02.03-numbers

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1

1.1 Integers

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

```
Out[1]: 4
```

```
In [2]: 3 - 4
```

```
Out[2]: -1
```

```
In [3]: 4 * 5
```

```
Out[3]: 20
```

Python 3
`12 / 522.4`

```
In [4]: 12 / 5
```

```
Out[4]: 2.4
```

```
In [5]: 2 ** 5
```

```
Out[5]: 32
```

```
In [6]: 32 % 5
```

```
Out[6]: 2
```

```
In [7]: a = 1
        a
```

```
Out[7]: 1

   type()

In [8]: type(a)

Out[8]: int


    32 4 -2,147,483,648 2,147,483,647
    64 8 -9,223,372,036,854,775,808 9,223,372,036,854,775,807

In [9]: import sys
        sys.maxsize

Out[9]: 9223372036854775807
```

1.2 Floating Point Numbers

```
In [13]: a = 1.4
         type(a)

Out[13]: float

   12 / 52.4

In [14]: 12.0 / 5.0

Out[14]: 2.4

In [15]: 12 / 5.0

Out[15]: 2.4

In [10]: 12.0 / 5

Out[10]: 2.4


In [11]: 5 + 2.4

Out[11]: 7.4


In [12]: 3.4 - 3.2

Out[12]: 0.19999999999999973

In [13]: 12.3 + 32.4
```

```
Out[13]: 44.7

In [14]: 2.5 ** 2

Out[14]: 6.25

In [15]: 3.4 % 2.1

Out[15]: 1.2999999999999998
```

PythonCJavaIEEE 754 floating point standard
3.4 - 3.2 0.2
Python '0.19999999999999973354647408996243029832839965820312 5'0.2|

```
In [16]: '{:.52}'.format(3.4 - 3.2)

Out[16]: '0.19999999999999973354647408996243029832839965820312 5'
```

sys.float_info

```
In [17]: import sys
         sys.float_info

Out[17]: sys.float_info(max=1.7976931348623157e+308, max_exp=1024, max_10_exp=308, min=2.22507

In [18]: sys.float_info.max

Out[18]: 1.7976931348623157e+308
```

0

```
In [19]: sys.float_info.min

Out[19]: 2.2250738585072014e-308

In [20]: sys.float_info.epsilon

Out[20]: 2.220446049250313e-16
```

1.3 Complex Numbers

Python `j`

```
In [21]: a = 1 + 2j
         type(a)

Out[21]: complex
```

```
In [22]: a.real

Out[22]: 1.0

In [23]: a.imag

Out[23]: 2.0

In [24]: a.conjugate()

Out[24]: (1-2j)
```

##

```
In [25]: 1 + 2 - (3 * 4 / 6) ** 5 + 7 % 5

Out[25]: -27.0
```

Python“”“”“”

- ( )
- **
- * / // %
- ‘+ -’

```
In [26]: 12.3 // 5.2

Out[26]: 2.0

In [27]: 12.3 // -4

Out[27]: -4.0
```

1.4

```
In [28]: abs(-12.4)

Out[28]: 12.4
```

```
In [29]: round(21.6)

Out[29]: 22
```

```
In [30]: print (min(2, 3, 4, 5))
         print (max(2, 4, 3))

2
4
```

1.5

```
In [31]: type(max)

Out[31]: builtin_function_or_method
```

```
In [32]: max = 1
         type(max)

Out[32]: int

In [33]: max(4, 5)

         ---------------------------------------------------------------------------

         TypeError                                 Traceback (most recent call last)

         <ipython-input-33-844ab04d5106> in <module>
    ----> 1 max(4, 5)


         TypeError: 'int' object is not callable
```

1.6

```
In [34]: print (int(12.324))
         print (int(-3.32))
```

```
12
-3
```

```
In [35]: print (float(1.2))
```

```
1.2
```

1.7

10

```
In [36]: 1e-6
```

```
Out[36]: 1e-06
```

160x0-9A-F

```
In [37]: 0xFF
```

```
Out[37]: 255
```

80o0-7

```
In [38]: 0o67
```

```
Out[38]: 55
```

20b01

```
In [39]: 0b101010
```

```
Out[39]: 42
```

1.8 In-place

Python

```
In [40]: b = 2.5
         b += 2
         print (b)
         b *= 2
         print (b)
         b -= 3
         print (b)
```

```
4.5
9.0
6.0
```

1.9 Boolean Data Type

```
TrueFalse
```

```
In [41]: q = True
         type(q)
```

```
Out[41]: bool
```

```
In [42]: q = 1 > 2
         print (q)
```

```
False
```

```
<, >, <=, >=, ==, !=
```

Python

```
In [43]: x = 2
         1 < x <= 3
```

```
Out[43]: True
```