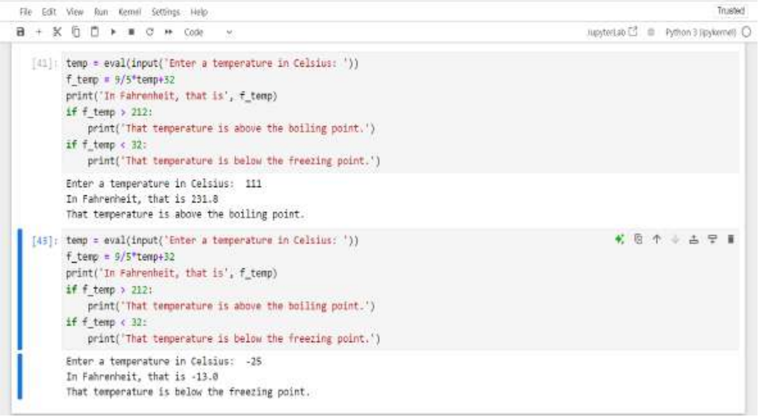
Practical No 2: Python Programming

Math Module:



```
[41]: temp = eval(input('Enter a temperature in Celsius: '))
      f_temp = 9/5*temp+32
      print('In Fahrenheit, that is', f_temp)
      if f_temp > 212:
          print('That temperature is above the boiling point.')
      if f_temp < 32:
          print('That temperature is below the freezing point.')

      Enter a temperature in Celsius:  111
      In Fahrenheit, that is 231.8
      That temperature is above the boiling point.

[43]: temp = eval(input('Enter a temperature in Celsius: '))
      f_temp = 9/5*temp+32
      print('In Fahrenheit, that is', f_temp)
      if f_temp > 212:
          print('That temperature is above the boiling point.')
      if f_temp < 32:
          print('That temperature is below the freezing point.')

      Enter a temperature in Celsius:  -25
      In Fahrenheit, that is -13.0
      That temperature is below the freezing point.
```

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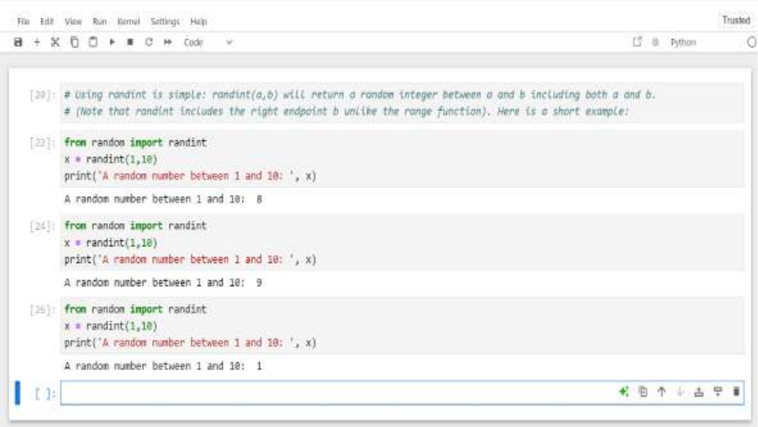
Using randint is simple: randint(a,b)



```
[20]: # Using randint is simple: randint(a,b) will return a random integer between a and b including both a and b.
      # (Note that randint includes the right endpoint b unlike the range function). Here is a short example:

[22]: from random import randint
      x = randint(1,10)
      print('A random number between 1 and 10: ', x)

      A random number between 1 and 10:  8

[24]: from random import randint
      x = randint(1,10)
      print('A random number between 1 and 10: ', x)

      A random number between 1 and 10:  9

[26]: from random import randint
      x = randint(1,10)
      print('A random number between 1 and 10: ', x)

      A random number between 1 and 10:  1

[ ]:
```

