float data type
float data type is used to reserve memory for float literal or value.
A float value is numeric value with fractional part or decimal part.
In python float values/literals are represented in two formats

1. Fixed notations
2. Scientific notation/Exponent notation

The size of float data type is 8byte (64 bits).
Default representation of float value in fixed notation.

Finding information about float data type

```
>>> import sys
>>> sys.float_info
sys.float_info(max=1.7976931348623157e+308, max_exp=1024,
max_10_exp=308, min=2.2250738585072014e-308, min_exp=-1021,
min_10_exp=-307, dig=15, mant_dig=53, epsilon=2.220446049250313e-
16, radix=2, rounds=1)
```

Example:

```
>>> a=1.5
>>> type(a)
<class 'float'>
>>> a
1.5
>>> b=1.123456789123456789123456789
>>> b
1.1234567891234568
>>> c=1.123123123123123123123123123123
>>> c
1.1231231231231231
```

The number of decimal places reserved by PVM for float is 15 to 16 digits.
If more than 16 digits, PVM round value to nearest digit (OR) truncate.

Exponent notation/ Scientific notation
In exponent notation float value consist of one special character “e”. The value of “e” is 10. If the value is very large it is represented in exponent notation.

```
>>> n1=123e-1   → 123x10 pow -1 → 123x1/10 → 12.3
>>> n1
12.3
>>> n2=1.2345e2
>>> n2
123.45
>>> n3=1.9e309
>>> n3
inf
>>> type(n3)
<class 'float'>
```

Complex data type

Complex number is numeric value, having two values

1. real
2. imag

Example:

```
>>> import math
>>> math.sqrt(9)
3.0
>>> math.sqrt(-9)
Traceback (most recent call last):
  File "<pyshell#18>", line 1, in <module>
    math.sqrt(-9)
ValueError: math domain error
>>> import cmath
>>> cmath.sqrt(9)
(3+0j)
```

Syntax of representing complex number in python

real+imagj

real and imag values are separated with +, imag value is suffix with j

```
>>> c1=1+2j
>>> c1
(1+2j)
>>> type(c1)
<class 'complex'>
```

```
>>> c1.real
1.0
>>> c1.imag
2.0
>>> c2=3j
>>> type(c2)
<class 'complex'>
>>> c2
3j
>>> c2.real
0.0
>>> c2.imag
3.0
```

NoneType

NoneType data type is used to represent None value.
“None” is a keyword which represent None value or empty value.

```
>>> x=None
>>> x
>>> type(x)
<class 'NoneType'>
>>> y=None
>>> y
>>> type(y)
<class 'NoneType'>
```

Bool data type

Boolean values in python are represented using two keywords

1. True
2. False

These boolean values are return by boolean expressions.

```
>>> rollno=1
>>> fees=4000.0
>>> fee_paid=True
```

```
>>> rollno
1
>>> fees
4000.0
fee_paid
True
>>> type(fee_paid)
<class 'bool'>
>>> type(rollno)
<class 'int'>
>>> type(fees)
<class 'float'>
>>> 10>5
True
>>> 10>100
False
>>> True+True
2
>>> True+False
1
>>> False+False
0
```

Str data type
String is a collection of characters; these characters can be alphabets, digits or special characters. String is non numeric data type.

How to represent string?
In python string values are represented in 3 ways

1. Within single quotes
2. Within double quotes
3. Within triple single quotes or double quotes

The string which consists of alphabets is alphabetic string.

The string which consists of alphabets and digits is called alphanumeric string.

Within single quotes, programmer can represent one line string.

```
>>> s1='python'
>>> s2='python language'
>>> s3='python language is
SyntaxError: incomplete input
>>> s4='nit123'
>>> type(s1)
<class 'str'>
>>> type(s2)
<class 'str'>
>>> type(s4)
<class 'str'>
>>> s1
'python'
>>> s2
'python language'
>>> s4
'nit123'
>>> s5='45'
>>> s5
'45'
>>> type(s5)
<class 'str'>
>>> s6='1.6'
>>> s6
'1.6'
>>> name='नरेश'
>>> name
'नरेश'
>>> name='నరేష్,
>>> name
,నరేష్,
```