

# 01

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## 1 Variables

A name that is used to denote something or a value is called a variable. In python, variables can be declared and values can be assigned to it as follows,

```
In [1]: x = 2  
        y = 5  
        xy = 'Hey'
```

```
In [3]: print(x+y, xy)
```

7 Hey

Multiple variables can be assigned with the same value.

```
In [43]: x = y = 1
```

```
In [44]: print(x,y)
```

1 1

## 2 Operators

##Arithmetic Operators

Symbol	Task Performed
+	Addition
-	Subtraction
/	division
%	mod
	multiplication
//	floor division to the power of

```
In [4]: 1+2
```

Out [4]: 3

In [5]: 2-1

Out [5]: 1

In [6]: 1\*2

Out [6]: 2

In [8]: 15%10

Out [8]: 5

Floor division is nothing but converting the result so obtained to the nearest integer.

In [9]: 2.8//2.0

Out [9]: 1.0

##Relational Operators

Symbol	Task Performed
==	True, if it is equal
!=	True, if not equal to
<	less than
>	greater than
<=	less than or equal to
>=	greater than or equal to

In [10]: z = 1

In [11]: z == 1

Out [11]: True

In [12]: z > 1

Out [12]: False

##Bitwise Operators

Symbol	Task Performed
&	Logical And
	Logical OR
^	XOR
~	Negate
>>	Right shift
<<	Left shift

```
In [13]: a = 2 #10  
        b = 3 #11
```

```
In [14]: print(a & b)  
        print(bin(a&b))
```

```
2  
0b10
```

```
In [15]: 5 >> 1
```

```
Out[15]: 2
```

```
0000 0101 -> 5  
Shifting the digits by 1 to the right and zero padding  
0000 0010 -> 2
```

```
In [16]: 5 << 1
```

```
Out[16]: 10
```

```
0000 0101 -> 5  
Shifting the digits by 1 to the left and zero padding  
0000 1010 -> 10
```

#Built-in Functions

Python comes loaded with pre-built functions

##Conversion from one system to another

Conversion from hexadecimal to decimal is done by adding prefix **0x** to the hexadecimal value or vice versa by using built in **hex()**, Octal to decimal by adding prefix **0** to the octal value or vice versa by using built in function **oct()**.

```
In [17]: hex(170)
```

```
Out[17]: '0xaa'
```

```
In [18]: 0xAA
```

```
Out[18]: 170
```

```
In [19]: oct(8)
```

```
Out[19]: '0o10'
```

```
In [21]: 0o10
```

```
Out[21]: 8
```

**int()** accepts two values when used for conversion, one is the value in a different number system and the other is its base. Note that input number in the different number system should be of string type.

```
In [22]: print(int('010',8))
         print(int('0xaa',16))
         print(int('1010',2))
```

```
8
170
10
```

**int()** can also be used to get only the integer value of a float number or can be used to convert a number which is of type string to integer format. Similarly, the function **str()** can be used to convert the integer back to string format

```
In [23]: print(int(7.7))
         print(int('7'))
```

```
7
7
```

Also note that function **bin()** is used for binary and **float()** for decimal/float values. **chr()** is used for converting ASCII to its alphabet equivalent, **ord()** is used for the other way round.

```
In [24]: chr(98)
```

```
Out[24]: 'b'
```

```
In [25]: ord('b')
```

```
Out[25]: 98
```

##Simplifying Arithmetic Operations

**round()** function rounds the input value to a specified number of places or to the nearest integer.

```
In [26]: print(round(5.6231))
         print(round(4.55892, 2))
```

```
6
4.56
```

**complex()** is used to define a complex number and **abs()** outputs the absolute value of the same.

```
In [27]: c =complex('5+2j')
         print(abs(c))
```

```
5.385164807134504
```

`divmod(x,y)` outputs the quotient and the remainder in a tuple(you will be learning about it in the further chapters) in the format (quotient, remainder).

```
In [28]: divmod(9,2)
```

```
Out[28]: (4, 1)
```

`isinstance()` returns True, if the first argument is an instance of that class. Multiple classes can also be checked at once.

```
In [29]: print(isinstance(1, int))
         print(isinstance(1.0,int))
         print(isinstance(1.0,(int,float)))
```

```
True
False
True
```

`pow(x,y,z)` can be used to find the power  $x^y$  also the mod of the resulting value with the third specified number can be found i.e. :  $(x^y \% z)$ .

```
In [34]: print(pow(3,3))
         print(pow(3,3,5))
```

```
27
2
```

##Accepting User Inputs

`input()` accepts input and stores it as a string. Hence, if the user inputs a integer, the code should convert the string to an integer and then proceed.

```
In [38]: abc = input("Type something here and it will be stored in variable abc \t")
```

```
Type something here and it will be stored in variable abc      2
```

```
In [39]: type(abc)
```

```
Out[39]: str
```

```
In [40]: abc1 = input("enter something that can be stored in variable abc \t")
```

```
Only integer can be stored in variable abc      2
```