

Python

Variables, Types & Operators



[@kabirbaidhya](#)

Before We Begin

Reflections

What we've learned from the past lessons.

1. Python - Hello World!
2. Git
3. Version Control
4. GitHub

Note: If you're not aware of these. Read them at

<https://github.com/kabirbaidhya/learn-python-django-web>

Variables

“ A variable is a symbolic name for (or reference to) information. The variable's name represents what information the variable contains. ”

For Instance

`foo` and `bar` could be variables that are just symbolic names that represent some information in the memory.

```
# Variable foo contains "Some Information"  
foo = "Some Information"  
  
# And variable bar contains 15.04  
bar = 15.64  
  
# Now variable `foo` can be used to get the reference of the variable  
print("It contains", foo)  
  
# And they could be used in expressions too  
print("Result = ", 5 * bar + 2)
```

Variables in Python

- Dynamically typed.
- Every variable is an object.
- Names are case sensitive.
- Assigned to a value using `=` operator eg: `foo = 10`.
- Name can contain letters, underscores (`_`) followed by numbers.
- **Naming Convention:** lowercase names using underscore `_` to separate words. eg: `first_name`, `last_name`, etc.

For instance

Let's say we have a numeric value `20.0` and we want to store it as the radius of a circle. We do that like this.

```
radius = 20.0
```

Here,

1. `radius` is a variable.
2. `20.0` is the value assigned to that variable.

For instance

Suppose that we need to store another constant value `3.14` as pi.

We can do that as well.

```
PI = 3.14
```

Now, `PI` is another variable that holds 3.14.

Using them in expressions

Let's do some computation with these values we have now.

```
# Values we have  
radius = 20.0  
PI = 3.14  
  
# Compute area of the circle  
area = PI * radius * radius  
  
# Print the results  
print("Area of Circle =", area)
```

In a Nutshell

**A variable is a symbol that stand in for a value
in the program.**

Example 1

```
first_name = "Kabir"  
last_name = "Baidhya"  
home_town = "Kathmandu, Nepal"  
  
print("Hi! I am", first_name, last_name, ".")  
print("I'm from", home_town, ".")
```

Output:

```
Hi! I am Kabir Baidhya .  
I'm from Kathmandu, Nepal .
```

Data Types

Built-in Data types

- **Numeric:** int, float, long
- **Boolean:** bool
- **Sequences:** str, list, tuple, bytes
- **Mappings:** dict
- **Sets:** set, frozen set

Immutable & Mutable types

1. Immutable types

- int, float, long, str, tuple, frozen set, etc.

2. Mutable types

- list, dict, set, etc.

Integer

Integers are positive or negative whole numbers with no decimal points.

In python 2.x there are two `int` types: `int` and `long`.

But in python 3.x onwards both have been unified into `int` and it behaves as `long`.

```
total_lessons = 24
```


Float

They represent real numbers and are written with a decimal point.

```
percentage = 70.05
```

Boolean

Variables with boolean type can represent only two values `True` or `False`.

```
success = True  
failure = not success
```

Example 2: Basic data types

```
an_integer = 6
a_floating_point = 17.60
a_boolean = True
a_string = "Foo"

print("Integer value =", an_integer)
print("Float value =", a_floating_point)
print("Boolean value =", a_boolean)
print("String value =", a_string)
```

Output:

```
Integer value = 6
Float value = 17.60
Boolean value = True
String value = Foo
```

Operators

Arithmetic Operators

Python supports all the basic arithmetic operators just like any other programming languages.

Operator	Operation	Example
+	Addition	$a + b$
-	Subtration	$a - b$
*	Multiplication	$a * b$
/	Division	a / b
**	Exponentiation	$a ** b$
%	Modulo	$a \% b$

Comparison Operators

Common comparison operators in python are `<`, `>`, `==`, `>=`, `<=`, and `!=`.

All of these operators return boolean results.

Operator	Comparison	Example
<code>></code>	Is greater than	<code>a > b</code>
<code><</code>	Is less than	<code>a < b</code>
<code>==</code>	Is equal to	<code>a == b</code>
<code>>=</code>	Is greater than or equal to	<code>a >= b</code>
<code><=</code>	Is less than or equal to	<code>a <= b</code>
<code>!=</code>	Is not equal to	<code>a != b</code>

Logical Operators

All of these operators return boolean results.

Operator	Operation	Example
and	Logical AND	a and b
or	Logical OR	a or b
not	Logical NOT	not a

Example 3

Try these in Python shell.

```
>>> (1 * 4) + (4 / 2) - (3 * 2)
>>> 7 % 3
>>> 2 ** 3
>>> 1 > 2
>>> 1 >= 1
>>> 1 < 5
>>> 1 <= 5
>>> 7 == 5
>>> 8 != 5
>>> 7 > 2 and 5 < 8
>>> 7 > 10 or 5 < 8
>>> not (5 > 7)
```


Exercise 1

Write a program to calculate the diameter, circumference, and the area of circle using the value of `radius` and constant `PI = 3.14159`.

Exercise 2

Write a program to calculate the distance between two points represented by coordinates (x_1, y_1) and (x_2, y_2) respectively.

Use Distance Formula

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

Exercise 3

Write a program to compute the possible values of x from a quadratic equation $ax^2 + bx + c = 0$ ($a \neq 0$) using the quadratic equation formula.

Use Quadratic Formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

User Input

Input

Getting the user input is an important part of every program.

In python you can use the `input` function to get the user input easily.

```
# Get the input and store it in the variable.  
name = input("Please enter your name: ")  
  
# Print the entered value.  
print("Hi", name)
```

Note: `input` only works in python3. You need to use `raw_input` if you're using python2.

Exercise 4

Make changes in the program you wrote for exercise 1 to get the radius from the user.

Exercise 5

Make changes in the program you wrote for exercise 2 to get x_1 , y_1 & x_2 , y_2 from the user.

Exercise 6

Make changes in the program you wrote for exercise 3 to get the values of a, b & c from the user.

Exercise 7

Write a program that asks for a number and prints if it's an even number or not.

Read More?

Links

1. <https://docs.python.org/3.5/tutorial/introduction.html>
2. <https://www.digitalocean.com/community/tutorials/how-to-use-variables-in-python-3>
3. <https://learnpythonthehardway.org/book/ex5.html>
4. <http://www.pythonforbeginners.com/basics/python-variables>
5. [https://www.learnpython.org/en/Variables and Types](https://www.learnpython.org/en/Variables_and_Types)

More links

6. [https://en.wikibooks.org/wiki/Python Programming/Data Types](https://en.wikibooks.org/wiki/Python_Programming/Data_Types)
7. <https://docs.python.org/3.6/reference/expressions.html#operator-precedence>

Thank You

[@kabirbaidhya](#)

kabirbaidhya@gmail.com