Data Types

Python has several in build data types, like Number datatype, Boolean types, String datatype, Sequence types, Binary types, Mapping data type, Set data type

Number : int, float, complex, bool (Boolean)

String : str

Sequence : list, tuple, range

BinaryTypes : bytes, bytearray

Mapping : dict

Set : set, frozenset

Number

Python's four number types are integers, floats, complex numbers, and Booleans

Note: Booleans behave like the numbers 1 (True) and 0 (False)

```
# Dynamic Typing/Changing
a = 10  # a is variable, 10 is expression
b = 20
print(a, b)  # 10 20

# Dynamic Changing
a = 30
print(a, b)  # 30 20
```

```
#Type of DataType
x = 10.0
y = 20
z = "30"

print(type(x)) # <class 'float'>
print(type(y)) # <class 'int'>
print(type(z)) # <class 'str'>
```

```
# Boolean
a = False
print(a) #False
print(type(a)) #<class 'bool'>

a = True
print(a) #True
print(type(a)) #<class 'bool'>

a = True * 5 # 1 * 5 =5
print(a) # 5

b = False * 5 # 0 * 5 = 0
print(b) #0
```

Complex Numbers:

Complex Numbers consist of both real element and imaginary element suffixed with j.

Complex numbers can be created used by assignment j or complex() function

To create a complex number we use a+bi, here a is the real part and b is the imaginary part. Instead we use J in place of i , in python language

```
a = 10j
print(a) # 10j
print(type(a)) # <class 'complex'>

# Complex Numbers
a = 10
b = 5j
result = a+b
print(result) #(10+5j)
print(type(result)) # <class 'complex'>
print(result.real) #10.0
print((result.imag)) # 5.0
```

Binary Numbers in Python:

If we want to work with binary numbers in Python, write the number and prefix it with 0b.

Base of binary is 2 and have two values 0 and 1

```
a = 0b00101

print("Binary Value is: ", + a) # Binary Value is:  5

print(type(a)) # <class 'int'>

b = 0b111

print("Binary Value is: ", + b) # Binary Value is:  7
```

Hexadecimal Numbers in Python:

Hexadecimal numbers are that are expressed in base 16 system

The symbols 0,1,2,3,4,5,6,7,8,9,a,b,c,d,e and f are used to represent hexadecimal numbers.

Hexadecimal numbers should be prefixed with 0x.

Typing a hexadecimal in the interpreter outputs its decimal equivalent.

```
a = 0xace

print(a) # 2766

print(type(a)) # <class 'int'>

b = 0xe

print(b) # 14

c = 0x9ac

print(c) # 2476

d = 0xbf

print(d) # 191
```

Octal Numbers in Python

Octal Numbers are expressed in base 8 system

It uses digits from 0 to 7 to represent in numbers

Octal Numbers are prefixed with 0o.

Typing a hexadecimal in the interpreter outputs its decimal equivalent.

```
a = 0o22

print(a) # 18

b = 0o210

print(b) # 136

c = 0o112

print(c) # 74
```

Conversion Decimal to Binary, Hexadecimal, Octal

To convert any number to binary, hexadecimal, octal number, we can use the built in **bin, hex and oct** python functions.

```
#Converting to binary

x = bin(9)

print(x) # 0b1001

#Converting to hexadecimal

y = hex(800)

print(y) # 0x320

#Converting to Octal

z = oct(75)

print(z) # 0o113
```

```
a = 10
print(b) #NameError: name 'b' is not defined
```

```
a = 10
print(a # SyntaxError: unexpected EOF while parsing
```

```
a 10
print(a)   # SyntaxError: invalid syntax
```