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BASIC PROGRAMMING WITH PYTHON

February 7, 2022 **Prepared by Niti**
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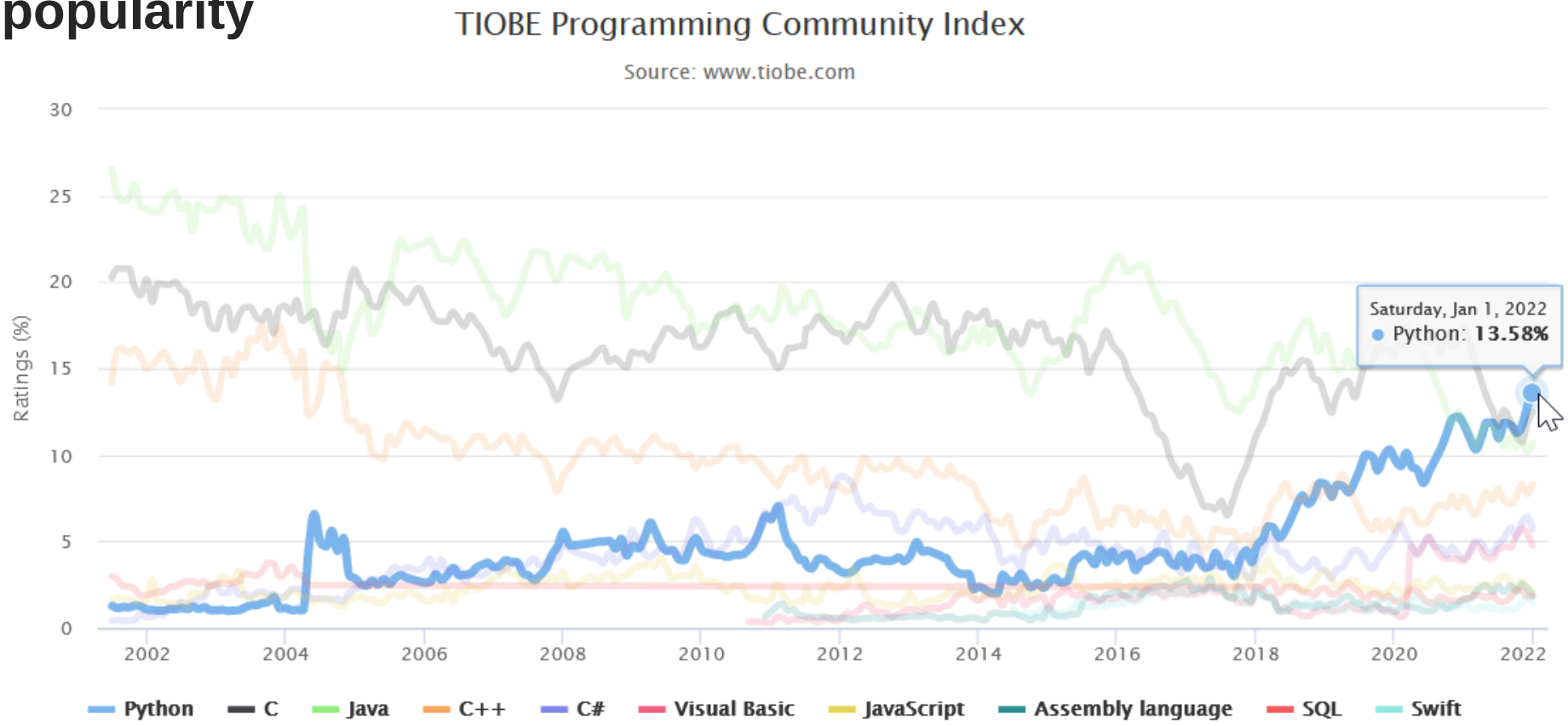
Python's Popularity

Python gained the highest increase in one year in TIOBE index of programming language popularity



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

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Python’s Popularity

1. Statistical analysis
2. Scientific computing
3. Machine learning
4. Data visualization
5. Artificial intelligence
6. Others:
    i. Scripting & automation
    ii. Web development
    iii. Systems testing & prototyping
    iv. Desktop & mobile applications
    v. Education!