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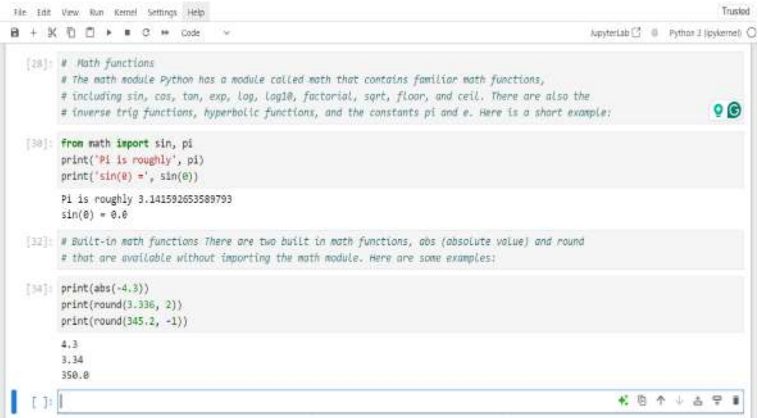
Math functions:



```
[28]: #  Math functions
      # The math module Python has a module called math that contains familiar math functions,
      # including sin, cos, tan, exp, log, log10, factorial, sqrt, floor, and ceil. There are also the
      # inverse trig functions, hyperbolic functions, and the constants pi and e. Here is a short example:

[30]: from math import sin, pi
      print('Pi is roughly', pi)
      print('sin(0) =', sin(0))

      Pi is roughly 3.141592653589793
      sin(0) = 0.0

[32]: # Built-in math functions There are two built in math functions, abs (absolute value) and round
      # that are available without importing the math module. Here are some examples:

[34]: print(abs(-4.3))
      print(round(3.336, 2))
      print(round(345.2, -1))

      4.3
      3.34
      350.0

[ ]:
```

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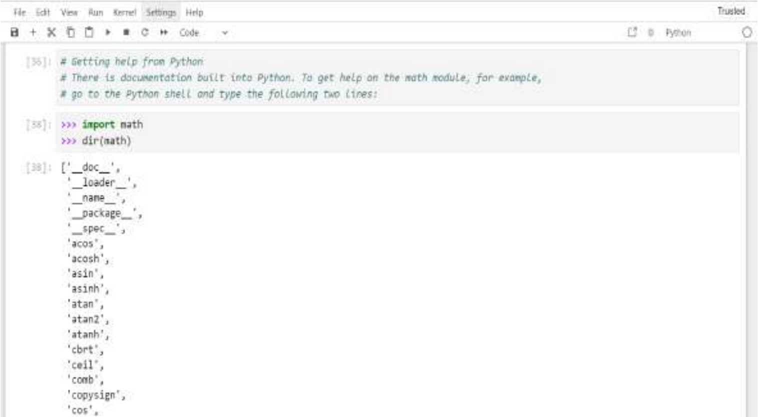
Getting help from Python :



```
[36]: # Getting help from Python
      # There is documentation built into Python. To get help on the math module, for example,
      # go to the Python shell and type the following two lines:

[38]: >>> import math
      >>> dir(math)

[38]: ['__doc__',
       '__loader__',
       '__name__',
       '__package__',
       '__spec__',
       'acos',
       'acosh',
       'asin',
       'asinh',
       'atan',
       'atan2',
       'atanh',
       'cbrt',
       'ceil',
       'comb',
       'copysign',
       'cos',
```

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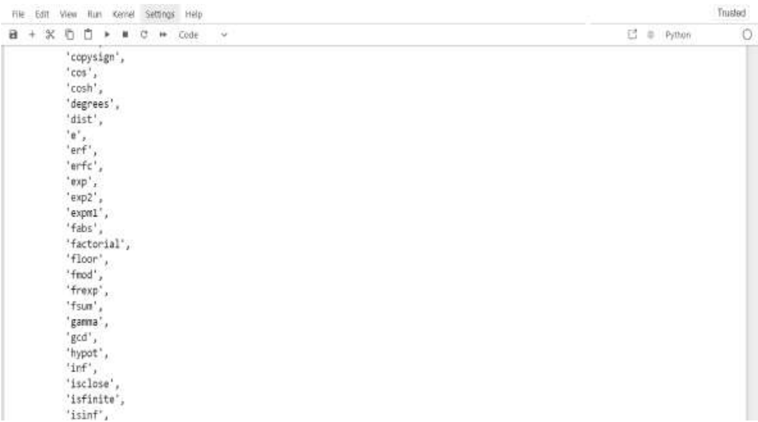
Getting help from Python :



```
            'copysign',
            'cos',
            'cosh',
            'degrees',
            'dist',
            'e',
            'erf',
            'erfc',
            'exp',
            'exp2',
            'expm1',
            'fabs',
            'factorial',
            'floor',
            'fmod',
            'frexp',
            'fsum',
            'gamma',
            'gcd',
            'hypot',
            'inf',
            'isclose',
            'isfinite',
            'isinf',
```

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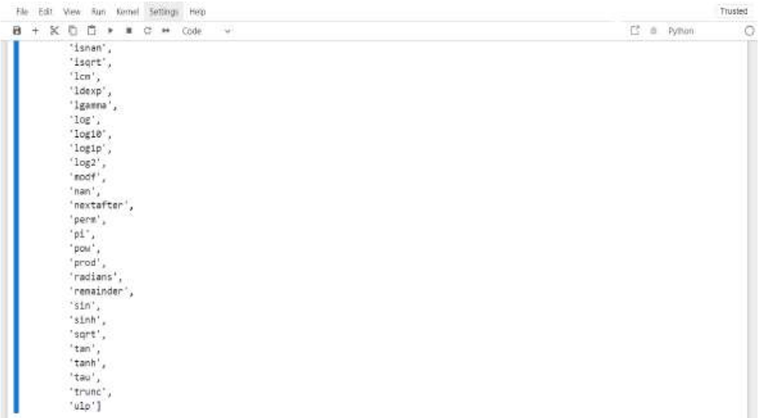
Getting help from Python :



```
        'isnan',
        'isqrt',
        'lcm',
        'ldexp',
        'lgamma',
        'log',
        'log10',
        'log1p',
        'log2',
        'modf',
        'nan',
        'nextafter',
        'perm',
        'pi',
        'pow',
        'prod',
        'radians',
        'remainder',
        'sin',
        'sinh',
        'sqrt',
        'tan',
        'tanh',
        'tau',
        'trunc',
        'ulp']
```

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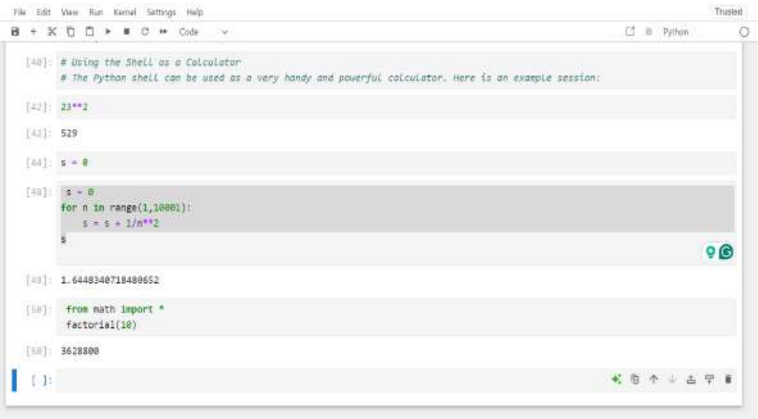
Using the Shell as a Calculator:



```
[40]: # Using the Shell as a Calculator
      # The Python shell can be used as a very handy and powerful calculator. Here is an example session:

[42]: 23**2

[42]: 529

[44]: s = 0

[48]:  s = 0
      for n in range(1,10001):
          s = s + 1/n**2
      s

[48]: 1.6448340718480652

[50]:  from math import *
       factorial(10)

[50]: 3628800

[ ]:
```

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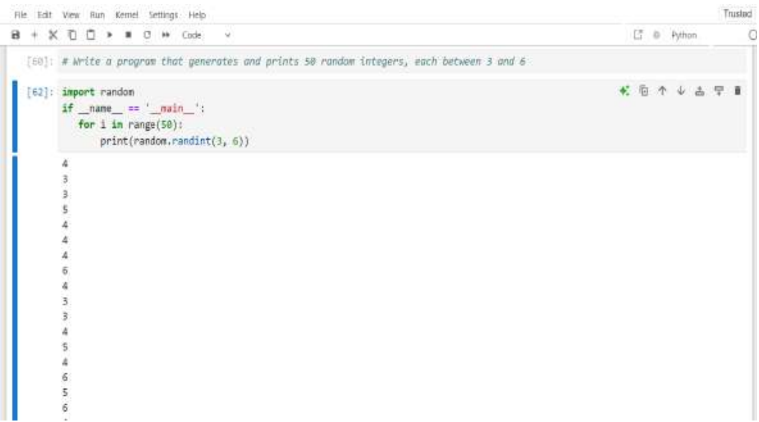
Write a program that generates and prints 50 random integers, each between 3 and 6:



