# Basics of Python Syntax

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**Website for Learning:**

Yizhou's Classroom -- http://yizhou.weebly.com/

Python Tutor -- http://www.pythontutor.com/

*Attention: Please create a folder for your Python programs.*

**Your First Program:**

```
>>> print('Hi! Nihao!')
Hi! Nihao!
```

**Variables & Data Types**

```
a = 10    #We created an integer.
b = 9.31 #This is a floating point number.
name = "Yizhou" #This is a string.

list_name = [ 'abc', 123 , 3.14, 'yizhou', 9.31 ] #This is a list.
tuple_name = ( 'abc',123 , 3.14, 'yizhou', 9.31 ) #This is a tuple.
```

The first index is zero, the second index is one, and so forth.

*The main differences between lists and tuples are: Lists are enclosed in square brackets [ ] and their elements and size can be changed, while tuples are enclosed in parentheses ( ) and cannot be updated. Tuples can be thought of as read-only lists.*

**Operators**

```
>>> 1+1 #add
2
>>> 2*4 # multiply
8
>>> 3-1 #subsract
2
>>> 3+4*5
23
>>> 18 / 5 # division always returns a floating point number
3.6
>>> 18 // 5 # floor division discards the fractional part
3
>>> 12 % 10 # the % operator returns the remainder of the division
2
>>> 3**2 # 3 squared
9
>>> 2**5 # 2 to the power of 7
32
```

**Operation of Variables**

```
>>> a = 10
>>> b = 3
>>> a / b
3.3333333333333335
>>> a * b
30
>>> a + b
13
>>> c = a * b +a - b
>>> print(c)
37
```

**Useful Functions:**

```
>>> round(3.1415926)
3
>>> round(3.1415926,3)
3.142
>>> import math      # This will import math module
>>> math.ceil(3.1415926) #The ceiling of x: the smallest integer not less than x
4
>>> math.floor(3.1415926) #The floor of x: the largest integer not greater than x
3
>>> math.sqrt(9) #The method sqrt() returns the square root of x for x > 0.
3.0
>>> import random
>>> random.choice([1,2,3,4])    # Get a random item from a list, tuple, or string.
2
>>> random.random()
0.11945081647411793
>>> math.floor(random.random()*10) # Get a random integer from 0 to 9.
7
>>> range(3)
    What we get are: 0,1,2
>>> range(1,4)
    What we get are: 1,2,3
>>> range(0, 10, 3)
    What we get are: 0, 3, 6, 9
>>> random.choice(range(10)) # Get a random integer from 0 to 9.
5
```

String to Integer: int('123') # You get an integer 123
Integer to String: str(123)    # You get a string '123'