Getting Python

- **Anaconda**
  - Anaconda installation is the **recommended** method for getting **Python**.
  - Anaconda is a package manager that allows installing many applications at once.
  - **Installation Guide - Video :** https://youtu.be/Z1Yd7upQsXY?t=4m19s *timestamped to start minutes 19 seconds watch until 5:59*
  - **Installation Guide - Text** https://bit.ly/2FRyakD

Writing Python Codes

- **Jupyter Notebook**
  - Among other applications, Anaconda also installs **Jupyter notebook**,
  - Jupyter Notebook is an application where you can easily write and execute Python codes.

- **Google Colab**
  - Google's colaboratory, which is a free Jupyter notebook environment that requires no setup and runs entirely on Google's cloud.

- **UofT Jupyter Hub**
  - https://jupyter.utoronto.ca/

Python Help

- Please contact ***pythonhelp@rotman.utoronto.ca*** if you require additional assistance to install jupyter notebook through Anaconda or for any other Python related inquires.

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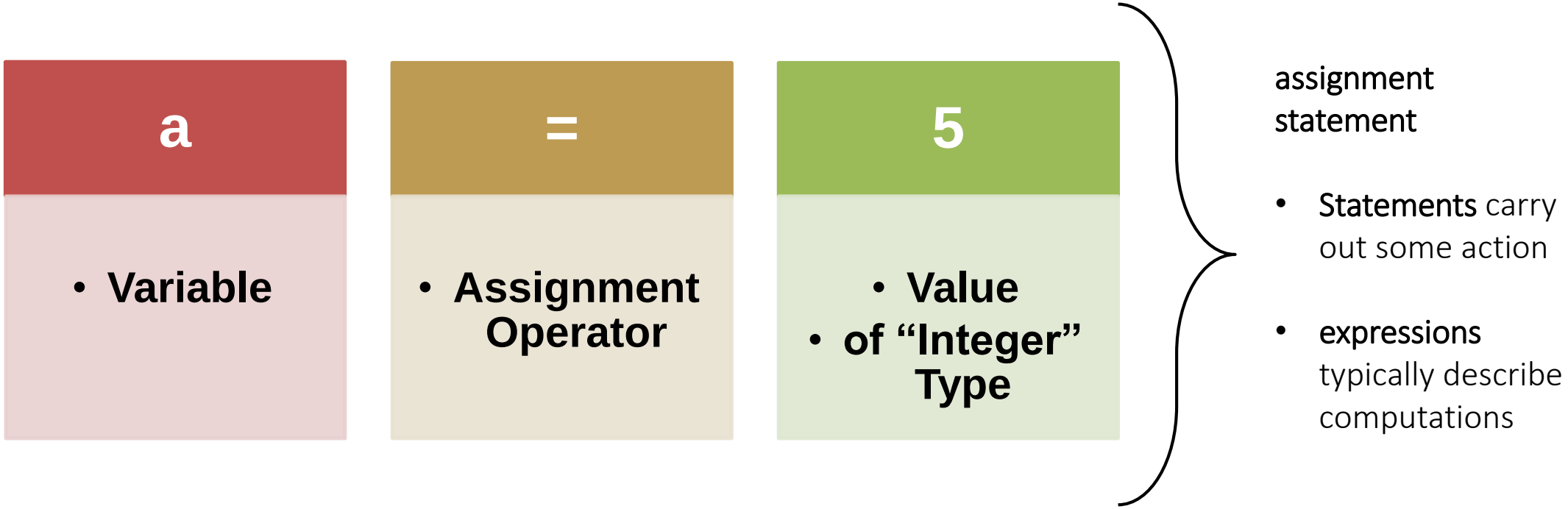
Data Structures

Data Structures

1. Basic
    a) Values
    b) Types
    c) Variables

2. Native to Python
    a) List
    b) Dictionary

Data Structures: Basic



- A program works with values
- Values can be numbers, texts and/or special characters
- Values belong to different **data types**

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Special Attention to Data Type - String

STRING

- values contained by either single or double quotes
- sequence of character(s)
- can be indexed and sliced by its position
- positions can be indicated by an integer value called index

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Data Structures: Native to Python

