Fundamentals of Python I

January 18, 2026

Python as a scientific calculator

```
[1]: 2+3
```

```
[1]: 5
```

```
[2]: 2-3
```

```
[2]: -1
```

```
[3]: #Multiplication *
     2*3
```

```
[3]: 6
```

```
[4]: # Division /
     3/4
```

```
[4]: 0.75
```

```
[5]: 2/1
```

```
[5]: 2.0
```

```
[6]: type(2+3)
```

```
[6]: int
```

```
[7]: type(1/2)
```

```
[7]: float
```

```
[8]: type('varun')
```

```
[8]: str
```

```
[9]: type(1+2j)
```

```
[9]: complex
```

```python
[10]: print('Hello World')
```

Hello World

```python
[11]: print(2+3)
```

5

```python
[12]: #modulus %
      76%3
```

[12]: 1

```python
[13]: 76//3
```

[13]: 25

```python
[14]: 76/3
```

[14]: 25.333333333333332

```python
[15]: round(76/3,2)
```

[15]: 25.33

```python
[16]: help(round)
```

Help on built-in function round in module builtins:

round(number, ndigits=None)
    Round a number to a given precision in decimal digits.

    The return value is an integer if ndigits is omitted or None. Otherwise
    the return value has the same type as the number. ndigits may be negative.

```python
[77]: format(76/3,'.2f')
```

[77]: '25.33'

```python
[17]: #Exponentiation
      2**3
```

[17]: 8

```python
[18]: 7^9
```

[18]: 14

```python
[19]: bin(7)
```

```
[19]: '0b111'
```

```
[20]: bin(9)
```

```
[20]: '0b1001'
```

```
[21]: bin(14)
```

```
[21]: '0b1110'
```

```
[22]: #Order of operations - PEMDAS rule
      #Parantheses
      #Exp
      #Mult, Div, Mod, Floor Div
      #Addition, Sub
      #Left to right (except exponentiation)
```

```
[23]: 2**3**2
```

```
[23]: 512
```

```
[24]: 2*3/4**2
```

```
[24]: 0.375
```

Assigning variable names

```
[25]: #letters, numbers, _
      #cannot start with number
      a= 5
```

```
[26]: a = a+1
```

```
[27]: a
```

```
[27]: 6
```

```
[28]: a==5
```

```
[28]: False
```

```
[29]: a!=5
```

```
[29]: True
```

```
[30]: a == 6 or 1>2
```

```
[30]: True
```

```python
[31]: a == 6 and 1>2
```

```
[31]: False
```

```python
[32]: abs(-2)
```

```
[32]: 2
```

```python
[33]: abs(3+4j)
```

```
[33]: 5.0
```

```python
[34]: c=3+4j
```

```python
[35]: c.real
```

```
[35]: 3.0
```

```python
[36]: c.imag
```

```
[36]: 4.0
```

```python
[37]: c.conjugate()
```

```
[37]: (3-4j)
```

More on print statement

```python
[38]: print(2+3)
      print(3+4)
```

```
5
7
```

```python
[39]: print(2+3,end=" ")
      print(3+4)
```

```
5 7
```

```python
[40]: print(2+3,end=",")
      print(3+4)
```

```
5,7
```

```python
[41]: #formatted printing
      a, b = 5,10
      print('The value of sum of a and b is ', a+b, ' and the value of product is ',␣
       ↪a*b)
```

```
The value of sum of a and b is  15  and the value of product is  50
```

```python
[42]: print(f"The value of sum of a and b is {a+b} and the value of product is {a*b}.
      ↪")
```

The value of sum of a and b is 15 and the value of product is 50.

User Input

```python
[44]: name = input()
      print(f"Hi,{name}, Welcome to the course")
```

 Varun

Hi,Varun, Welcome to the course

```python
[45]: number = input()
      type(number)
```

 2

```
[45]: str
```

```python
[49]: #type conversions
      int_input = int(input())
      type(int_input)
```

 3

```
[49]: int
```

```python
[50]: flt_input = float(input())
      type(flt_input)
```

 3.5

```
[50]: float
```

```python
[51]: type(str(3))
```

```
[51]: str
```

```python
[71]: #try and except methods
      try:
          a = float(input('Enter a number'))
      except ValueError:
          print('You entered an invalid number')
```

Enter a number 3.5

```python
[72]: velocity = float(input('Enter Velocity:'))
      time = float(input('Enter time travelled:'))
      distance = velocity * time
      print('The distance travelled is ', distance)
```

```
Enter Velocity: 65
Enter time travelled: 6

The distance travelled is  390.0
```

[52]:
```python
#String Methods
sample_string = input()
len(sample_string)
```

```
 varun
```

