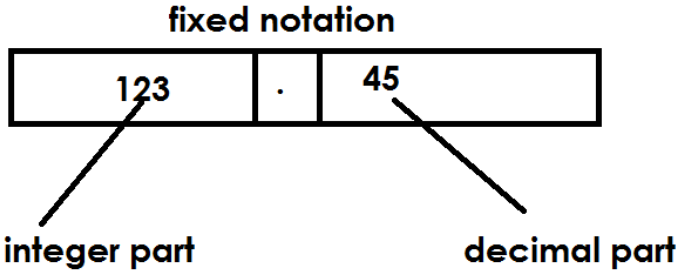
float data type or real data type
This data type is used to allocate memory for float value/real number. float value is numeric value with precisions.
Note: all data types in python are dynamic size (OR) size of any data type is unlimited.

C,C++,Java	**Python**
Short – 2bytes	int
Int – 4bytes	float
Long – 8bytes	
Float – 4bytes	
Double – 8bytes	

float literal
a float value is represented in two formats or notations

1. Fixed notation/Standard notation
2. Exponent notation

Fixed notation or fixed format



In fixed notation float value is represented by separating integer value and decimal values using a decimal point.

```
>>> f1=1.5
>>> type(f1)
<class 'float'>
>>> f2=1.12345678912345678912345678 9
>>> f2
1.1234567891234568
>>>
```

Float data type reserve memory for 16 precisions. if more than 16 precisions it performs either rounding or truncating. If performs rounding if value >=.5 else it truncates.

Float is literal/constant/immutable, after creating float object we cannot modify. Because of it is immutable, it can be shared.

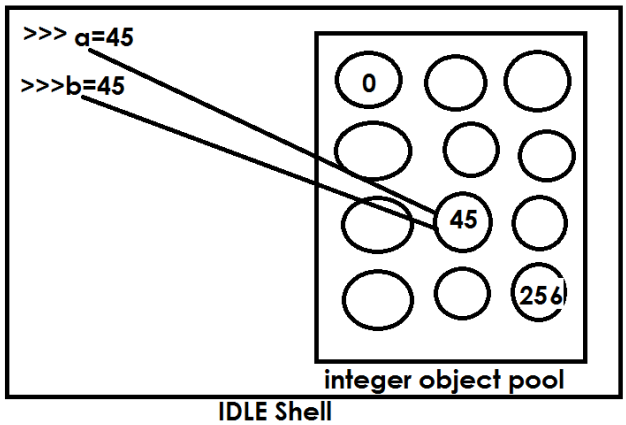
Program

```
a=257
b=257
print(id(a),id(b))
f1=1.5
f2=1.5
print(id(f1),id(f2))
```

Output:

```
186484395408 186484395408
186484392912 186484392912
```

Note: IDLE shell is only for learning purpose not developing projects.




```
>>> a=1.6
>>> b=1.6
>>> id(a)
619202147280
>>> id(b)
619202149904
>>> i1=800
>>> i2=800
>>> id(i1)
619202149936
>>> id(i2)
619202149968
>>> i3=100
>>> i4=100
```

```
>>> id(i3)
619158328784
>>> id(i4)
619158328784
>>> a=255
>>> b=255
>>> id(a)
619158333808
>>> id(b)
619158333808
>>> x=256
>>> y=256
>>> id(x)
619158333840
>>> id(y)
619158333840
>>> p=257
>>> q=257
>>> id(p)
619202150000
>>> id(q)
619202150064
>>>
```

Exponent notation or scientific notation

If the value is very large, it is represented exponent notation.
In exponent notation we use one special character “e” or “E”
Example:

```
>>> f1=123e-1
>>> f1
12.3
>>> f2=1234e2
>>> f2
123400.0
>>> type(f1)
<class 'float'>
>>> type(f2)
<class 'float'>
>>> f3=1.45678e-3
>>> f3
```

0.00145678
>>>

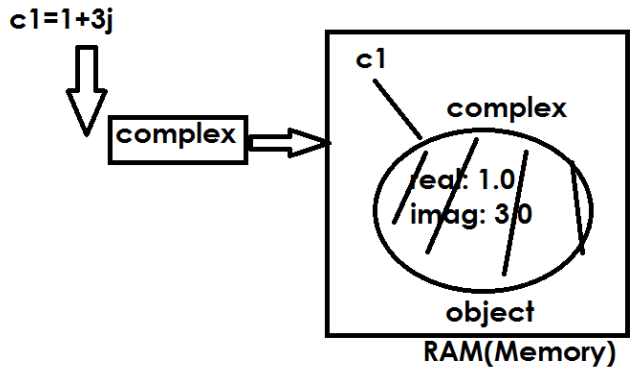
The value of “e” is 10
123e3 ➔ 123x10 pow 3

Complex data type or complex number
“complex” class or data type used to represent complex numbers.
Complex number is having two values.

1. Real
2. Imag

Syntax of representing complex number
real+imagj

imag value is suffix with “j”




```
>>> c1=1+2j
>>> type(c1)
<class 'complex'>
>>> c1
(1+2j)
>>> c1.real
1.0
>>> c1.imag
2.0
>>> c1.real=1.2
Traceback (most recent call last):
  File "<pyshell#56>", line 1, in <module>
    c1.real=1.2
AttributeError: readonly attribute
```

>>>