Introduction to Python
WHAT IS PYTHON?

• Invented by a Dutch programmer Guido van Rossum as a “hobby” during Christmas week, 1989
• Name comes from “Monty Python”
• Open source
• Companies: Instagram, Amazon, Facebook, SurveyMonkey...
• Design philosophy: “Readability counts”
Why PYTHON?

Python Programming Language

Easy | Useful | Popular | General Purpose | Powerful | Large Libraries

#Python

```python
print("Hello world!"
```

#Java

```java
public class Main {
    public static void main(String[] args) {
        System.out.println("Hello, World!");
    }
}
```
• One of the most popular programming languages

• Top Ten Languages of 2018

Source: IEEE (Institute of Electrical and Electronics Engineers)
PYTHON IS USED FOR

• Web Development
• Data Analysis/visualization
• Machine Learning
• Web Scraping
• Over 6 million users
• Works on Linux, Windows, and Mac
• 1400+ packages pre-installed
• IDEs including: Jupyter, JupyterLab, Spyder, and RStudio

• Anaconda
Python knows various types of data. Common ones are:

- **Strings** – “a”, “hi”
- **Integer numbers** – 2, 4, 6,
- **Floating point numbers** – 3.14, 2.0, 2.12
- **Boolean** – True/False
CHECK AND CHANGE TYPES
BUILT-IN FUNCTION type

In [50]:
1. print(type(int("3")))
2. print(str(3))
3. print(float(3))

<class 'int'>
3
3.0
In [18]:

    print ("Hello World!")
    print ('Hello World!')

    print ("I'm a girl")
    print('I\'m a girl')

    "Hello World!"

Out[18]: 'Hello World!'

"escape" character.
# Arithmetic Operators

<table>
<thead>
<tr>
<th>Operator</th>
<th>Meaning</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>+</td>
<td>Addition</td>
<td>4 + 7 → 11</td>
</tr>
<tr>
<td>-</td>
<td>Subtraction</td>
<td>12 - 5 → 7</td>
</tr>
<tr>
<td>*</td>
<td>Multiplication</td>
<td>6 * 6 → 36</td>
</tr>
<tr>
<td>/</td>
<td>Division</td>
<td>30 / 5 → 6</td>
</tr>
<tr>
<td>%</td>
<td>Modulus</td>
<td>10 % 4 → 2</td>
</tr>
<tr>
<td>//</td>
<td>Quotient</td>
<td>18 // 5 → 3</td>
</tr>
<tr>
<td>**</td>
<td>Exponent</td>
<td>3 ** 5 → 243</td>
</tr>
</tbody>
</table>
# Exercise 1:
# Radius=5, π=3.14, calculate the area of the circle
OPERATORS WORK DIFFERENTLY BASE ON DATA TYPE

```
In [ ]: 1 print("Hello"+"World")

In [ ]: 1 print("Hello"*3)

In [46]: 1 print("Hello"+"World")

HelloWorld

In [2]: 1 print("Hello"*3)

HelloHelloHello
```
LOGIC OPERATORS    <, >, ==, !=, <=, >=  AND STATEMENTS and, or, not
RETURN BOOLEAN DATA TYPE

| In [10]: 1 > 7          | Out[10]: False       |
| In [11]: 1 True and False | Out[11]: False    |
| In [12]: 1 True or False      | Out[12]: True      |
| In [13]: 1 not True       | Out[13]: False    |
#Exercise 2:
Create a variable affiliation, prompt a question, "Are you a student or a staff member?"

print "You are a " + input
ASSIGNING VARIABLES

```python
In [28]:
    a = 3
    b = 4
    c = a + b
    d = a*b + c
    e = a**b/c
    print (c)
    print (d)
    print (e)
```

```
7
19
11.571428571428571
```
Exercise 3: Create a BMI function and calculate BMI for person1 and person2. BMI = weight/height²

# person1: height:1.65m, weight:60kg
# person2: height:1.75m, weight:75kg
• Lists [1,2,3] ordered and changeable
• Tuples (1,2,3) ordered and unchangeable
• Dictionary {'a': 1, 'b': 2, 'c': 3} unordered, changeable and indexed
Create a list:

```python
1 mylist = ['apple', 'orange', 'banana']
2 print (mylist)

['apple', 'orange', 'banana']
```

Access item:

```python
1 mylist = ['apple', 'orange', 'banana']
2 print (mylist[1])

orange
```

Change Item Value:

```python
1 mylist = ['apple', 'orange', 'banana']
2 mylist[1] = 'cherry'
3 print (mylist)

['apple', 'cherry', 'banana']
```

Add Items:

```python
1 mylist = ['apple', 'orange', 'banana']
2 mylist.append('pear')
3 print (mylist)

['apple', 'orange', 'banana', 'pear']
```

Remove Items:

```python
1 mylist = ['apple', 'orange', 'banana']
2 mylist.remove('apple')
3 print (mylist)

['orange', 'banana']
```

Exercise 4:
1) Create a list of your favorite songs, print the list
2) Print the 3rd item in the list
3) Change the 3rd item into another song
4) Add one more song
5) Remove one song
Exercise 5: Create a variable called "behavior", assign a value "good" to it

# if "good" print "candy"
# elif "bad" print "no candy"
# else print "ask your mom"
CONTROL FLOW – FOR LOOP

Exercise 6
Create a list called “animals” and put "cat", "dog", "pig"...in it
Use for loop to print each one out

```python
for x in range(1, 6):
    print(x)

animals = ['cat', 'dog', 'pig']
for x in animals:
    print(x)
```

- cat
- dog
- pig
Useful Libraries

• **Beautiful Soup** – web scraping

• **NumPy** – advanced math functionalities

• **Matplotlib** – graphs

• **Pandas** – data structures and data analysis tools
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- Reviews draft data management plans
- Teaches custom workshops on request

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