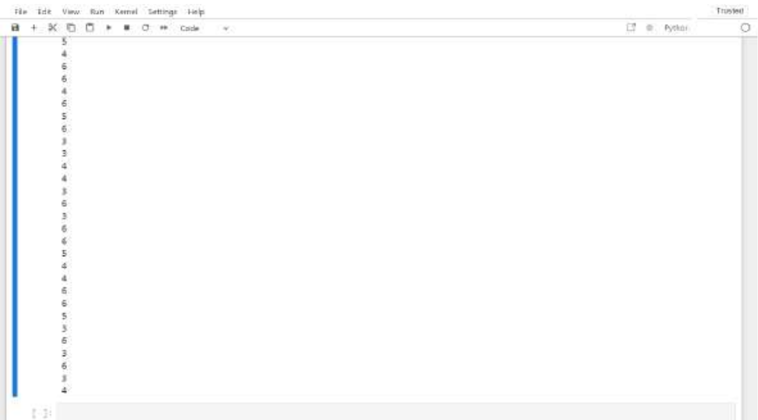
```
[60]: # Write a program that generates and prints 50 random integers, each between 3 and 6
```

```
[62]: import random
      if __name__ == '__main__':
        for i in range(50):
            print(random.randint(3, 6))
```

```
4
3
3
5
4
4
4
6
4
3
3
4
5
4
6
5
6
```

Practical No 2: Python Programming

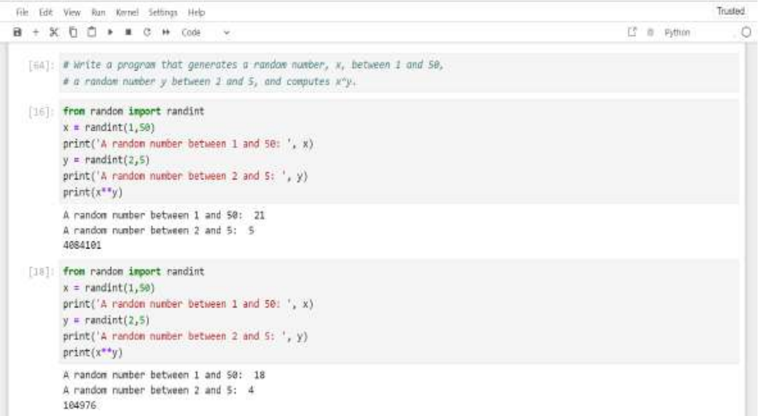
Write a program that generates and prints 50 random integers, each between 3 and 6:



```
5
4
6
6
4
6
5
6
3
3
4
4
3
6
3
6
6
5
4
4
6
6
5
3
6
3
6
3
4
```

Practical No 2: Python Programming

Write a program that generates a random number, x, between 1 and 50, a random number y between 2 and 5, and computes x^y.:



```
[64]: # Write a program that generates a random number, x, between 1 and 50,
      # a random number y between 2 and 5, and computes x^y.
```

```
[16]: from random import randint
      x = randint(1,50)
      print('A random number between 1 and 50: ', x)
      y = randint(2,5)
      print('A random number between 2 and 5: ', y)
      print(x**y)
```

```
A random number between 1 and 50:  21
A random number between 2 and 5:  5
4084101
```

```
[18]: from random import randint
      x = randint(1,50)
      print('A random number between 1 and 50: ', x)
      y = randint(2,5)
      print('A random number between 2 and 5: ', y)
      print(x**y)
```

```
A random number between 1 and 50:  18
A random number between 2 and 5:  4
104976
```