[52]: 5

[54]:
```python
sample_string[0]
```

[54]: 'v'

[56]:
```python
sample_string[4]
```

[56]: 'n'

[57]:
```python
sample_string[-1]
```

[57]: 'n'

[58]:
```python
sample_string[1:3]
```

[58]: 'ar'

[59]:
```python
sample_string[2:]
```

[59]: 'run'

[60]:
```python
sample_string[:3]
```

[60]: 'var'

[61]:
```python
sample_string[:]
```

[61]: 'varun'

[62]:
```python
sample_string[::2]
```

[62]: 'vrn'

[63]:
```python
sample_string[0:4:2]
```

[63]: 'vr'

[64]:
```python
sample_string.upper()
```

```
[64]: 'VARUN'
```

```
[65]: sample_string.lower()
```

```
[65]: 'varun'
```

```
[66]: sample_string.isalpha()
```

```
[66]: True
```

```
[68]: sample_string.isnumeric()
```

```
[68]: False
```

Conditional statement if, elif, else

```
[82]: #Check whether a number is even or not
      num = int(input('Enter a number'))
      if num%2 ==0:
          print('Even')
      else:
          print('Odd')
```

Enter a number 33

Odd

```
[83]: #Find whether a number ends with 0 or 5 or any other number'
```

```
[84]: #Find the grade of a student bases on given marks from 0 to 100
```

```
[85]: #Simulating a coin toss
      #importing libraries
      #math, numpy, random, matplotlib, sympy, scipy etc
      #import math
      #import math as m
      #pip install tensorflow
```

```
[86]: import random
```

```
[88]: help(random.random)
```

Help on built-in function random:

random() method of random.Random instance
    random() -> x in the interval [0, 1).

```
[94]: a = random.random()
      if a<0.5:
```

```
        print('Heads')
    else:
        print('Tails')
```

Heads

[106]:
```
#Simulate dice
a = random.randint(1,6)
print(a)
```

6

[104]:
```
help(random.randint)
```

Help on method randint in module random:

randint(a, b) method of random.Random instance
    Return random integer in range [a, b], including both end points.

[107]:
```
#Calculating grade
help(random.randrange)
```

Help on method randrange in module random:

randrange(start, stop=None, step=1) method of random.Random instance
    Choose a random item from range(stop) or range(start, stop[, step]).

    Roughly equivalent to ``choice(range(start, stop, step))`` but
    supports arbitrarily large ranges and is optimized for common cases.

[119]:
```
marks = round(random.random() * 100)
if marks < 40:
    print('F')
elif marks <50:
    print('P')
elif marks <60:
    print('D')
elif marks <70:
    print('C')
elif marks <80:
    print('B')
elif marks <90:
    print('A')
else:
    print('O')
```

P

looping

```
[120]: question = input('Which year did India get Independence ?')
       if question !=1947:
           question = input('Which year did India get Independence ?')
```

```
Which year did India get Independence ? 2045
Which year did India get Independence ? 2045
```

```
[2]: question = int(input('Which year did India get Independence ?'))
     while question != 1947:
             question = int(input('Which year did India get Independence ?'))
     print('Correct Answer')
```

```
Which year did India get Independence ? 2025
Which year did India get Independence ? 1947
```

```
Correct Answer
```

```
[3]: #Find factorial of a number
     #Find the number of digits in the given number
     #Reverse the digits in given number
     #Find whether a given number is palindrome
```

The for loop

```
[4]: print('Hi')
     print('Hi')
     print('Hi')
     print('Hi')
     print('Hi')
     print('Hi')
     print('Hi')
     print('Hi')
```

```
Hi
Hi
Hi
Hi
Hi
Hi
Hi
Hi
```

```
[5]: for i in range(8):
         print('Hi')
```

```
Hi
Hi
Hi
```

```
Hi
Hi
Hi
Hi
Hi
```

[6]: `#Print all even numbers from 1 to 50`

[7]:
```
#for loop to add first n numbers
#for loop to find factorial
#For loop with step size
#For loop with reverse printing
#Printing letters in a string
##Find all prime numbers less than entered number
```

break, continue, pass

[8]:
```python
#username from email
email = input()
for c in email:
  if c=='@':
    break
  print(c,end="")
```

varunsmn@gmail.com

varunsmn

[9]:
```python
email = input()
for c in email:
  if c=='@':
    continue
  print(c,end="")
```

varunsmn@gmail.com

varunsmngmail.com

[10]:
```python
email = input()
for c in email:
  if c=='@':
    print('')
    continue
  print(c,end="")
```

varunsmn@gmail.com

varunsmn
gmail.com

[11]: `#pass- Do nothing`

[ ]: