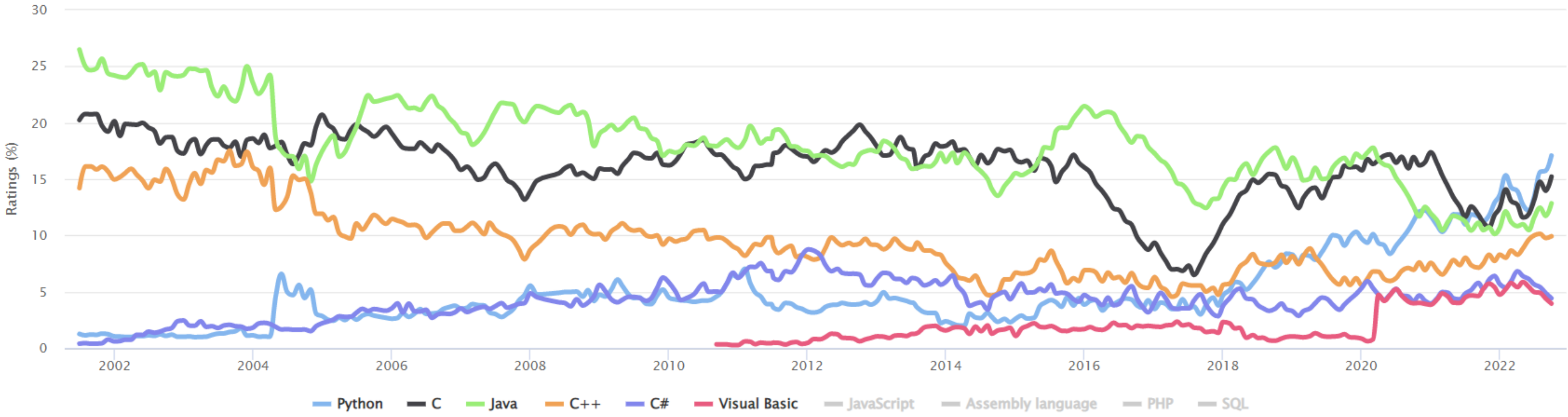
# Информатика

## Лекция №3. Тема: «Современные языки программирования. Python. Основы регулярных выражений.»

# Статистика использования языков



TIOBE Programming Community Index

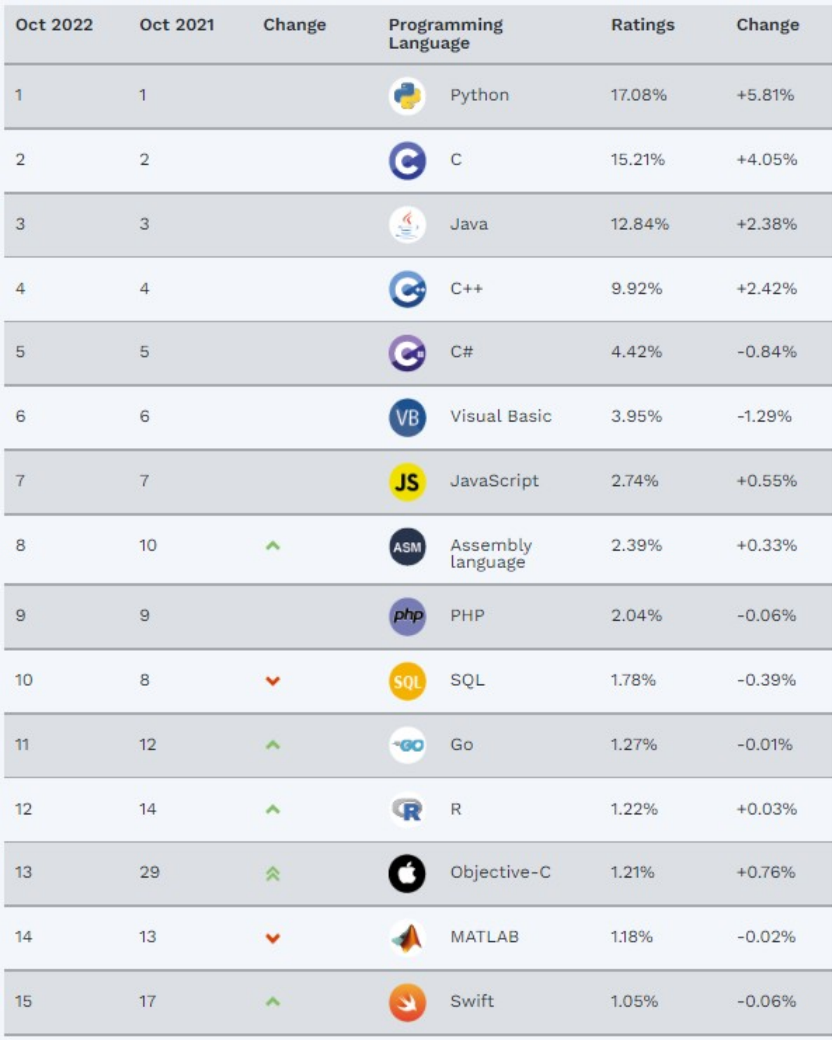
Source: www.tiobe.com

https://www.tiobe.com/tiobe-index/

# Статистика использования языков (2)

Python:

September 2017 = 2,98%
September 2018 = 7,65%
September 2019 = 9,88%
September 2020 = 10,47%
September 2021 = 11,67%
September 2022 = 15,74%

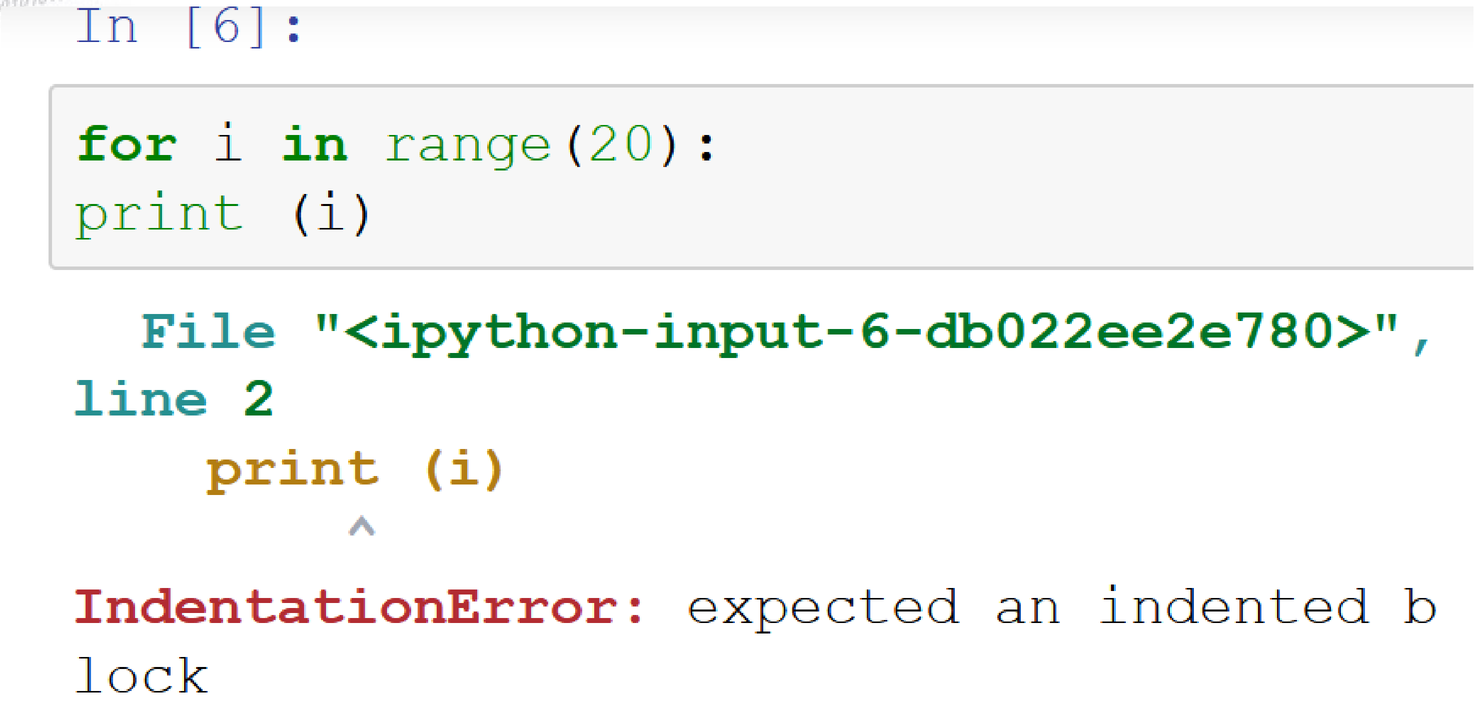


| Oct 2022 | Oct 2021 | Change | Programming Language | Ratings | Change |
|---|---|---|---|---|---|
| 1 | 1 | | Python | 17.08% | +5.81% |
| 2 | 2 | | C | 15.21% | +4.05% |
| 3 | 3 | | Java | 12.84% | +2.38% |
| 4 | 4 | | C++ | 9.92% | +2.42% |
| 5 | 5 | | C# | 4.42% | -0.84% |
| 6 | 6 | | Visual Basic | 3.95% | -1.29% |
| 7 | 7 | | JavaScript | 2.74% | +0.55% |
| 8 | 10 | ↑ | Assembly language | 2.39% | +0.33% |
| 9 | 9 | | PHP | 2.04% | -0.06% |
| 10 | 8 | ↓ | SQL | 1.78% | -0.39% |
| 11 | 12 | ↑ | Go | 1.27% | -0.01% |
| 12 | 14 | ↑ | R | 1.22% | +0.03% |
| 13 | 29 | ⇈ | Objective-C | 1.21% | +0.76% |
| 14 | 13 | ↓ | MATLAB | 1.18% | -0.02% |
| 15 | 17 | ↑ | Swift | 1.05% | -0.06% |

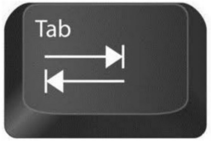
# Языки программирования лидеров IT-рынка

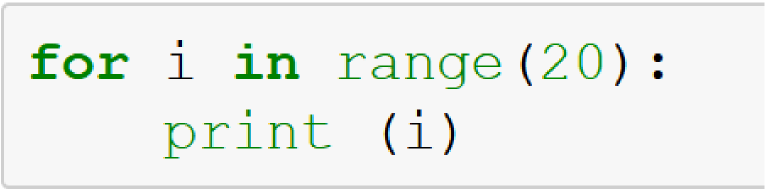
| | |
|---|---|
| SAMSUNG | C, C++, Java, Python, JavaScript |
| Microsoft | C, C++, C#, HTML5/JavaScript |
| Google | C, C++, Java, Python, Go, HTML5/JavaScript |
|  | Objective-C, Swift |
| facebook | PHP, HTML5/JavaScript, Hack |
| **Интернет-стартапы** | Python, Ruby |

# Особенности языка Python



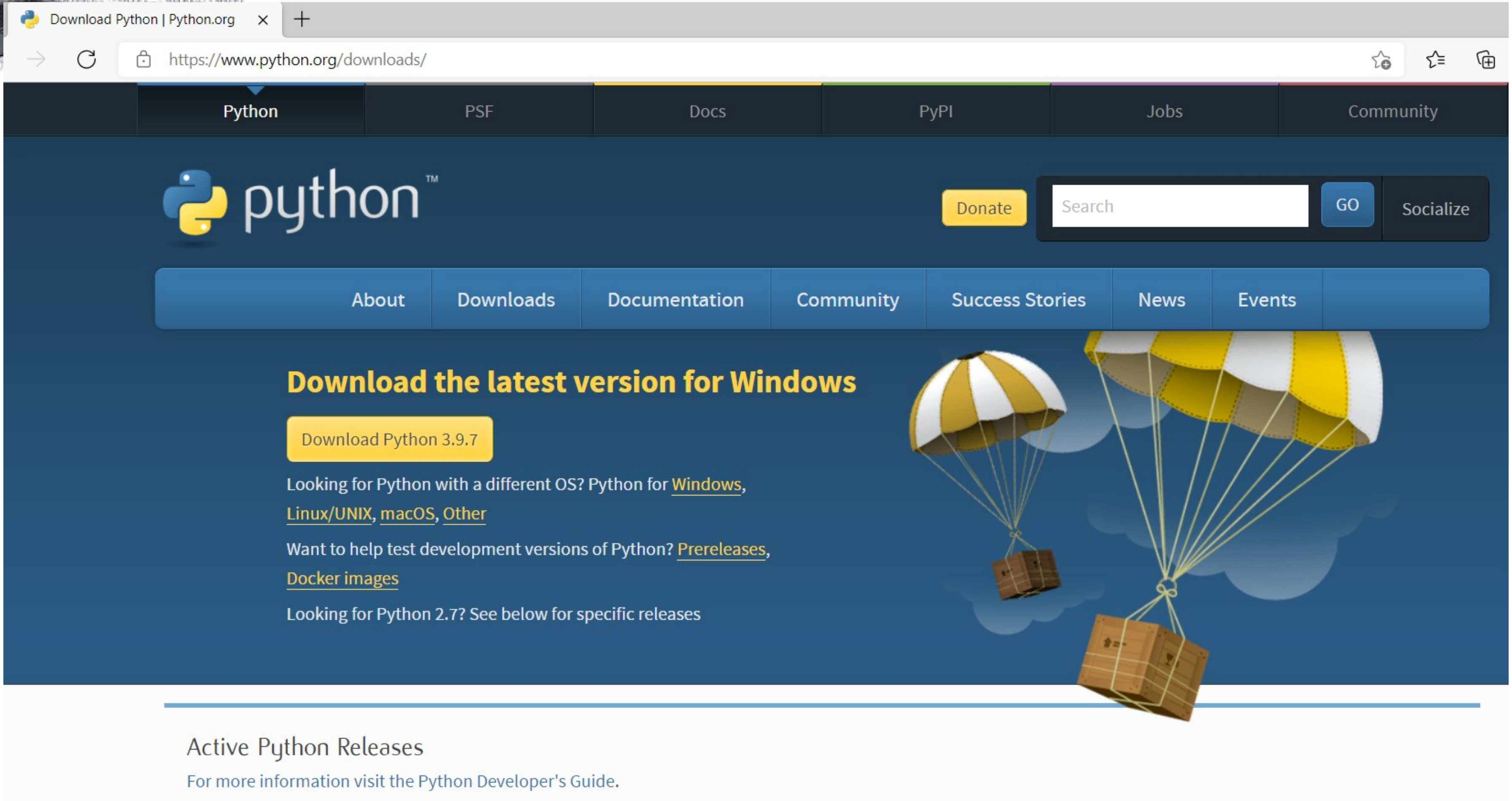
```
In [6]:

for i in range(20):
print (i)

  File "<ipython-input-6-db022ee2e780>",
line 2
    print (i)
        ^

IndentationError: expected an indented b
lock
```





```
for i in range(20):
    print (i)
```

# Установка



## Download the latest version for Windows

Looking for Python with a different OS? Python for Windows, Linux/UNIX, macOS, Other

Want to help test development versions of Python? Prereleases, Docker images

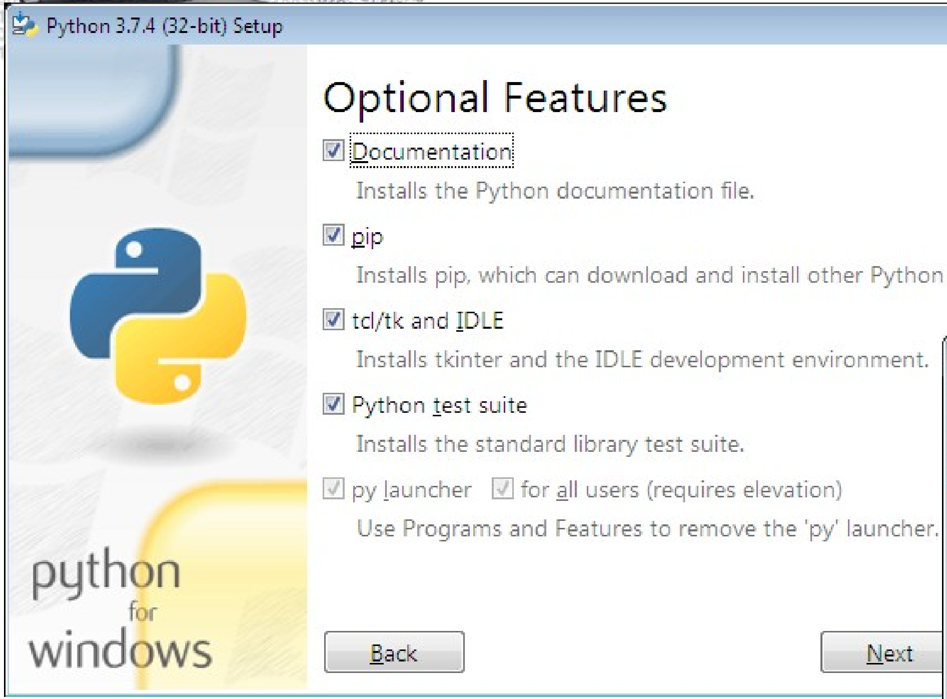
Looking for Python 2.7? See below for specific releases

### Active Python Releases

For more information visit the Python Developer's Guide.

https://www.python.org/downloads/

# Установка(2)



## Optional Features

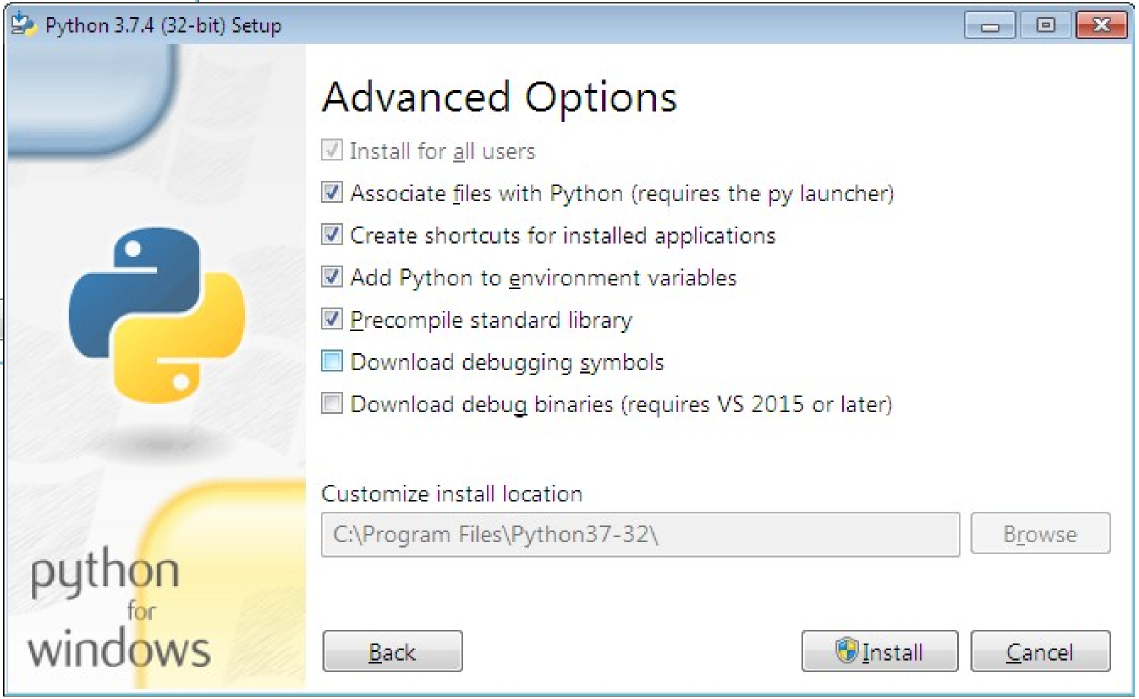
☑ Documentation
Installs the Python documentation file.

☑ pip
Installs pip, which can download and install other Python packages.

☑ tcl/tk and IDLE
Installs tkinter and the IDLE development environment.

☑ Python test suite
Installs the standard library test suite.

☑ py launcher ☑ for all users (requires elevation)
Use Programs and Features to remove the 'py' launcher.



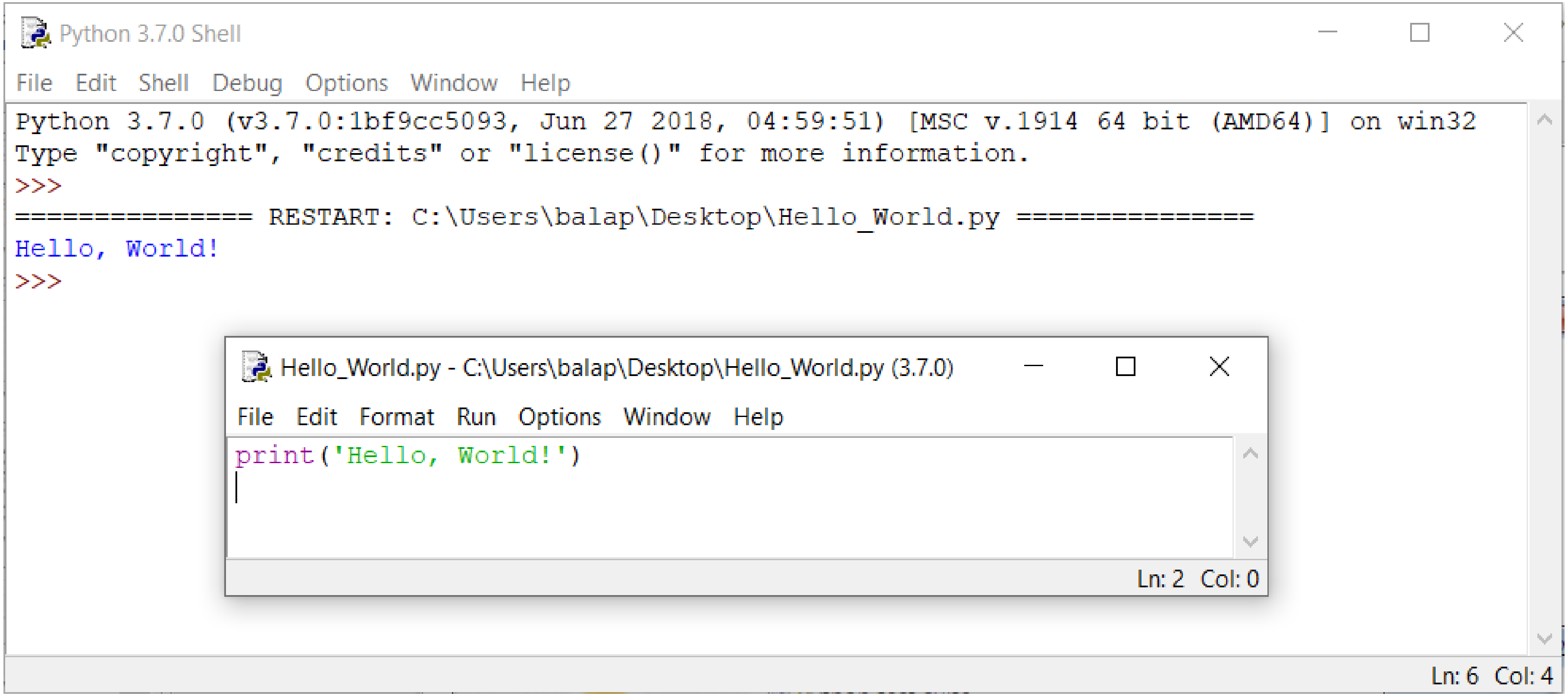
## Advanced Options

☑ Install for all users
☑ Associate files with Python (requires the py launcher)
☑ Create shortcuts for installed applications
☑ Add Python to environment variables
☑ Precompile standard library
□ Download debugging symbols
□ Download debug binaries (requires VS 2015 or later)

Customize install location
C:\Program Files\Python37-32\

Важно установить pip для дальнейшего подключения пакетов/библиотек

# Hello, world!

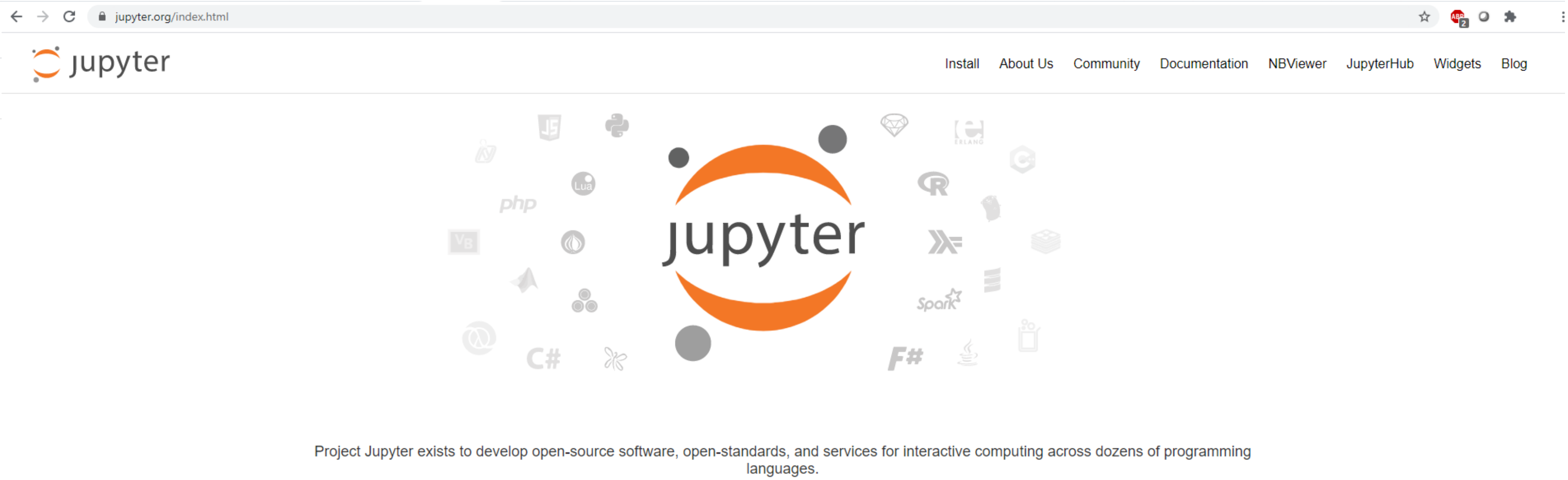


Python 3.7.0 Shell
File Edit Shell Debug Options Window Help
Ln: 6 Col: 4
Hello_World.py - C:\Users\balap\Desktop\Hello_World.py (3.7.0)
File Edit Format Run Options Window Help
Ln: 2 Col: 0

```
Python 3.7.0 (v3.7.0:1bf9cc5093, Jun 27 2018, 04:59:51) [MSC v.1914 64 bit (AMD64)] on win32
Type "copyright", "credits" or "license()" for more information.
>>>
=============== RESTART: C:\Users\balap\Desktop\Hello_World.py ===============
Hello, World!
>>>
```

```
print('Hello, World!')
```

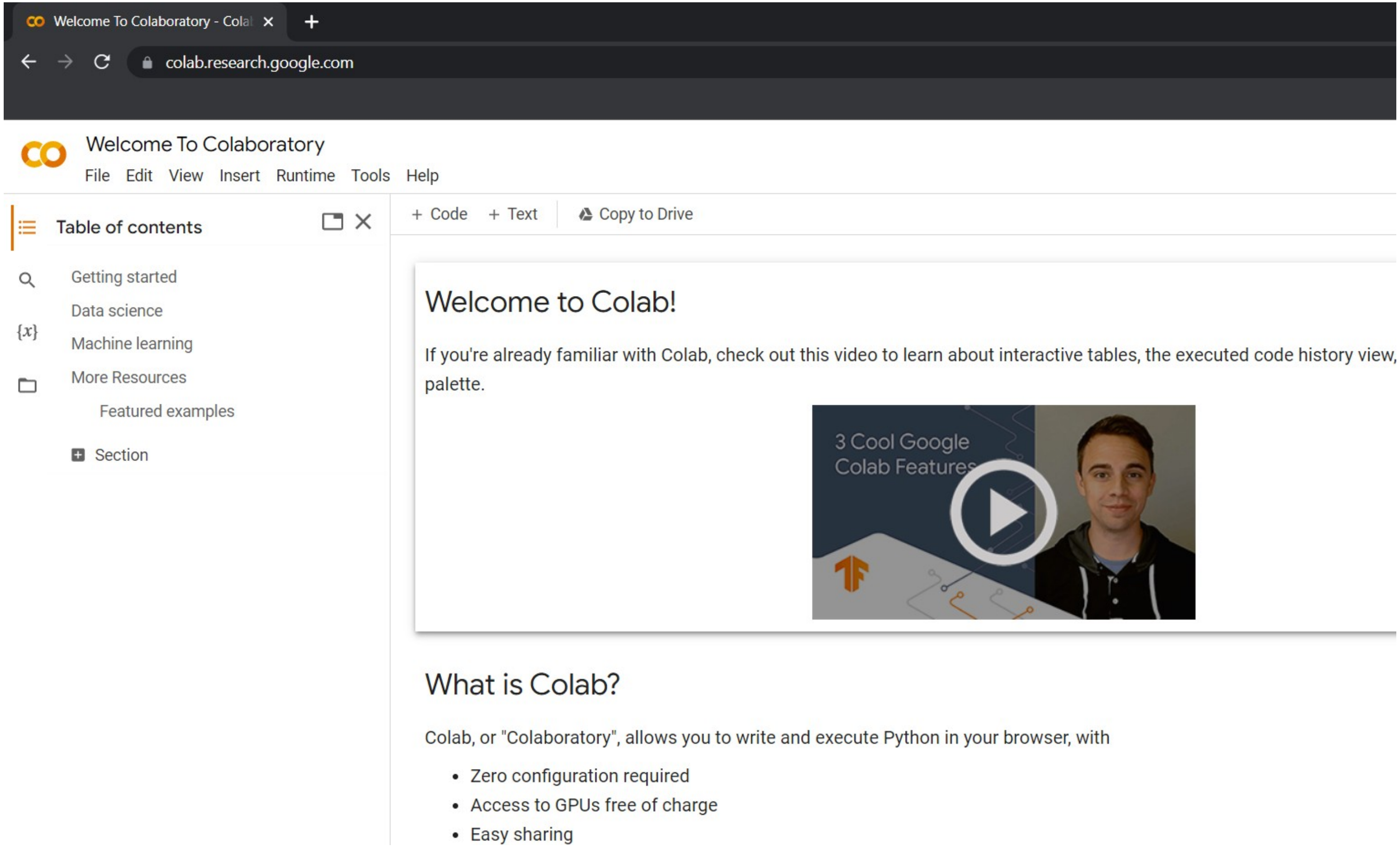
# Environmnet Jupyter



Project Jupyter exists to develop open-source software, open-standards, and services for interactive computing across dozens of programming languages.

# Environmnet Colab

## Онлайн Jupiter для целей ML&DS



Welcome To Colaboratory - Colal ✕ +

colab.research.google.com

Welcome To Colaboratory

File Edit View Insert Runtime Tools Help

Table of contents

- Getting started
- Data science
- Machine learning
- More Resources
  - Featured examples
- Section

+ Code + Text Copy to Drive

### Welcome to Colab!

If you're already familiar with Colab, check out this video to learn about interactive tables, the executed code history view, palette.

### What is Colab?

Colab, or "Colaboratory", allows you to write and execute Python in your browser, with

- Zero configuration required
- Access to GPUs free of charge
- Easy sharing

!pip — для установки библиотек

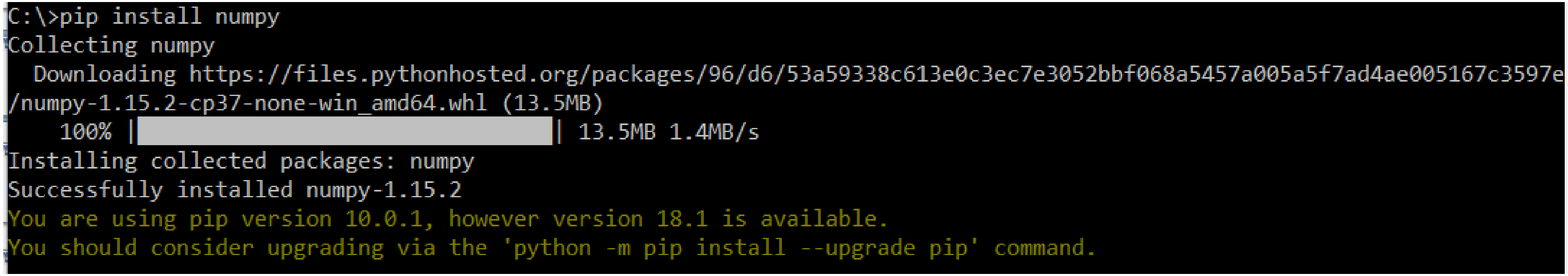
! — при использовании bash-скриптов

# Примеры команд

pip install --upgrade ipython jupyter
pip install jupyterlab

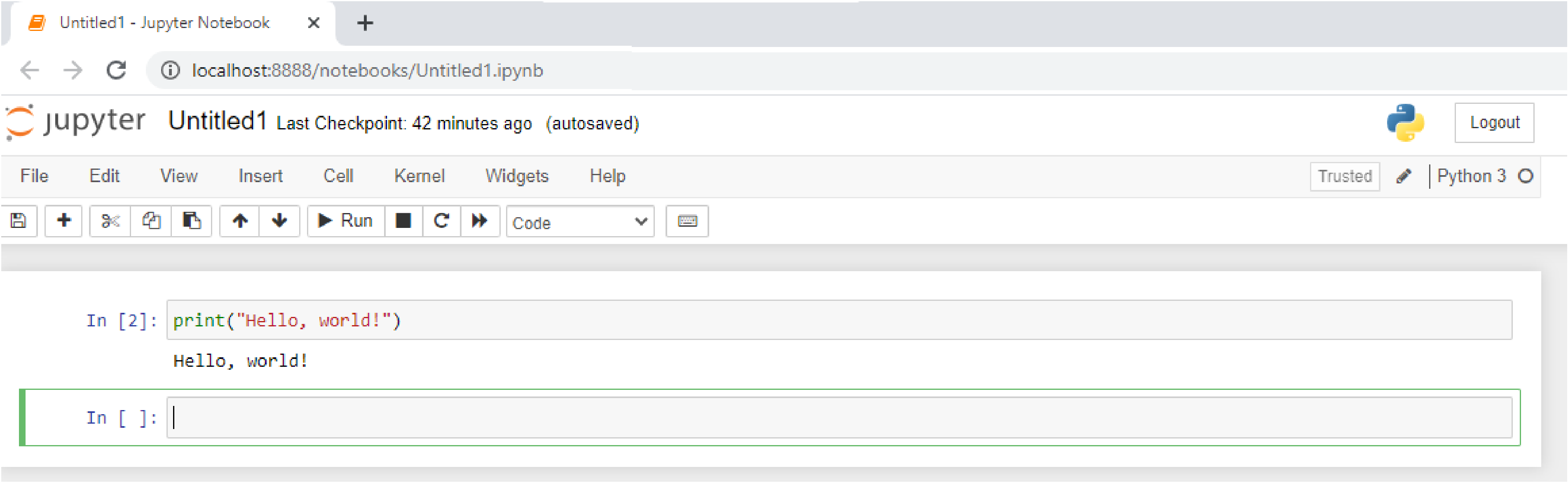
cd C:\Users\<USER_NAME>\AppData\Local\Programs\Python\Python37\Scripts

jupyter-notebook.exe



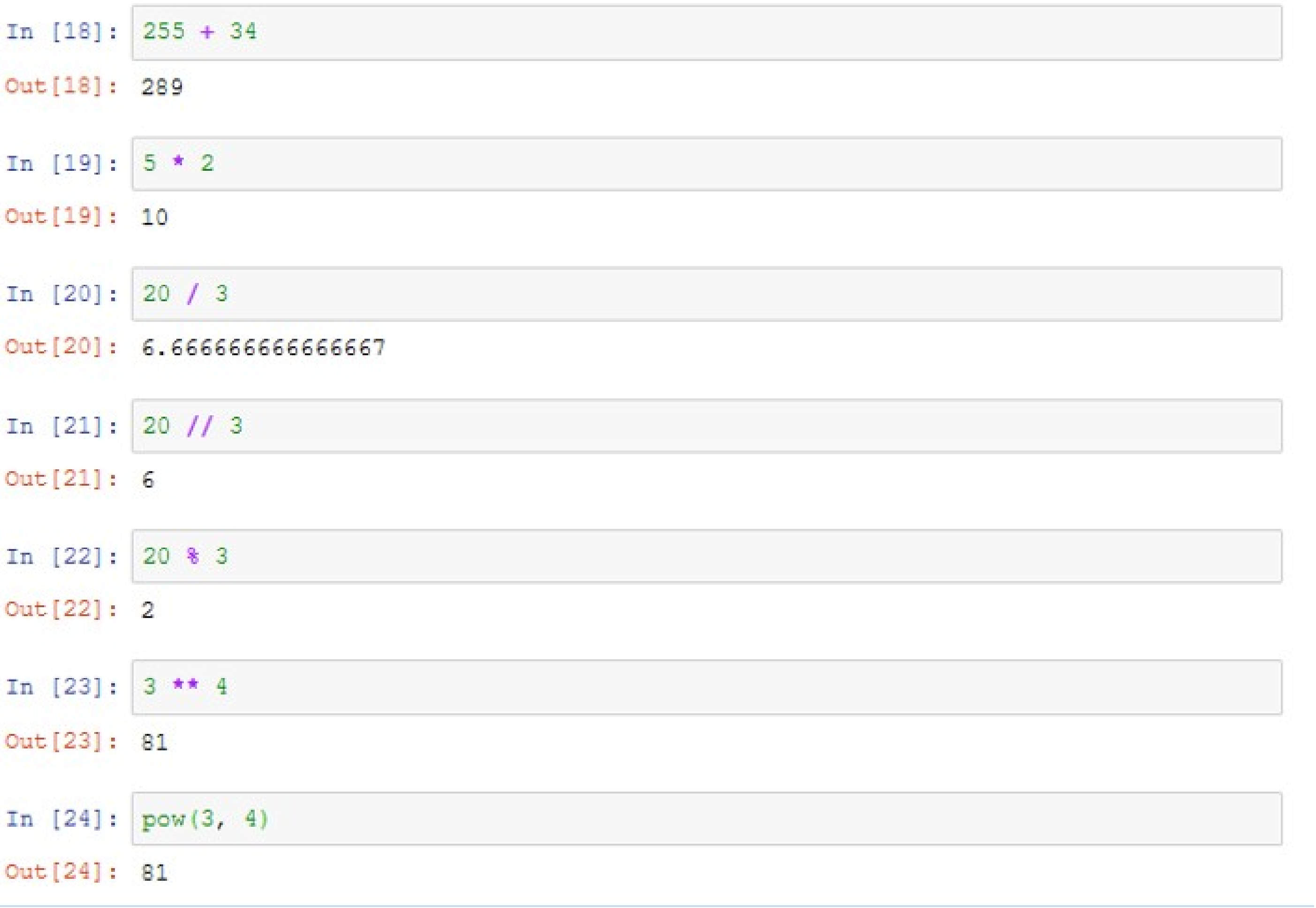
```
C:\>pip install numpy
Collecting numpy
  Downloading https://files.pythonhosted.org/packages/96/d6/53a59338c613e0c3ec7e3052bbf068a5457a005a5f7ad4ae005167c3597e
/numpy-1.15.2-cp37-none-win_amd64.whl (13.5MB)
    100% |████████████████████████████████| 13.5MB 1.4MB/s
Installing collected packages: numpy
Successfully installed numpy-1.15.2
You are using pip version 10.0.1, however version 18.1 is available.
You should consider upgrading via the 'python -m pip install --upgrade pip' command.
```

# Hello, world! (2)


Untitled1 - Jupyter Notebook
localhost:8888/notebooks/Untitled1.ipynb
jupyter
Untitled1 Last Checkpoint: 42 minutes ago (autosaved)
Logout
File
Edit
View
Insert
Cell
Kernel
Widgets
Help
Trusted
Python 3
Run
Code

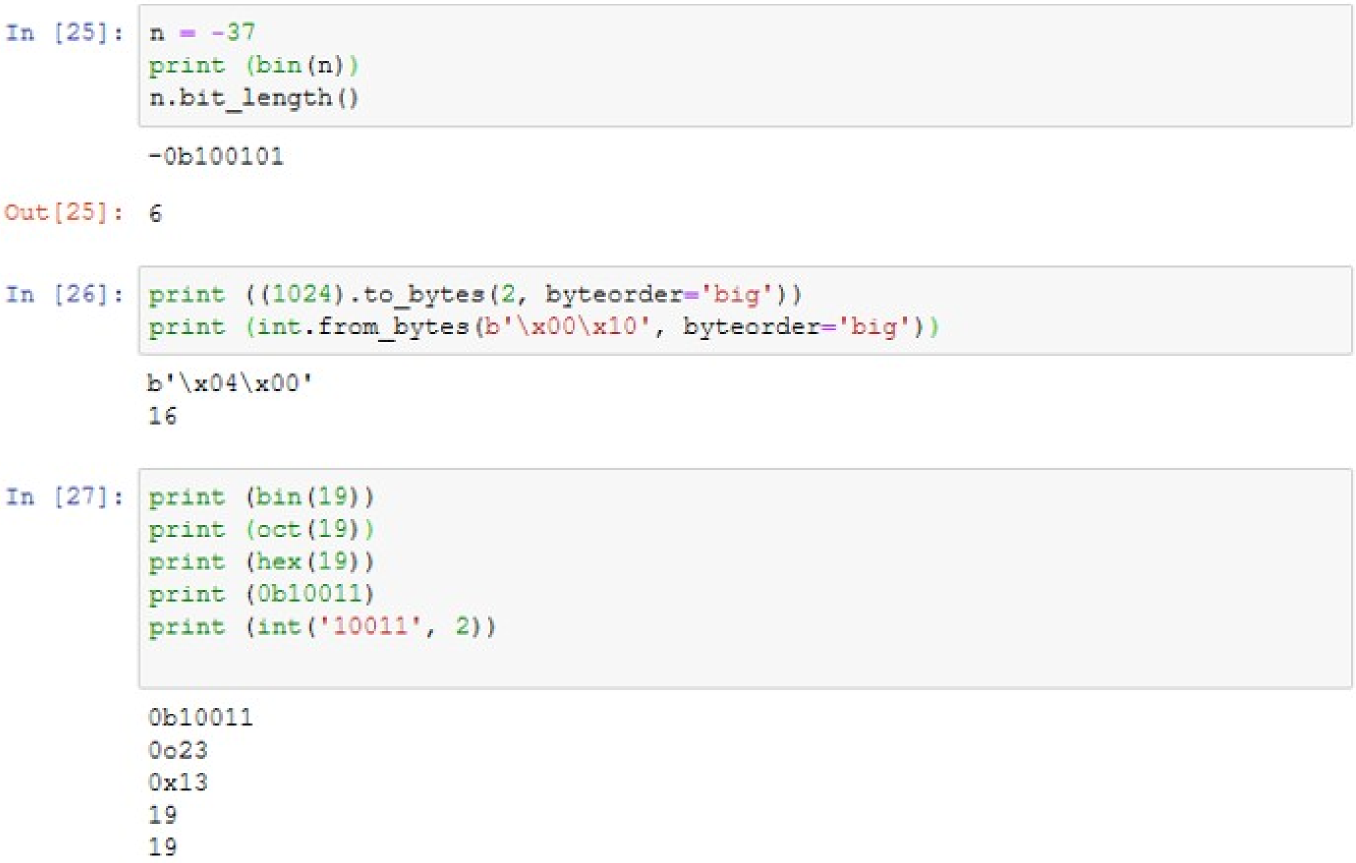
```
In [2]: print("Hello, world!")

        Hello, world!

In [ ]: 
```

# Функции в Python



```
In [18]: 255 + 34
Out[18]: 289

In [19]: 5 * 2
Out[19]: 10

In [20]: 20 / 3
Out[20]: 6.666666666666667

In [21]: 20 // 3
Out[21]: 6

In [22]: 20 % 3
Out[22]: 2

In [23]: 3 ** 4
Out[23]: 81

In [24]: pow(3, 4)
Out[24]: 81
```

# Функции в Python(2)

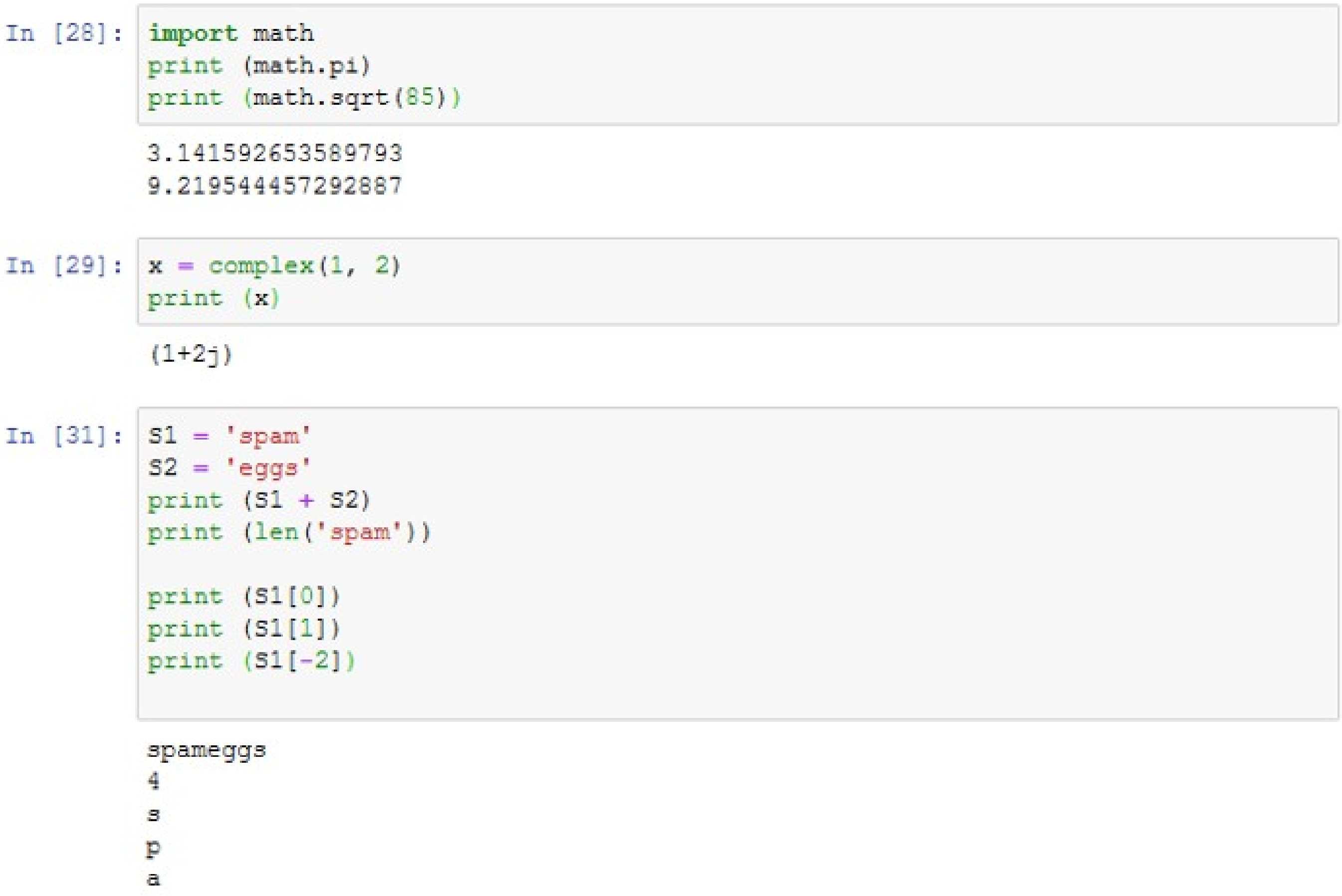


```
In [25]: n = -37
         print (bin(n))
         n.bit_length()

         -0b100101

Out[25]: 6
```

```
In [26]: print ((1024).to_bytes(2, byteorder='big'))
         print (int.from_bytes(b'\x00\x10', byteorder='big'))

         b'\x04\x00'
         16
```

```
In [27]: print (bin(19))
         print (oct(19))
         print (hex(19))
         print (0b10011)
         print (int('10011', 2))

         0b10011
         0o23
         0x13
         19
         19
```

# Функции в Python(3)



```
In [28]: import math
         print (math.pi)
         print (math.sqrt(85))
```

```
3.141592653589793
9.219544457292887
```

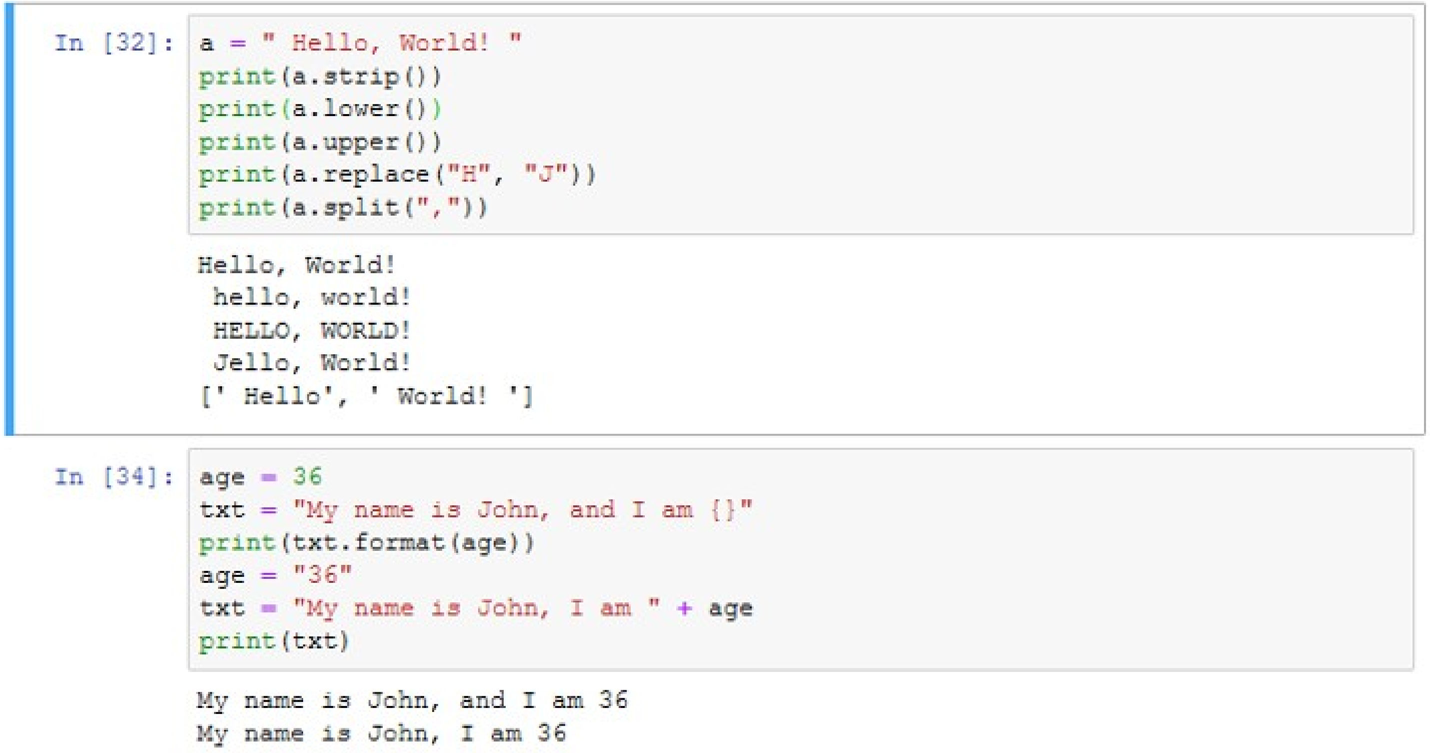
```
In [29]: x = complex(1, 2)
         print (x)
```

```
(1+2j)
```

```
In [31]: S1 = 'spam'
         S2 = 'eggs'
         print (S1 + S2)
         print (len('spam'))

         print (S1[0])
         print (S1[1])
         print (S1[-2])
```

```
spameggs
4
s
p
a
```

# Функции в Python(4)



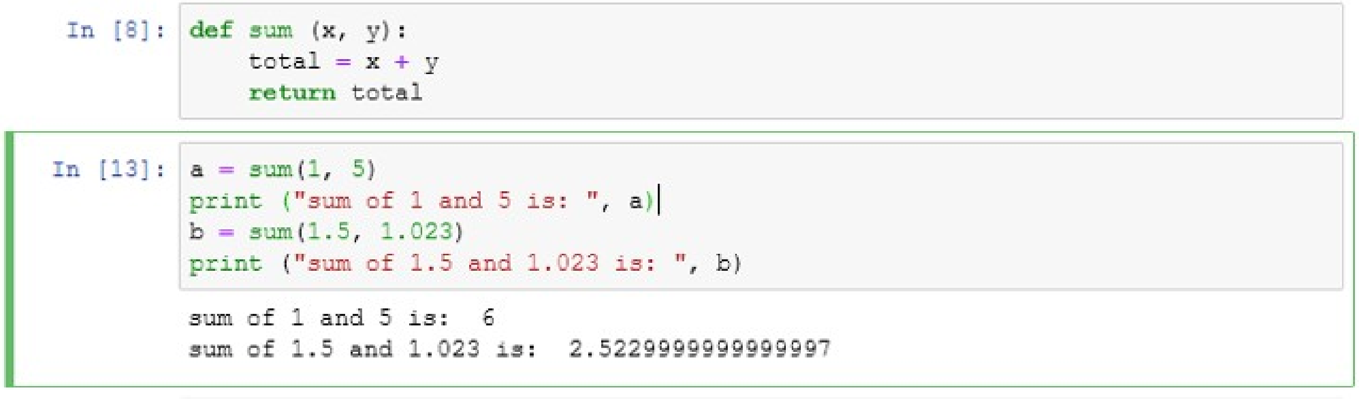
```
In [32]: a = " Hello, World! "
         print(a.strip())
         print(a.lower())
         print(a.upper())
         print(a.replace("H", "J"))
         print(a.split(","))
```

```
Hello, World!
 hello, world! 
 HELLO, WORLD! 
 Jello, World! 
[' Hello', ' World! ']
```

```
In [34]: age = 36
         txt = "My name is John, and I am {}"
         print(txt.format(age))
         age = "36"
         txt = "My name is John, I am " + age
         print(txt)
```

```
My name is John, and I am 36
My name is John, I am 36
```

# Функции в Python(5)

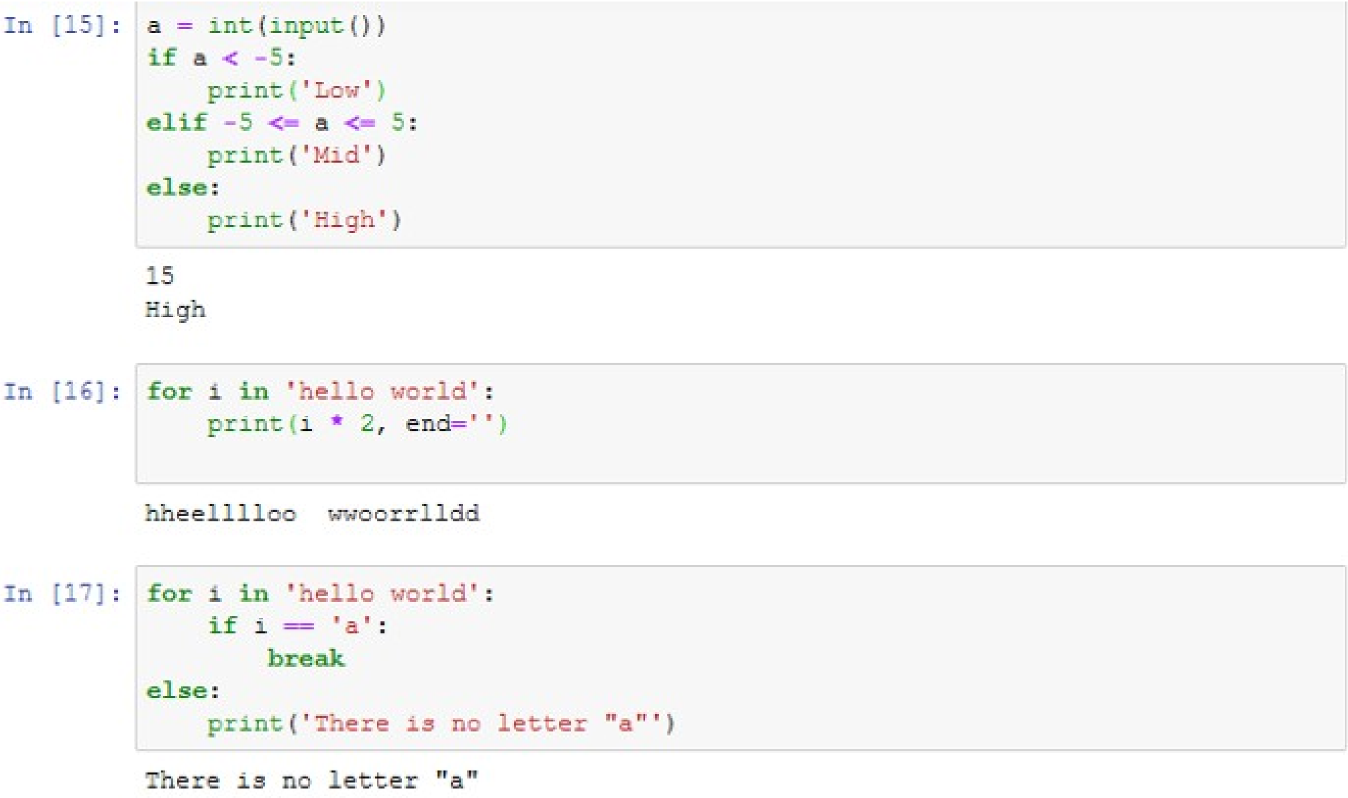


```
In [8]: def sum (x, y):
            total = x + y
            return total
```

```
In [13]: a = sum(1, 5)
         print ("sum of 1 and 5 is: ", a)
         b = sum(1.5, 1.023)
         print ("sum of 1.5 and 1.023 is: ", b)
```

```
sum of 1 and 5 is:  6
sum of 1.5 and 1.023 is:  2.5229999999999997
```

# Функции в Python(6)

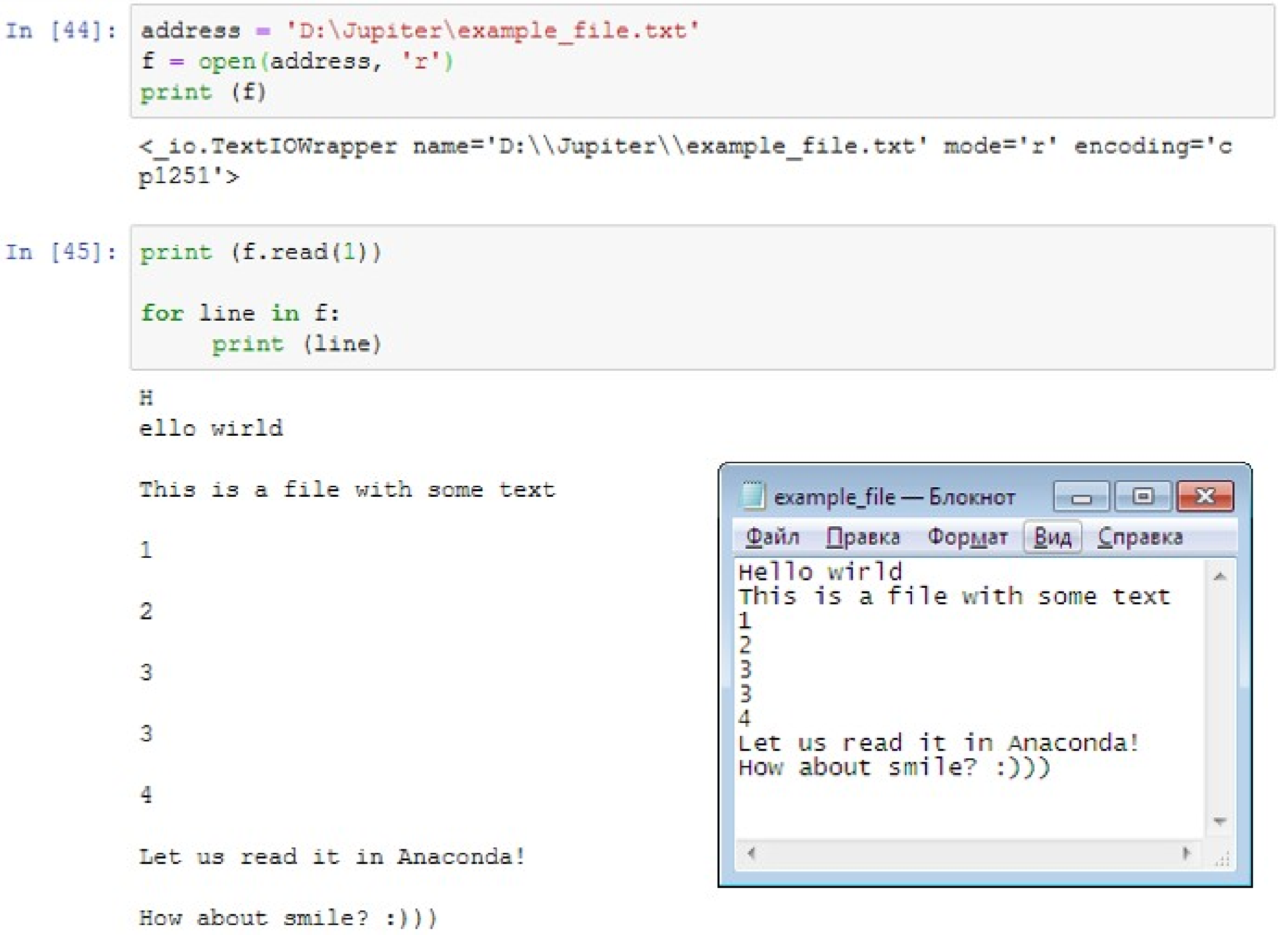


```
In [15]: a = int(input())
         if a < -5:
             print('Low')
         elif -5 <= a <= 5:
             print('Mid')
         else:
             print('High')

         15
         High
```

```
In [16]: for i in 'hello world':
             print(i * 2, end='')

         hheelllloo  wwoorrlldd
```

```
In [17]: for i in 'hello world':
             if i == 'a':
                 break
         else:
             print('There is no letter "a"')

         There is no letter "a"
```

# Работа с файлами в Python



```
In [44]: address = 'D:\Jupiter\example_file.txt'
         f = open(address, 'r')
         print (f)
```

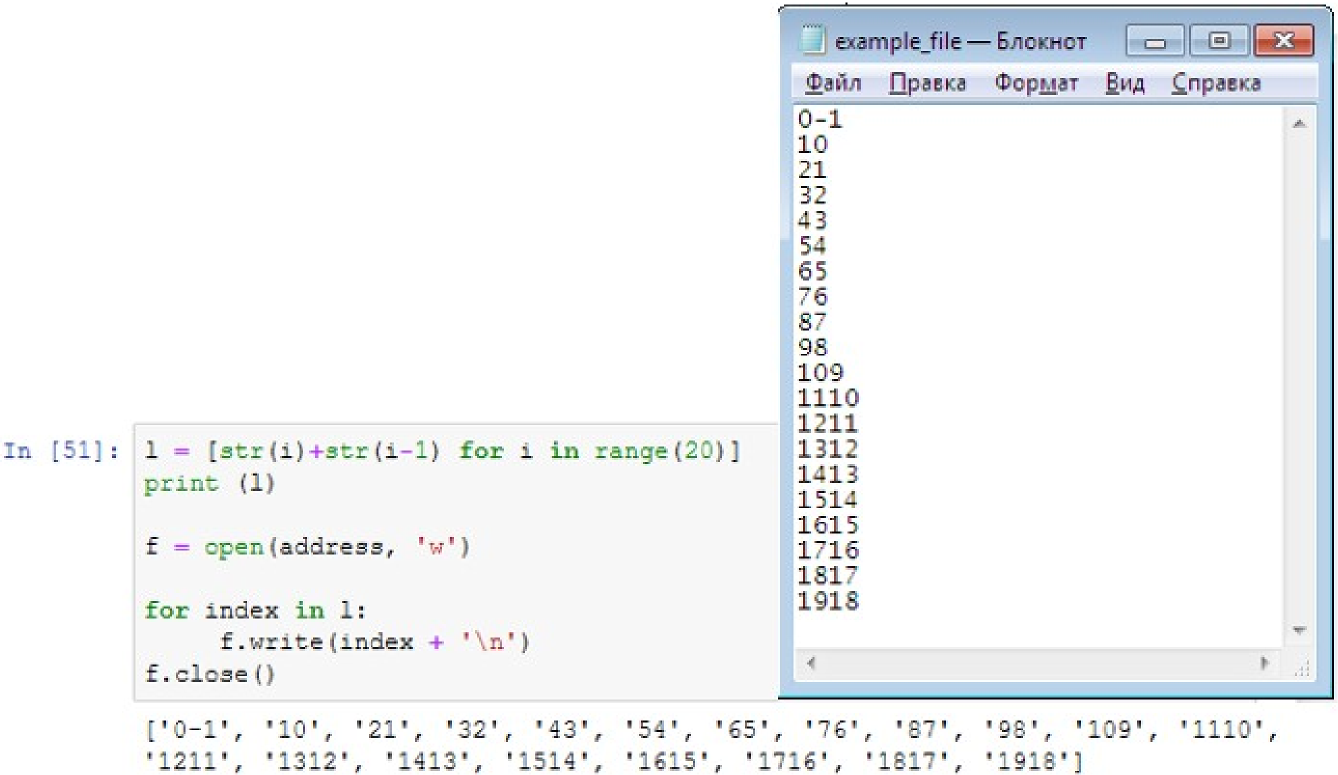
```
<_io.TextIOWrapper name='D:\\Jupiter\\example_file.txt' mode='r' encoding='c
p1251'>
```

```
In [45]: print (f.read(1))

         for line in f:
             print (line)
```

```
H
ello wirld

This is a file with some text

1

2

3

3

4

Let us read it in Anaconda!

How about smile? :)))
```

```
Hello wirld
This is a file with some text
1
2
3
3
4
Let us read it in Anaconda!
How about smile? :)))
```

# Работа с файлами в Python(2)

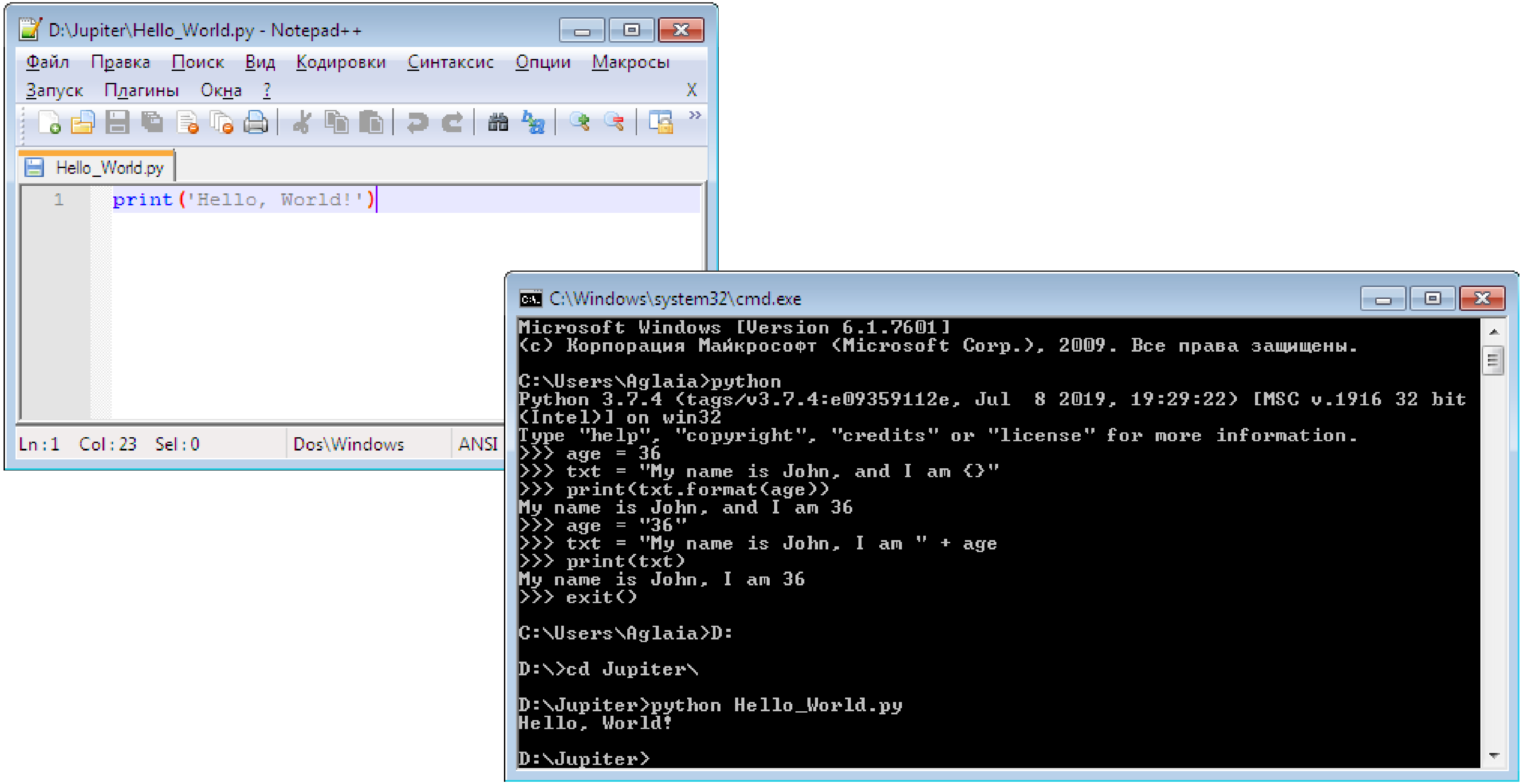


```
0-1
10
21
32
43
54
65
76
87
98
109
1110
1211
1312
1413
1514
1615
1716
1817
1918
```

```
In [51]: l = [str(i)+str(i-1) for i in range(20)]
         print (l)

         f = open(address, 'w')

         for index in l:
              f.write(index + '\n')
         f.close()
```

```
['0-1', '10', '21', '32', '43', '54', '65', '76', '87', '98', '109', '1110',
'1211', '1312', '1413', '1514', '1615', '1716', '1817', '1918']
```

# Запуск из командной строки



D:\Jupiter\Hello_World.py - Notepad++
Файл Правка Поиск Вид Кодировки Синтаксис Опции Макросы
Запуск Плагины Окна ?
Hello_World.py
Ln : 1 Col : 23 Sel : 0
Dos\Windows
ANSI
C:\Windows\system32\cmd.exe

```python
print('Hello, World!')
```

```
Microsoft Windows [Version 6.1.7601]
(c) Корпорация Майкрософт (Microsoft Corp.), 2009. Все права защищены.

C:\Users\Aglaia>python
Python 3.7.4 (tags/v3.7.4:e09359112e, Jul  8 2019, 19:29:22) [MSC v.1916 32 bit
(Intel)] on win32
Type "help", "copyright", "credits" or "license" for more information.
>>> age = 36
>>> txt = "My name is John, and I am {}"
>>> print(txt.format(age))
My name is John, and I am 36
>>> age = "36"
>>> txt = "My name is John, I am " + age
>>> print(txt)
My name is John, I am 36
>>> exit()

C:\Users\Aglaia>D:

D:\>cd Jupiter\

D:\Jupiter>python Hello_World.py
Hello, World!

D:\Jupiter>
```

# Полезные функции для работы со строками

| | | | |
|---|---|---|---|
| capitalize() | Converts the first character to upper case | ljust() | Returns a left justified version of the string |
| casefold() | Converts string into lower case | lower() | Converts a string into lower case |
| center() | Returns a centered string | lstrip() | Returns a left trim version of the string |
| count() | Returns the number of times a specified value occurs in a string | maketrans() | Returns a translation table to be used in translations |
| encode() | Returns an encoded version of the string | partition() | Returns a tuple where the string is parted into three parts |
| endswith() | Returns true if the string ends with the specified value | replace() | Returns a string where a specified value is replaced with a specified value |
| expandtabs() | Sets the tab size of the string | rfind() | Searches the string for a specified value and returns the last position of where it was found |
| find() | Searches the string for a specified value and returns the position of where it was found | rindex() | Searches the string for a specified value and returns the last position of where it was found |
| format() | Formats specified values in a string | rjust() | Returns a right justified version of the string |
| format_map() | Formats specified values in a string | rpartition() | Returns a tuple where the string is parted into three parts |
| index() | Searches the string for a specified value and returns the position of where it was found | rsplit() | Splits the string at the specified separator, and returns a list |
| isalnum() | Returns True if all characters in the string are alphanumeric | rstrip() | Returns a right trim version of the string |
| isalpha() | Returns True if all characters in the string are in the alphabet | split() | Splits the string at the specified separator, and returns a list |
| isdecimal() | Returns True if all characters in the string are decimals | splitlines() | Splits the string at line breaks and returns a list |

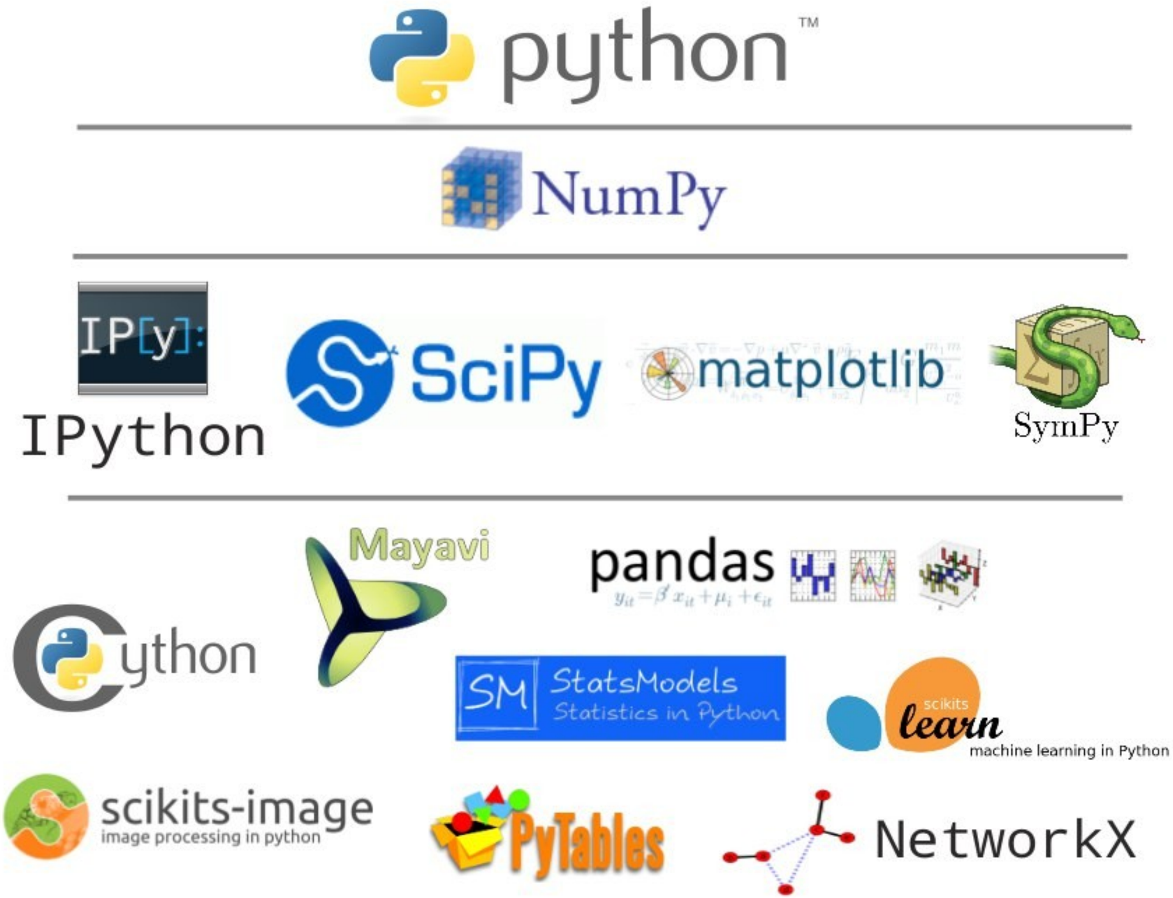
# Полезные функции для работы со строками(2)

| | | | |
|---|---|---|---|
| isdigit() | Returns True if all characters in the string are digits | startswith() | Returns true if the string starts with the specified value |
| isidentifier() | Returns True if the string is an identifier | strip() | Returns a trimmed version of the string |
| islower() | Returns True if all characters in the string are lower case | swapcase() | Swaps cases, lower case becomes upper case and vice versa |
| isnumeric() | Returns True if all characters in the string are numeric | title() | Converts the first character of each word to upper case |
| isprintable() | Returns True if all characters in the string are printable | translate() | Returns a translated string |
| isspace() | Returns True if all characters in the string are whitespaces | upper() | Converts a string into upper case |
| istitle() | Returns True if the string follows the rules of a title | zfill() | Fills the string with a specified number of 0 values at the beginning |
| isupper() | Returns True if all characters in the string are upper case | ljust() | Returns a left justified version of the string |
| join() | Joins the elements of an iterable to the end of the string | lower() | Converts a string into lower case |
| capitalize() | Converts the first character to upper case | lstrip() | Returns a left trim version of the string |
| casefold() | Converts string into lower case | maketrans() | Returns a translation table to be used in translations |
| center() | Returns a centered string | partition() | Returns a tuple where the string is parted into three parts |
| count() | Returns the number of times a specified value occurs in a string | replace() | Returns a string where a specified value is replaced with a specified value |
| encode() | Returns an encoded version of the string | rfind() | Searches the string for a specified value and returns the last position of where it was found |
| endswith() | Returns true if the string ends with the specified value | rindex() | Searches the string for a specified value and returns the last position of where it was found |

# Полезные функции для работы со строками(3)

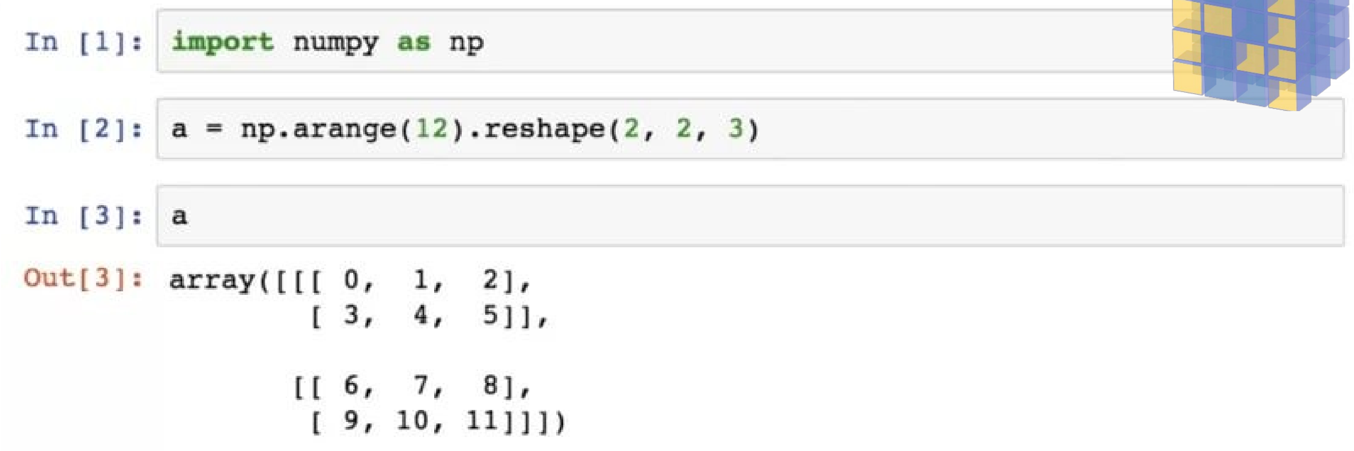
| | | | |
|---|---|---|---|
| expandtabs() | Sets the tab size of the string | rjust() | Returns a right justified version of the string |
| find() | Searches the string for a specified value and returns the position of where it was found | rpartition() | Returns a tuple where the string is parted into three parts |
| format() | Formats specified values in a string | rsplit() | Splits the string at the specified separator, and returns a list |
| format_map() | Formats specified values in a string | rstrip() | Returns a right trim version of the string |
| index() | Searches the string for a specified value and returns the position of where it was found | split() | Splits the string at the specified separator, and returns a list |

# Дополнительные библиотеки и пакеты



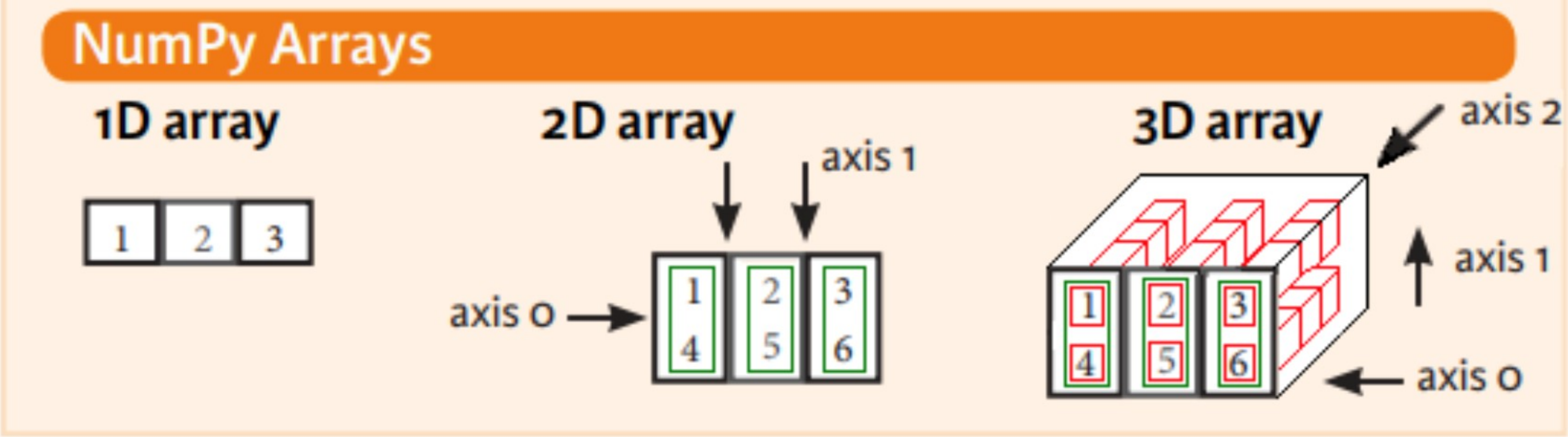
По материалам Жумагулова Я.В.

# Дополнительные библиотеки и пакеты(2)



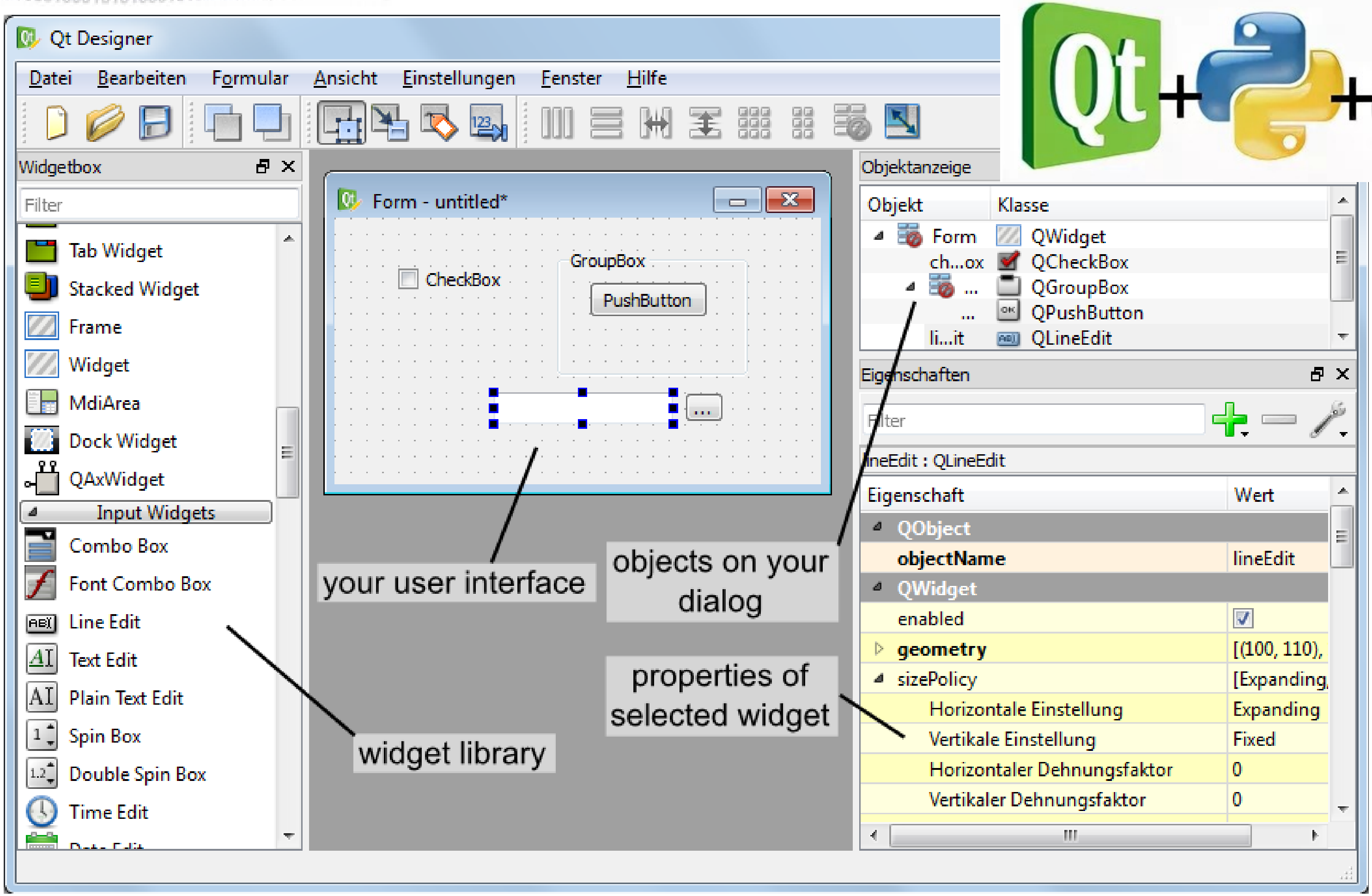
```
In [1]: import numpy as np

In [2]: a = np.arange(12).reshape(2, 2, 3)

In [3]: a

Out[3]: array([[[ 0,  1,  2],
                [ 3,  4,  5]],

               [[ 6,  7,  8],
                [ 9, 10, 11]]])
```

NumPy



# Дополнительные библиотеки и пакеты(3)

Qt + Python + = PySide
Python for Qt



| Objekt | Klasse |
|---|---|
| Form | QWidget |
| ch...ox | QCheckBox |
| ... | QGroupBox |
| ... | QPushButton |
| li...it | QLineEdit |

| Eigenschaft | Wert |
|---|---|
| QObject | |
| objectName | lineEdit |
| QWidget | |
| enabled | ☑ |
| geometry | [(100, 110), |
| sizePolicy | [Expanding, |
| Horizontale Einstellung | Expanding |
| Vertikale Einstellung | Fixed |
| Horizontaler Dehnungsfaktor | 0 |
| Vertikaler Dehnungsfaktor | 0 |

your user interface

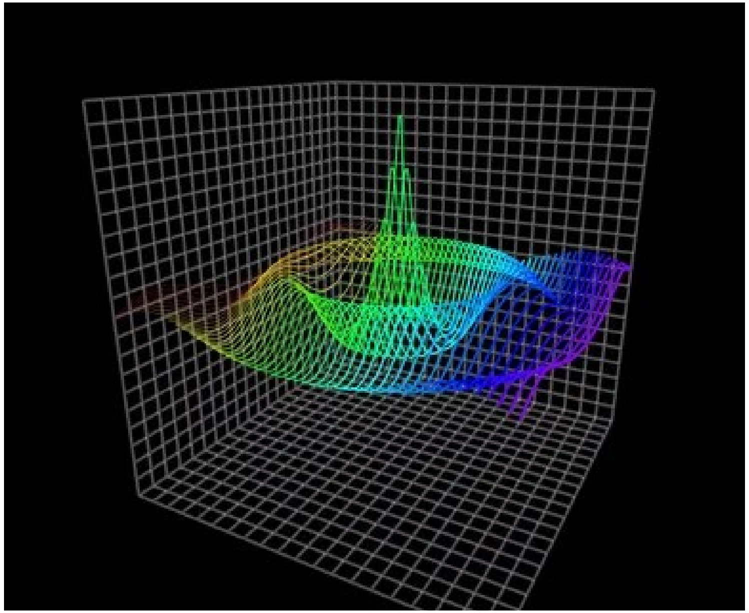
objects on your dialog

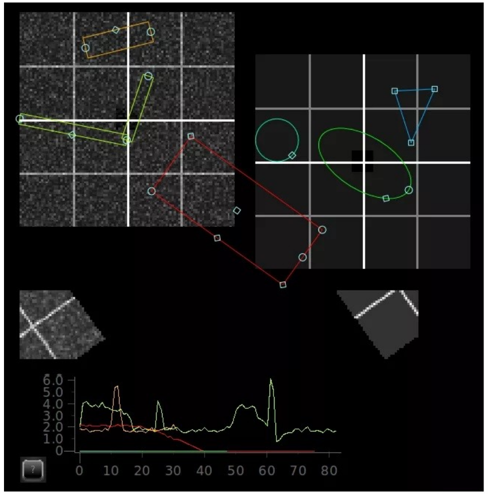
properties of selected widget

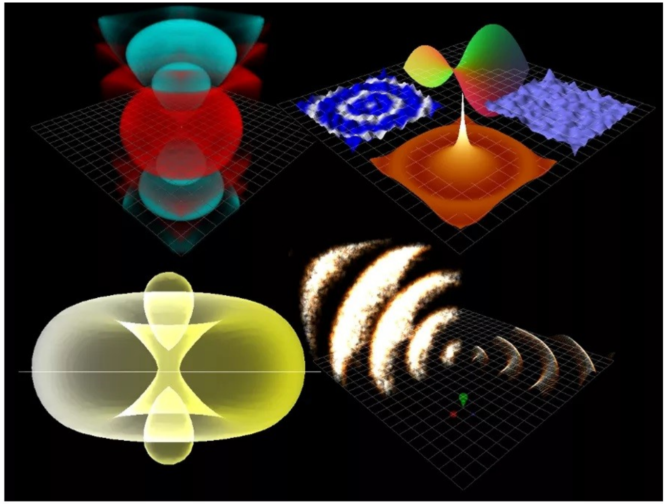
widget library

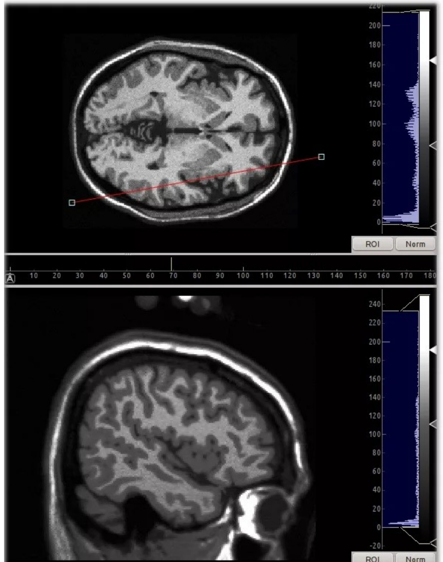
# Дополнительные библиотеки и пакеты(4)