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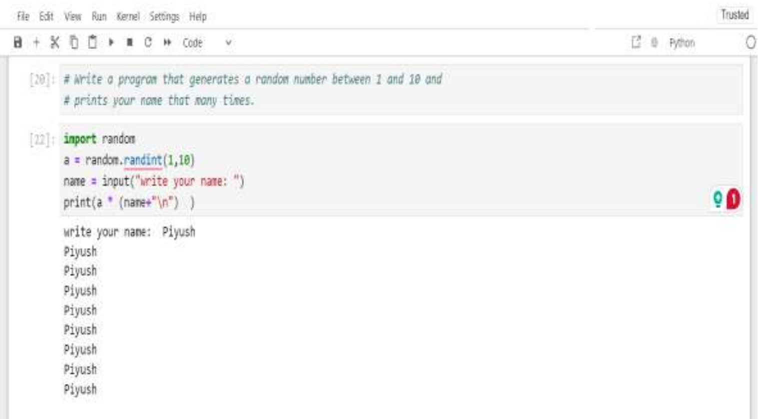
Write a program that generates a random number between 1 and 10 and prints your name that many times.:



```
# Write a program that generates a random number between 1 and 10 and
# prints your name that many times.
```

```
import random
a = random.randint(1,10)
name = input("write your name: ")
print(a * (name+"\n")  )
```

```
write your name:  Piyush
Piyush
Piyush
Piyush
Piyush
Piyush
Piyush
Piyush
Piyush
```

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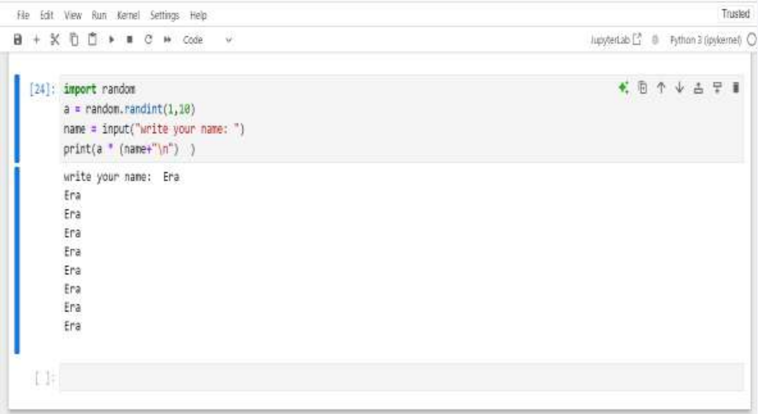
Write a program that generates a random number between 1 and 10 and prints your name that many times.:



```
[24]: import random
      a = random.randint(1,10)
      name = input("write your name: ")
      print(a * (name+"\n")  )
```

```
write your name:  Era
Era
Era
Era
Era
Era
Era
Era
Era
```

```
[ ]:
```

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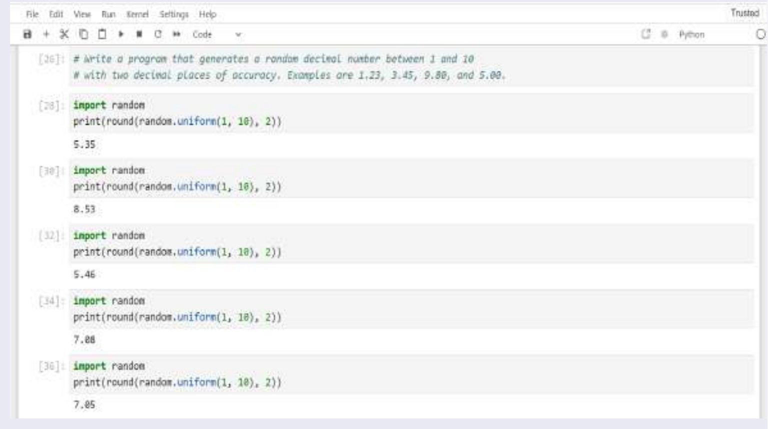
Write a program that generates a random decimal number between 1 and 10 with two decimal places of accuracy. Examples are 1.23, 3.45, 9.80, and 5.00.



```
[26]: # Write a program that generates a random decimal number between 1 and 10
      # with two decimal places of accuracy. Examples are 1.23, 3.45, 9.80, and 5.00.
```

```
[28]: import random
      print(round(random.uniform(1, 10), 2))
```

```
5.35
```

```
[30]: import random
      print(round(random.uniform(1, 10), 2))
```

```
8.53
```

```
[32]: import random
      print(round(random.uniform(1, 10), 2))
```

```
5.46
```

```
[34]: import random
      print(round(random.uniform(1, 10), 2))
```

```
7.88
```

```
[36]: import random
      print(round(random.uniform(1, 10), 2))
```

```
7.05
```

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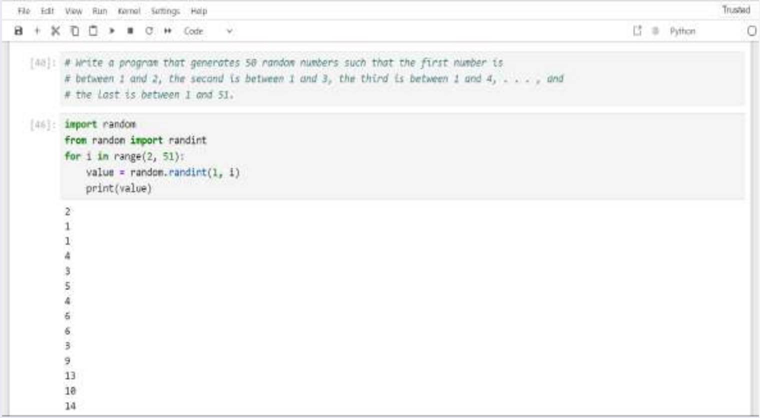
Write a program that generates 50 random numbers such that the first number is between 1 and 2, the second is between 1 and 3, the third is between 1 and 4,..., and the last is between 1 and 51.



```
[48]: # Write a program that generates 50 random numbers such that the first number is
      # between 1 and 2, the second is between 1 and 3, the third is between 1 and 4, . . . , and
      # the last is between 1 and 51.
```

```
[46]: import random
      from random import randint
      for i in range(2, 51):
          value = random.randint(1, i)
          print(value)
```

```
2
1
1
4
3
5
4
6
6
3
9
13
10
14
```

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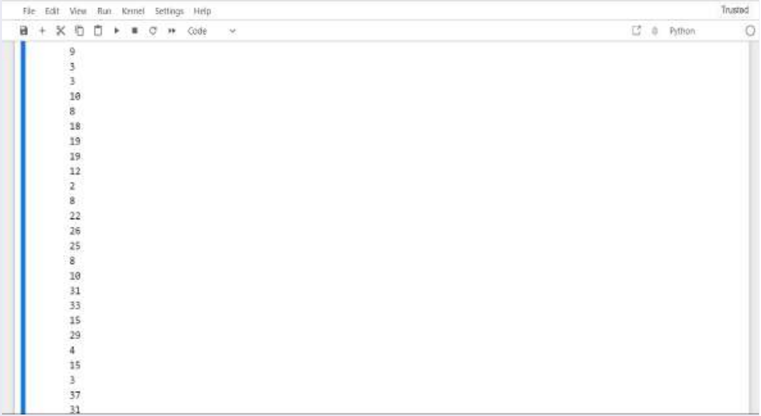
Write a program that generates 50 random numbers such that the first number is between 1 and 2, the second is between 1 and 3, the third is between 1 and 4,..., and the last is between 1 and 51.



```
9
3
3
10
8
18
19
19
12
2
8
22
26
25
8
10
31
33
15
29
4
15
3
37
31
```

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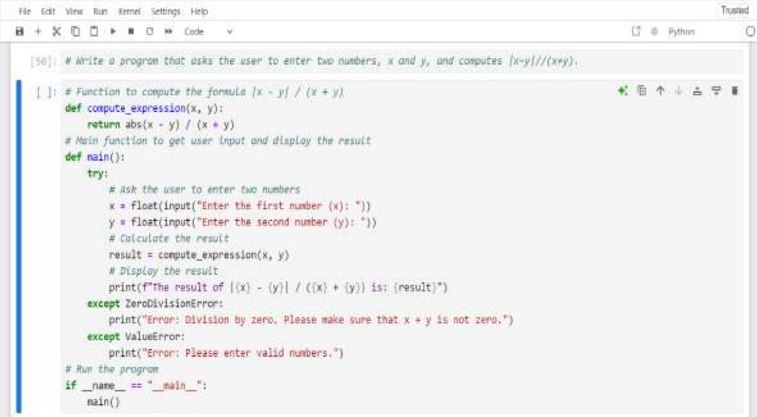
Write a program that asks the user to enter two numbers, x and y, and computes $\frac{|x-y|}{x+y}$



```
[50]: # Write a program that asks the user to enter two numbers, x and y, and computes |x-y|//(x+y).
```

```
[ ]: # Function to compute the formula |x - y| / (x + y)
     def compute_expression(x, y):
         return abs(x - y) / (x + y)
     # Main function to get user input and display the result
     def main():
         try:
             # Ask the user to enter two numbers
             x = float(input("Enter the first number (x): "))
             y = float(input("Enter the second number (y): "))
             # Calculate the result
             result = compute_expression(x, y)
             # Display the result
             print(f"The result of |{x} - {y}| / ({x} + {y}) is: {result}")
         except ZeroDivisionError:
             print("Error: Division by zero. Please make sure that x + y is not zero.")
         except ValueError:
             print("Error: Please enter valid numbers.")
     # Run the program
     if __name__ == "__main__":
         main()
```