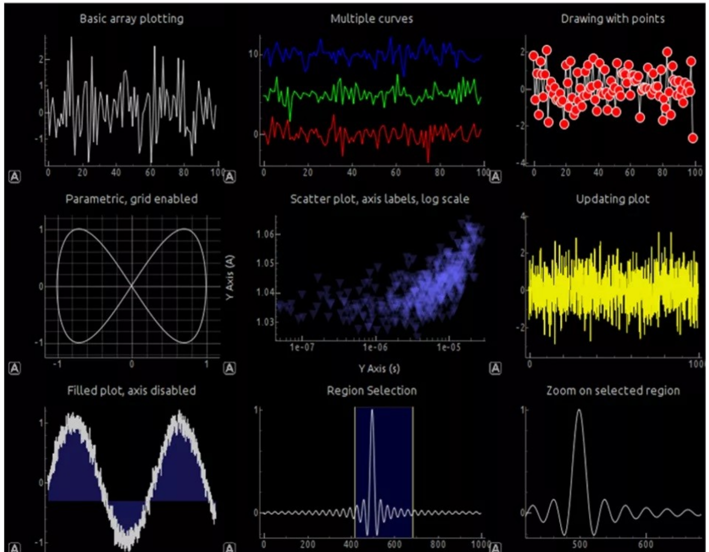
Pyqtgraph











# Полезные ссылки (2)

https://ru.wikiversity.org/wiki/Программирование_и_научные_вычисления_на_языке_Python

https://realpython.com/ - Простые примеры

https://habr.com/post/352678/ - Установка и использование NumPy

https://www.lfd.uci.edu/~gohlke/pythonlibs/ - Набор готовых библиотек

https://tproger.ru/translations/jupyter-notebook-python-3/ - Командная оболочка Jupyter для интерактивных вычислений

https://www.jetbrains.com/pycharm/ - Интегрированная среда разработки

https://books.ifmo.ru/file/pdf/2256.pdf - Методическое пособие Лямина А.В.

# Определение

**Регулярные выражения (regular expressions)** — последовательность символов, определяющая шаблон для поиска в строках.

Их поддерживают языки Python, Perl, R, C++, Java.

https://regex101.com/

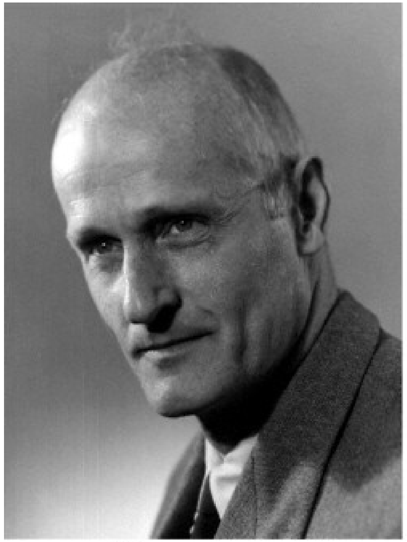
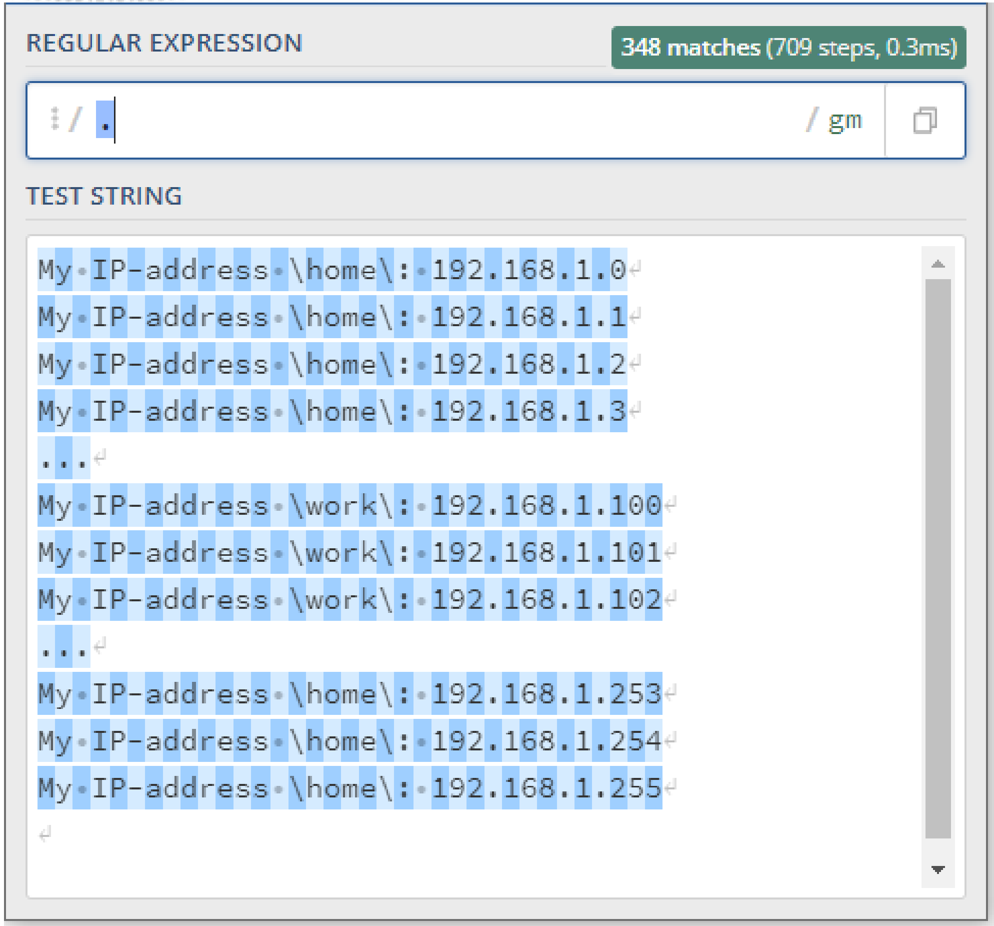


Photo by Harold N. Hone, Madison, Wisconsin

Stephen C. Kleene

Stephen Cole Kleene
(1909-1994)

# Примеры регулярных выражений



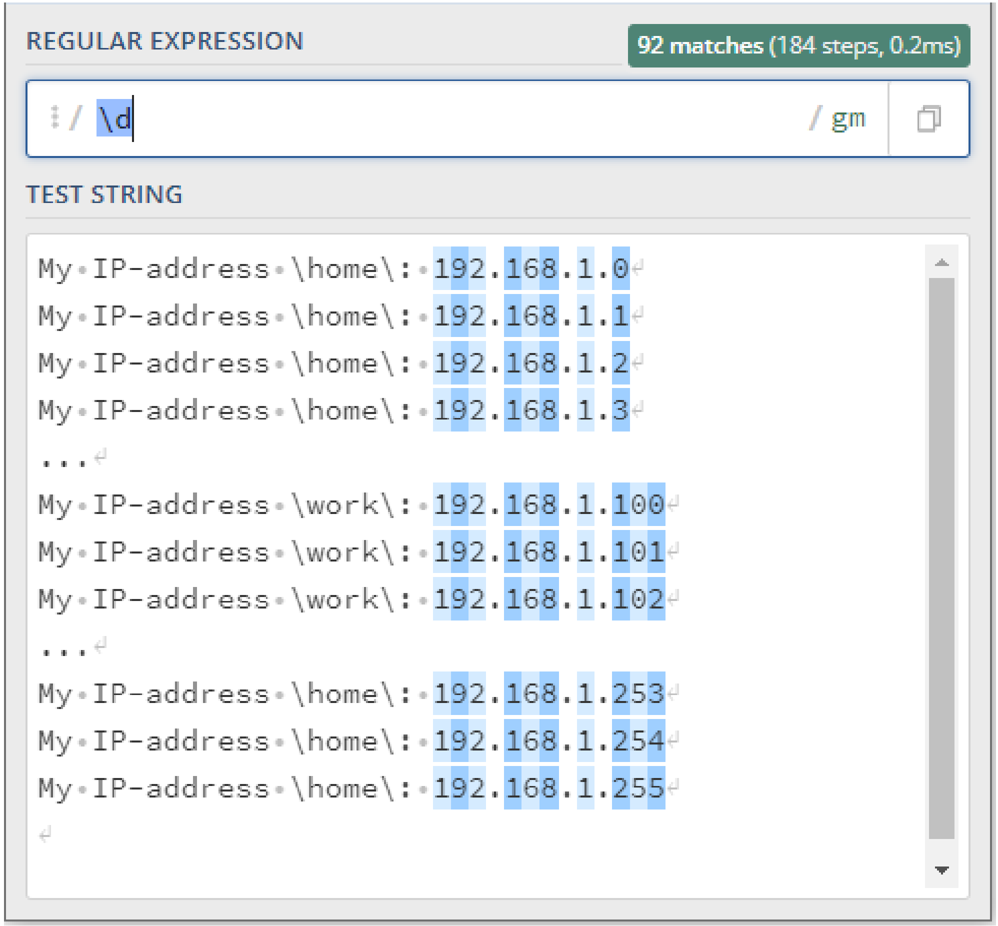
REGULAR EXPRESSION

348 matches (709 steps, 0.3ms)

```
/ . / gm
```

TEST STRING

```
My IP-address \home\: 192.168.1.0
My IP-address \home\: 192.168.1.1
My IP-address \home\: 192.168.1.2
My IP-address \home\: 192.168.1.3
...
My IP-address \work\: 192.168.1.100
My IP-address \work\: 192.168.1.101
My IP-address \work\: 192.168.1.102
...
My IP-address \home\: 192.168.1.253
My IP-address \home\: 192.168.1.254
My IP-address \home\: 192.168.1.255
```



REGULAR EXPRESSION

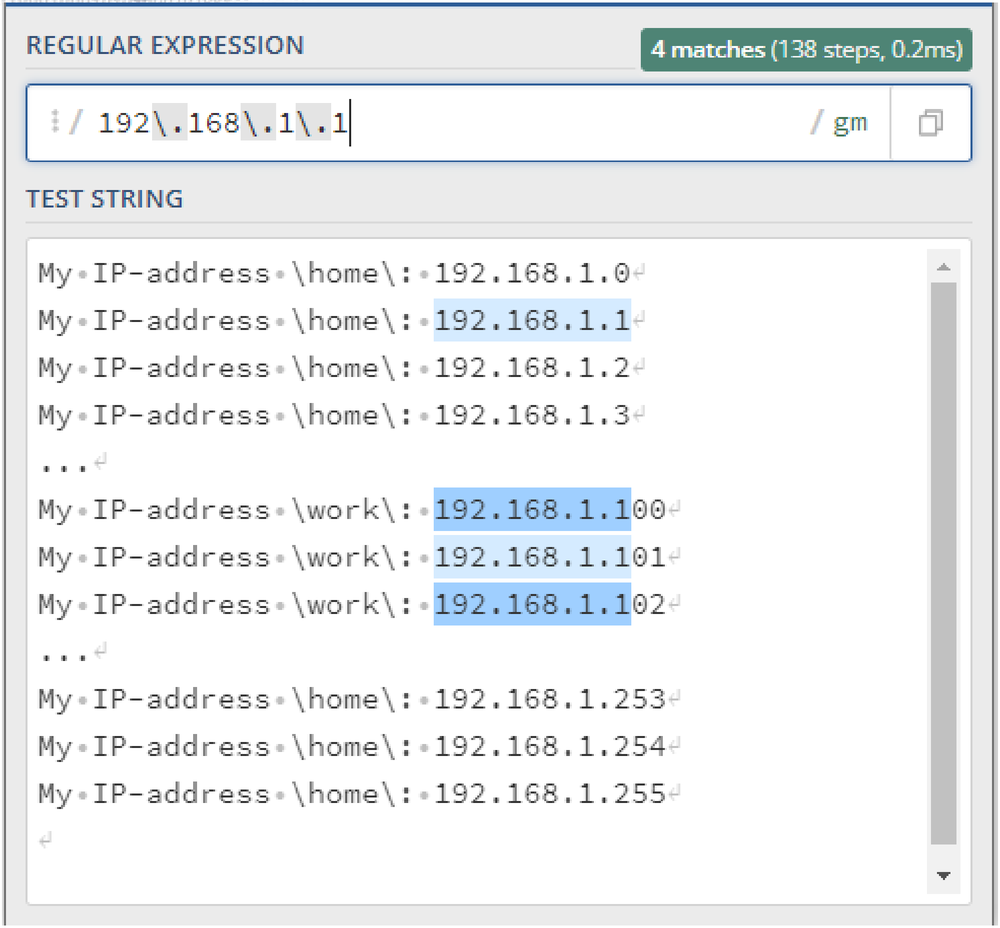
92 matches (184 steps, 0.2ms)

```
/ \d / gm
```

TEST STRING

```
My IP-address \home\: 192.168.1.0
My IP-address \home\: 192.168.1.1
My IP-address \home\: 192.168.1.2
My IP-address \home\: 192.168.1.3
...
My IP-address \work\: 192.168.1.100
My IP-address \work\: 192.168.1.101
My IP-address \work\: 192.168.1.102
...
My IP-address \home\: 192.168.1.253
My IP-address \home\: 192.168.1.254
My IP-address \home\: 192.168.1.255
```

# Примеры регулярных выражений



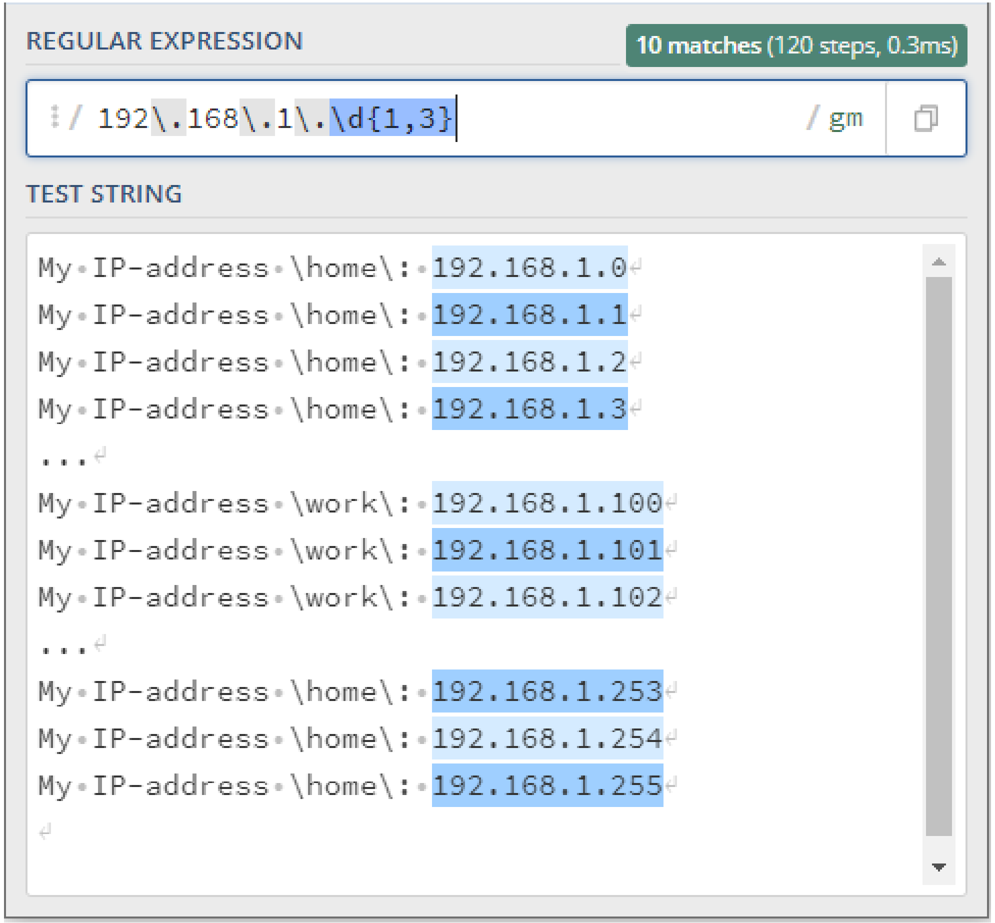
REGULAR EXPRESSION

4 matches (138 steps, 0.2ms)

```
/ 192\.168\.1\.1 / gm
```

TEST STRING

```
My IP-address \home\: 192.168.1.0
My IP-address \home\: 192.168.1.1
My IP-address \home\: 192.168.1.2
My IP-address \home\: 192.168.1.3
...
My IP-address \work\: 192.168.1.100
My IP-address \work\: 192.168.1.101
My IP-address \work\: 192.168.1.102
...
My IP-address \home\: 192.168.1.253
My IP-address \home\: 192.168.1.254
My IP-address \home\: 192.168.1.255
```



REGULAR EXPRESSION

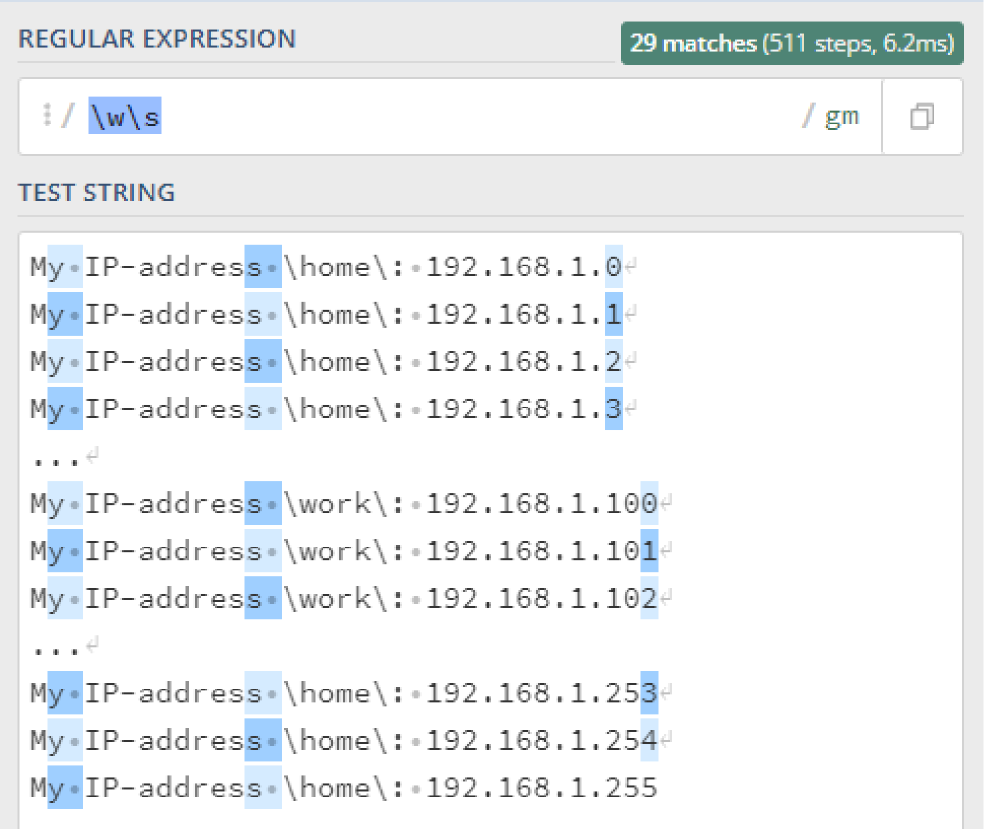
10 matches (120 steps, 0.3ms)

```
/ 192\.168\.1\.\d{1,3} / gm
```

TEST STRING

```
My IP-address \home\: 192.168.1.0
My IP-address \home\: 192.168.1.1
My IP-address \home\: 192.168.1.2
My IP-address \home\: 192.168.1.3
...
My IP-address \work\: 192.168.1.100
My IP-address \work\: 192.168.1.101
My IP-address \work\: 192.168.1.102
...
My IP-address \home\: 192.168.1.253
My IP-address \home\: 192.168.1.254
My IP-address \home\: 192.168.1.255
```

# Примеры регулярных выражений



REGULAR EXPRESSION

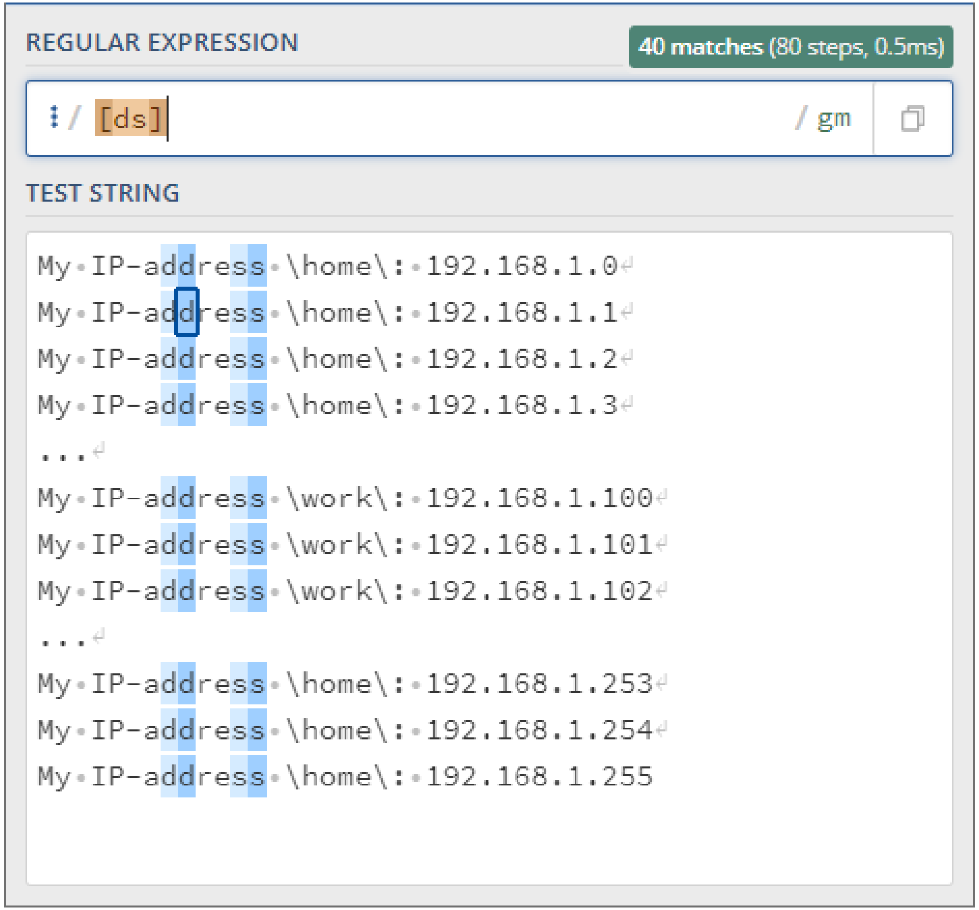
29 matches (511 steps, 6.2ms)

```
/ \w\s / gm
```

TEST STRING

```
My IP-address \home\: 192.168.1.0
My IP-address \home\: 192.168.1.1
My IP-address \home\: 192.168.1.2
My IP-address \home\: 192.168.1.3
...
My IP-address \work\: 192.168.1.100
My IP-address \work\: 192.168.1.101
My IP-address \work\: 192.168.1.102
...
My IP-address \home\: 192.168.1.253
My IP-address \home\: 192.168.1.254
My IP-address \home\: 192.168.1.255
```

Буквенный/цифровой + пробельный символ



REGULAR EXPRESSION

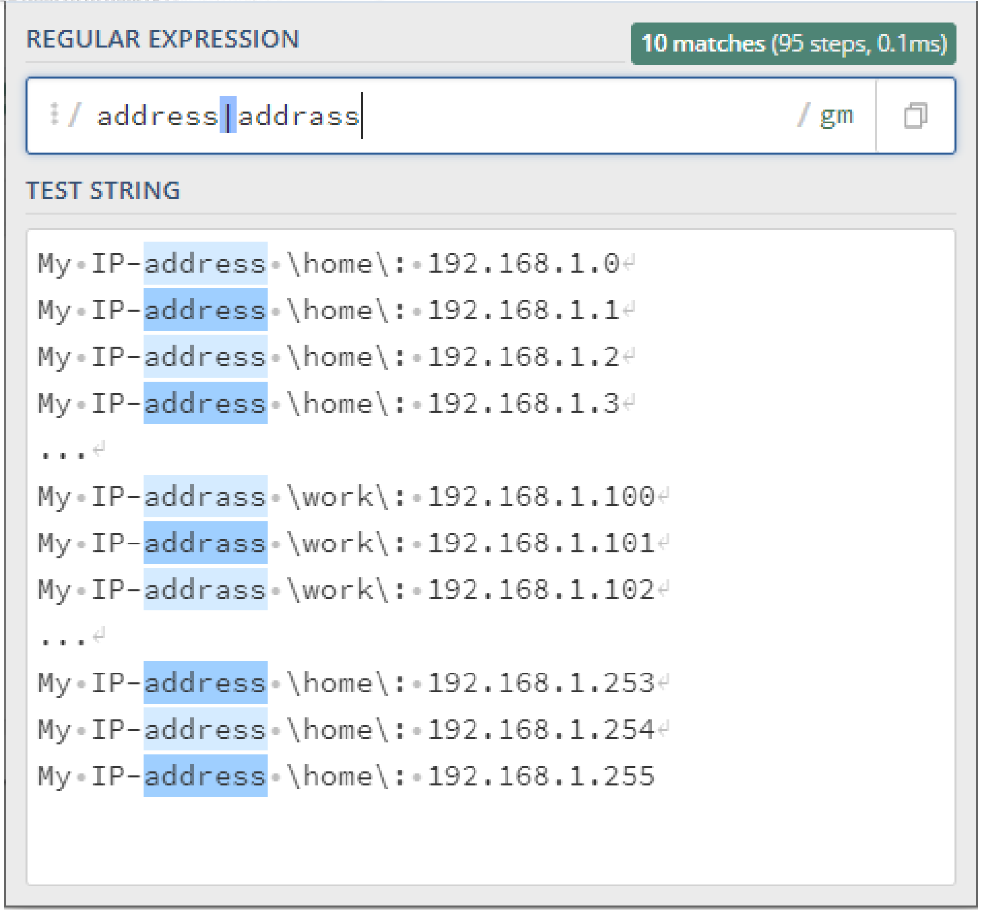
40 matches (80 steps, 0.5ms)

```
/ [ds] / gm
```

TEST STRING

```
My IP-address \home\: 192.168.1.0
My IP-address \home\: 192.168.1.1
My IP-address \home\: 192.168.1.2
My IP-address \home\: 192.168.1.3
...
My IP-address \work\: 192.168.1.100
My IP-address \work\: 192.168.1.101
My IP-address \work\: 192.168.1.102
...
My IP-address \home\: 192.168.1.253
My IP-address \home\: 192.168.1.254
My IP-address \home\: 192.168.1.255
```

# Примеры регулярных выражений



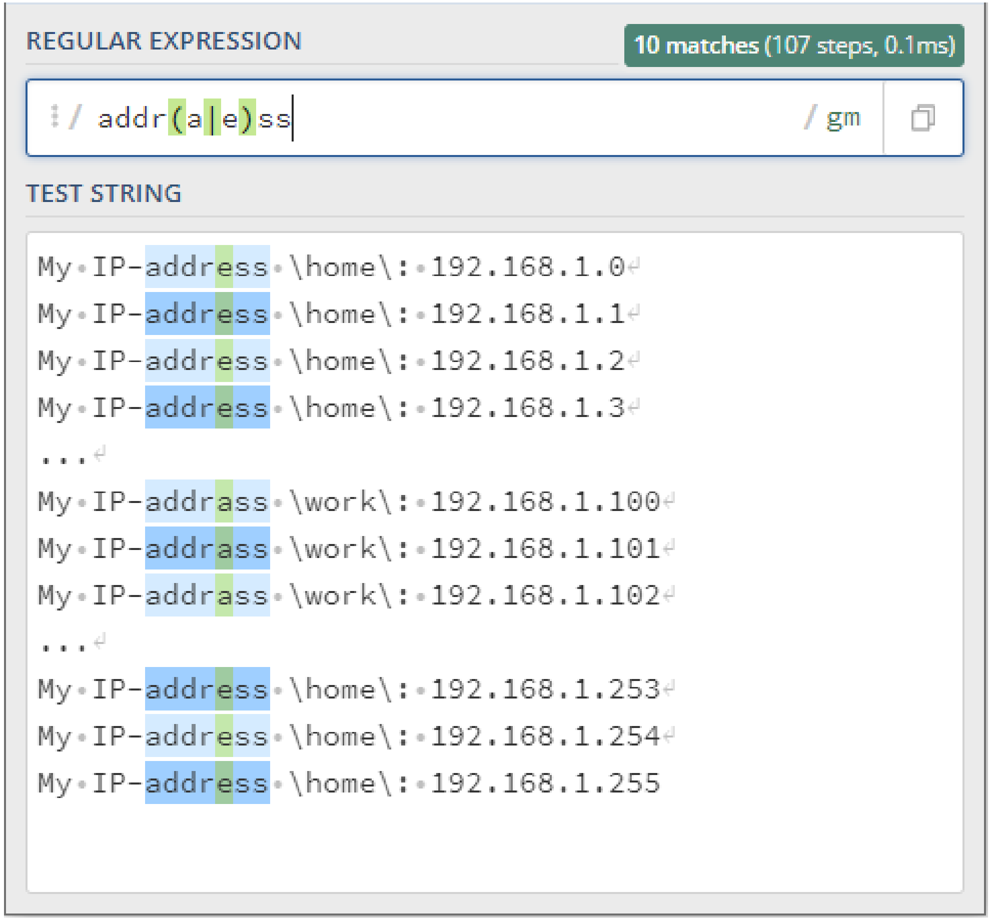
REGULAR EXPRESSION

10 matches (95 steps, 0.1ms)

```
/ address|addrass / gm
```

TEST STRING

```
My IP-address \home\: 192.168.1.0
My IP-address \home\: 192.168.1.1
My IP-address \home\: 192.168.1.2
My IP-address \home\: 192.168.1.3
...
My IP-addrass \work\: 192.168.1.100
My IP-addrass \work\: 192.168.1.101
My IP-addrass \work\: 192.168.1.102
...
My IP-address \home\: 192.168.1.253
My IP-address \home\: 192.168.1.254
My IP-address \home\: 192.168.1.255
```



REGULAR EXPRESSION

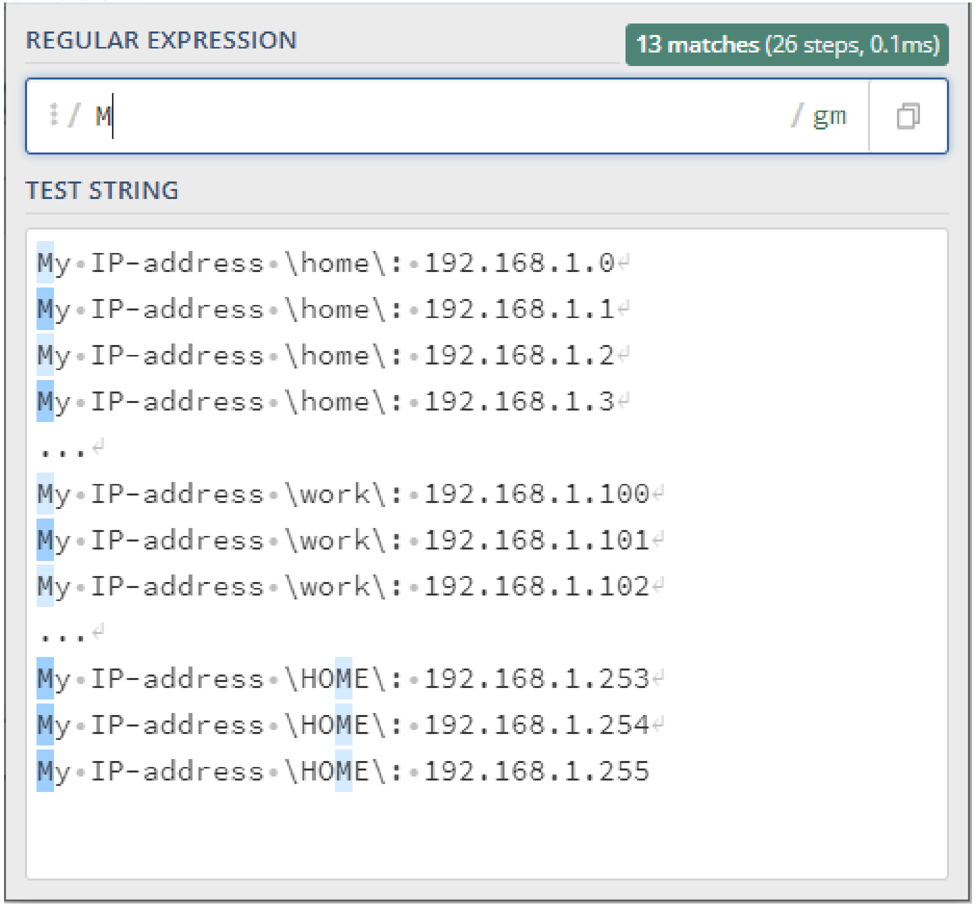
10 matches (107 steps, 0.1ms)

```
/ addr(a|e)ss / gm
```

TEST STRING

```
My IP-address \home\: 192.168.1.0
My IP-address \home\: 192.168.1.1
My IP-address \home\: 192.168.1.2
My IP-address \home\: 192.168.1.3
...
My IP-addrass \work\: 192.168.1.100
My IP-addrass \work\: 192.168.1.101
My IP-addrass \work\: 192.168.1.102
...
My IP-address \home\: 192.168.1.253
My IP-address \home\: 192.168.1.254
My IP-address \home\: 192.168.1.255
```