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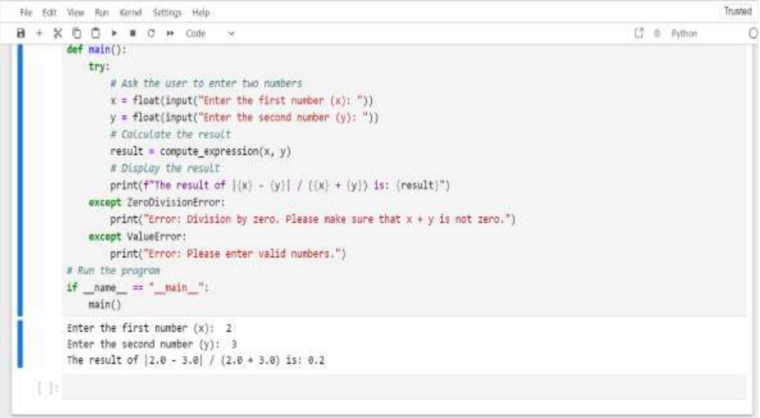
Write a program that asks the user to enter two numbers, x and y, and computes $\frac{|x-y|}{x+y}$.



```python
def main():
    try:
        # Ask the user to enter two numbers
        x = float(input("Enter the first number (x): "))
        y = float(input("Enter the second number (y): "))
        # Calculate the result
        result = compute_expression(x, y)
        # Display the result
        print(f"The result of |{x} - {y}| / ({x} + {y}) is: {result}")
    except ZeroDivisionError:
        print("Error: Division by zero. Please make sure that x + y is not zero.")
    except ValueError:
        print("Error: Please enter valid numbers.")
# Run the program
if __name__ == "__main__":
    main()
```

```
Enter the first number (x):  2
Enter the second number (y):  3
The result of |2.0 - 3.0| / (2.0 + 3.0) is: 0.2
```

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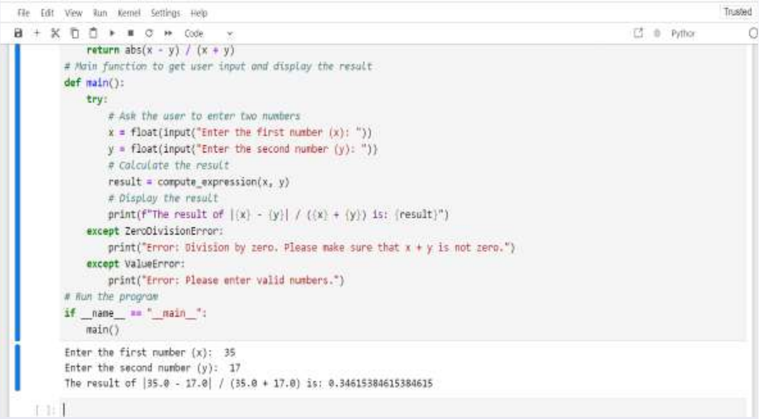
Write a program that asks the user to enter two numbers, x and y, and computes $\frac{|x-y|}{x+y}$.



```python
        return abs(x - y) / (x + y)
# Main function to get user input and display the result
def main():
    try:
        # Ask the user to enter two numbers
        x = float(input("Enter the first number (x): "))
        y = float(input("Enter the second number (y): "))
        # Calculate the result
        result = compute_expression(x, y)
        # Display the result
        print(f"The result of |{x} - {y}| / ({x} + {y}) is: {result}")
    except ZeroDivisionError:
        print("Error: Division by zero. Please make sure that x + y is not zero.")
    except ValueError:
        print("Error: Please enter valid numbers.")
# Run the program
if __name__ == "__main__":
    main()
```

```
Enter the first number (x):  35
Enter the second number (y):  17
The result of |35.0 - 17.0| / (35.0 + 17.0) is: 0.34615384615384615
```