# Примеры регулярных выражений

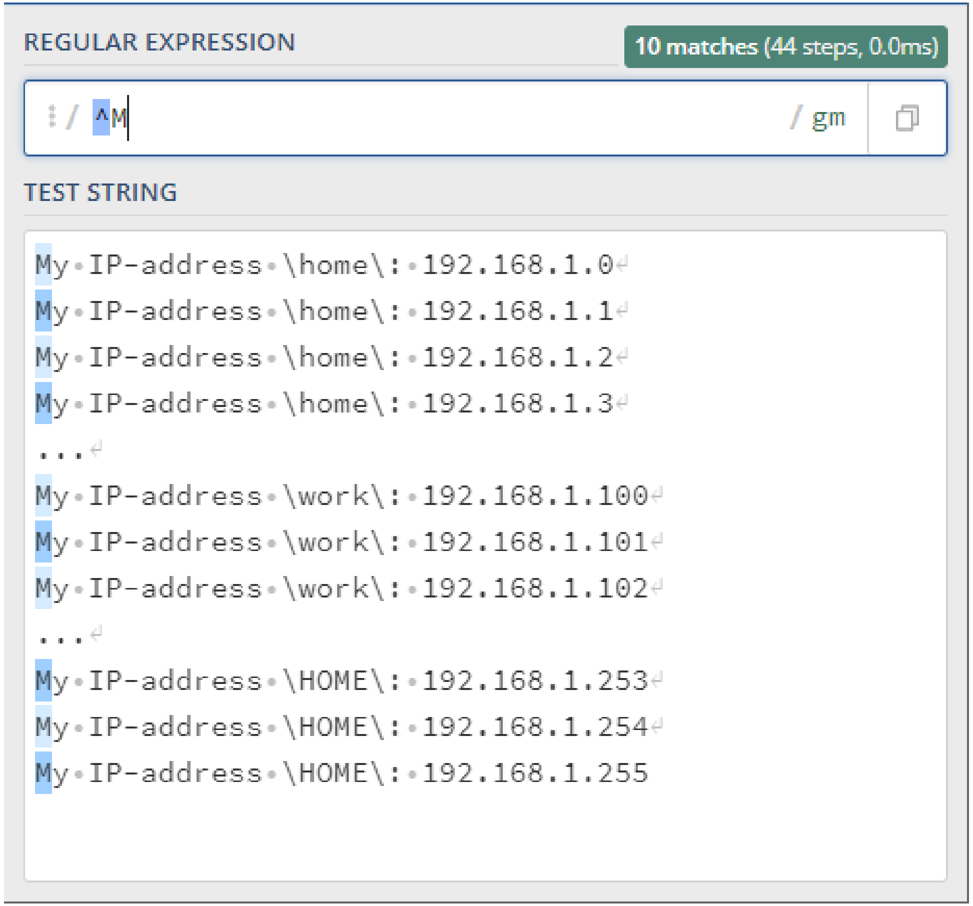


REGULAR EXPRESSION — 13 matches (26 steps, 0.1ms)

```
/ M / gm
```

TEST STRING

```
My IP-address \home\: 192.168.1.0
My IP-address \home\: 192.168.1.1
My IP-address \home\: 192.168.1.2
My IP-address \home\: 192.168.1.3
...
My IP-address \work\: 192.168.1.100
My IP-address \work\: 192.168.1.101
My IP-address \work\: 192.168.1.102
...
My IP-address \HOME\: 192.168.1.253
My IP-address \HOME\: 192.168.1.254
My IP-address \HOME\: 192.168.1.255
```



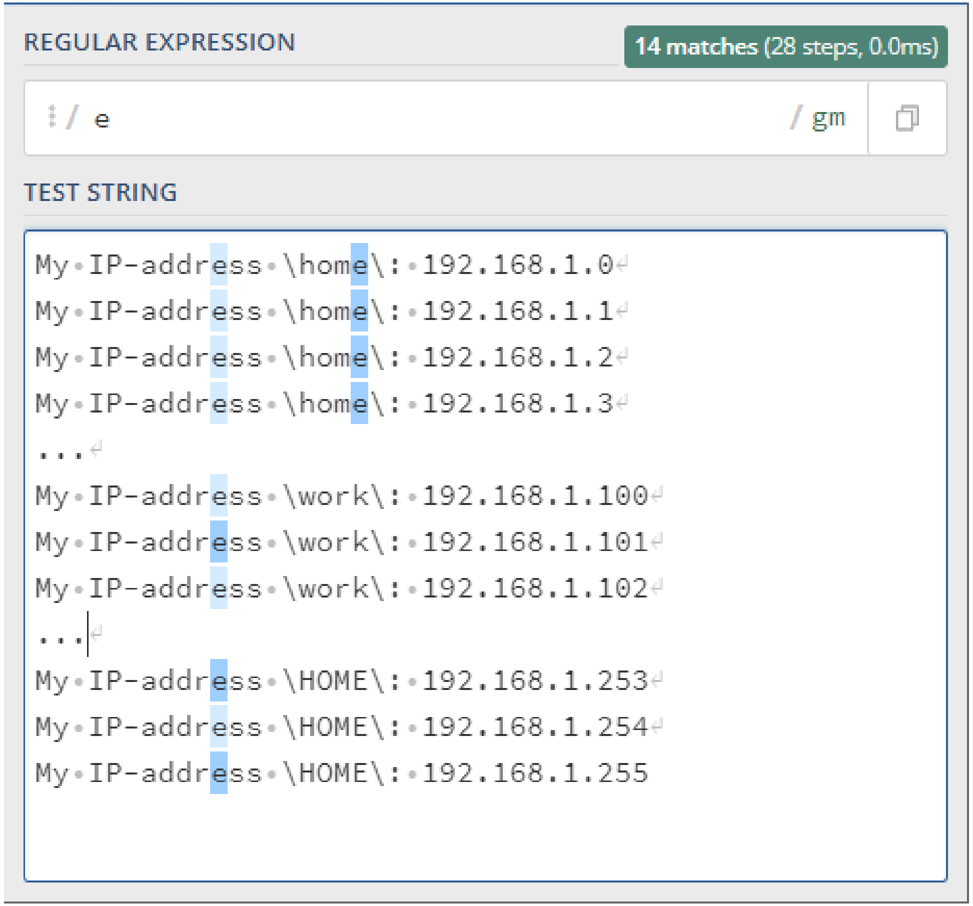
REGULAR EXPRESSION — 10 matches (44 steps, 0.0ms)

```
/ ^M / gm
```

TEST STRING

```
My IP-address \home\: 192.168.1.0
My IP-address \home\: 192.168.1.1
My IP-address \home\: 192.168.1.2
My IP-address \home\: 192.168.1.3
...
My IP-address \work\: 192.168.1.100
My IP-address \work\: 192.168.1.101
My IP-address \work\: 192.168.1.102
...
My IP-address \HOME\: 192.168.1.253
My IP-address \HOME\: 192.168.1.254
My IP-address \HOME\: 192.168.1.255
```

# Примеры регулярных выражений



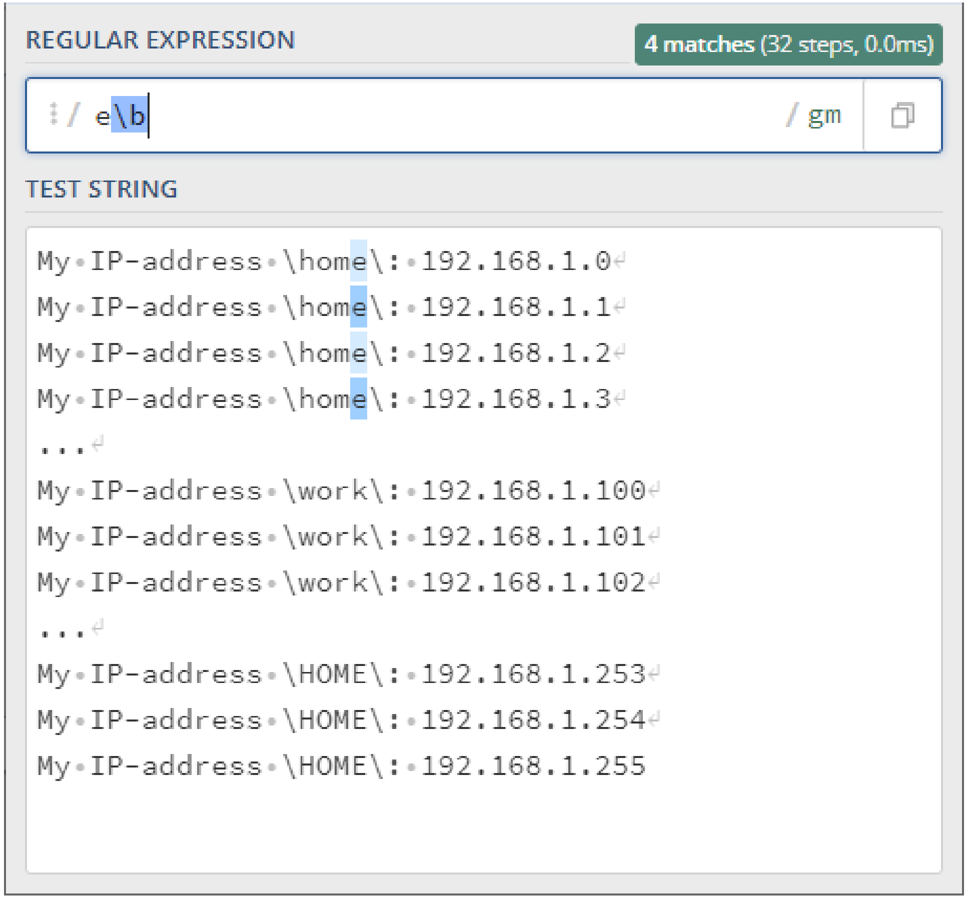
REGULAR EXPRESSION

14 matches (28 steps, 0.0ms)

```
/ e / gm
```

TEST STRING

```
My·IP-address·\home\:·192.168.1.0↵
My·IP-address·\home\:·192.168.1.1↵
My·IP-address·\home\:·192.168.1.2↵
My·IP-address·\home\:·192.168.1.3↵
...↵
My·IP-address·\work\:·192.168.1.100↵
My·IP-address·\work\:·192.168.1.101↵
My·IP-address·\work\:·192.168.1.102↵
...↵
My·IP-address·\HOME\:·192.168.1.253↵
My·IP-address·\HOME\:·192.168.1.254↵
My·IP-address·\HOME\:·192.168.1.255
```



REGULAR EXPRESSION

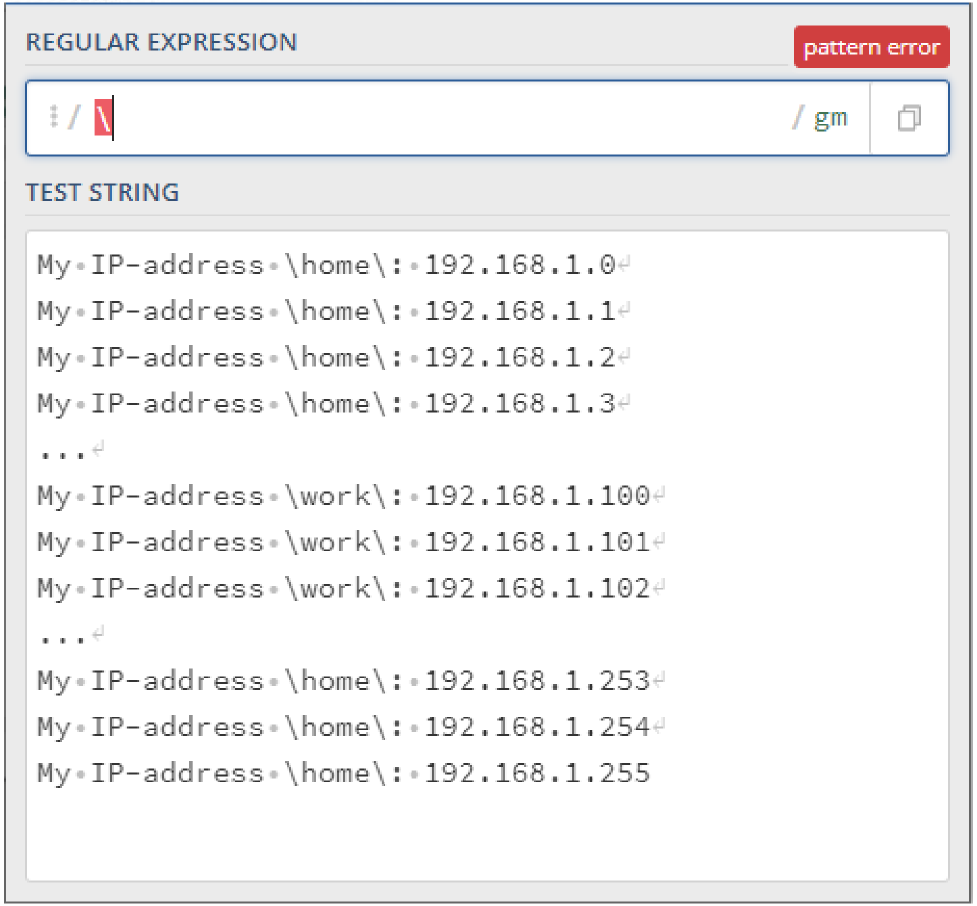
4 matches (32 steps, 0.0ms)

```
/ e\b / gm
```

TEST STRING

```
My·IP-address·\home\:·192.168.1.0↵
My·IP-address·\home\:·192.168.1.1↵
My·IP-address·\home\:·192.168.1.2↵
My·IP-address·\home\:·192.168.1.3↵
...↵
My·IP-address·\work\:·192.168.1.100↵
My·IP-address·\work\:·192.168.1.101↵
My·IP-address·\work\:·192.168.1.102↵
...↵
My·IP-address·\HOME\:·192.168.1.253↵
My·IP-address·\HOME\:·192.168.1.254↵
My·IP-address·\HOME\:·192.168.1.255
```

# Примеры регулярных выражений



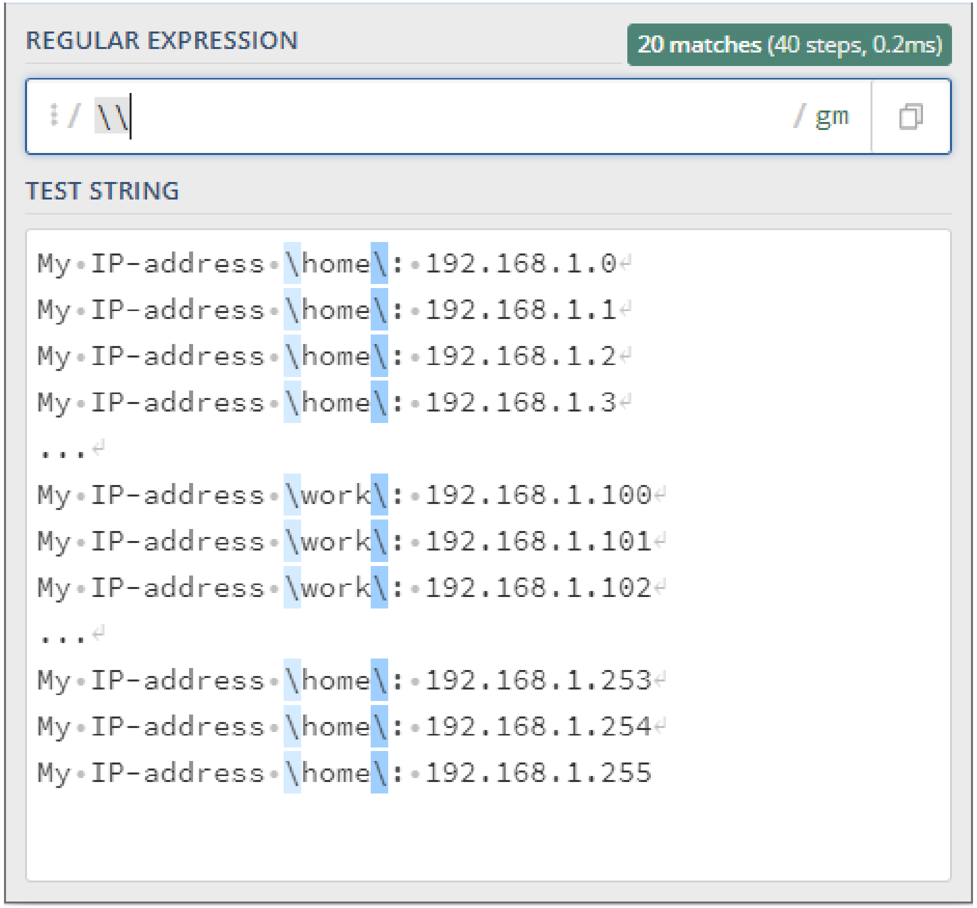
REGULAR EXPRESSION

pattern error

```
/ \ / gm
```

TEST STRING

```
My·IP-address·\home\:·192.168.1.0↵
My·IP-address·\home\:·192.168.1.1↵
My·IP-address·\home\:·192.168.1.2↵
My·IP-address·\home\:·192.168.1.3↵
...↵
My·IP-address·\work\:·192.168.1.100↵
My·IP-address·\work\:·192.168.1.101↵
My·IP-address·\work\:·192.168.1.102↵
...↵
My·IP-address·\home\:·192.168.1.253↵
My·IP-address·\home\:·192.168.1.254↵
My·IP-address·\home\:·192.168.1.255
```



REGULAR EXPRESSION

20 matches (40 steps, 0.2ms)

```
/ \\ / gm
```

TEST STRING

```
My·IP-address·\home\:·192.168.1.0↵
My·IP-address·\home\:·192.168.1.1↵
My·IP-address·\home\:·192.168.1.2↵
My·IP-address·\home\:·192.168.1.3↵
...↵
My·IP-address·\work\:·192.168.1.100↵
My·IP-address·\work\:·192.168.1.101↵
My·IP-address·\work\:·192.168.1.102↵
...↵
My·IP-address·\home\:·192.168.1.253↵
My·IP-address·\home\:·192.168.1.254↵
My·IP-address·\home\:·192.168.1.255
```

https://docs.python.org/3/library/re.html

```
import re
```

Основные причины использования:

- поиск в строке;
- разбиение строки на подстроки;
- замена части строки.

# Функции в регулярных выражениях в Python

re.compile()

re.match()
re.search()
re.fullmatch()
re.findall()
re.split()
re.sub()
re.finditer()

# Полезные ссылки

https://habr.com/ru/post/349860/ - Много примеров, заданий и объяснений