LIST

- Mutable
- Ordered
- Sequence of items

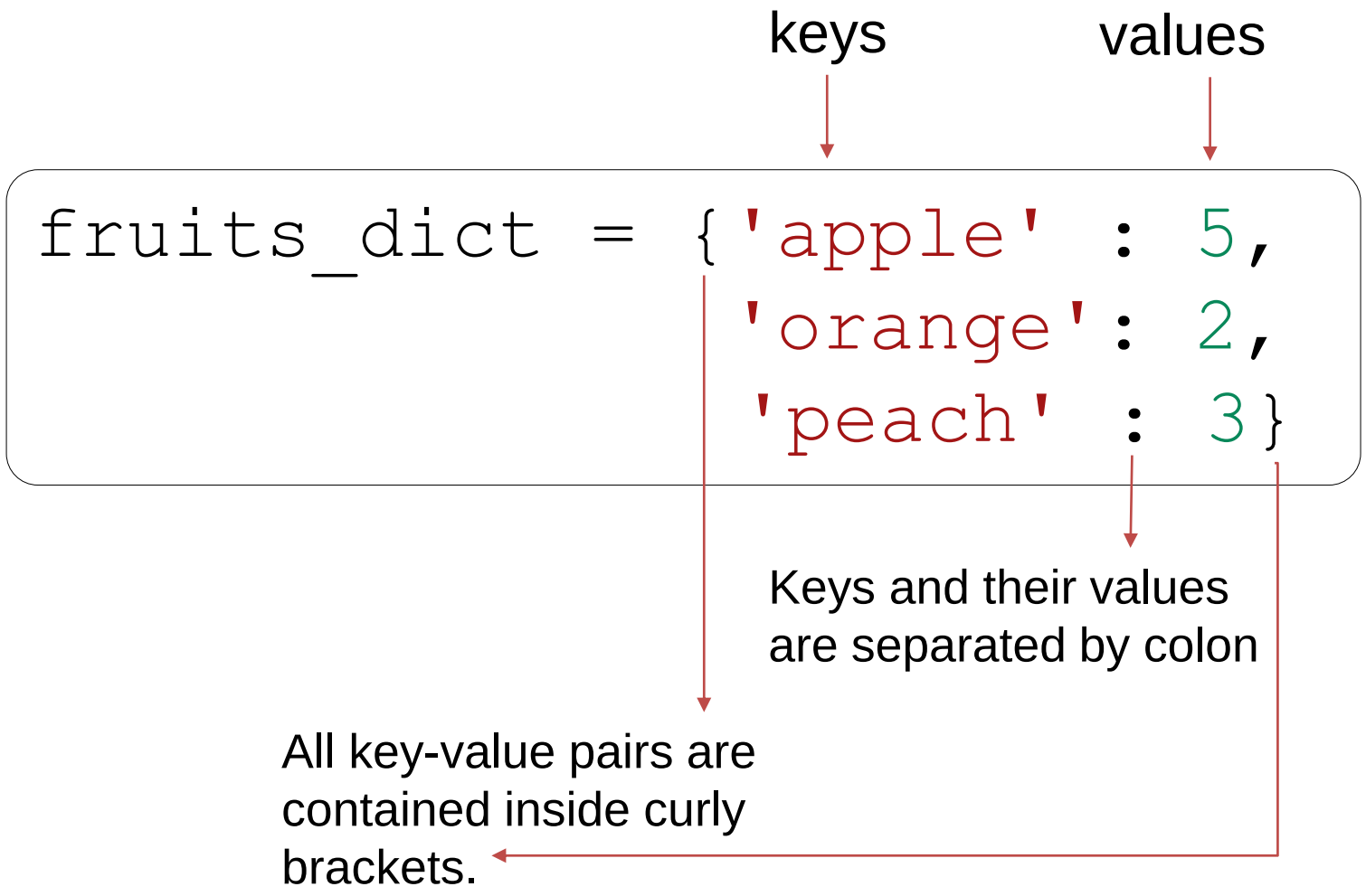
```
fruits = ['apple', 'orange',
          'peach']
```

Each element separated by comma.

All elements contained inside square brackets.

DICTIONARY

- Mutable
- Unordered
- Key-Value Pairs



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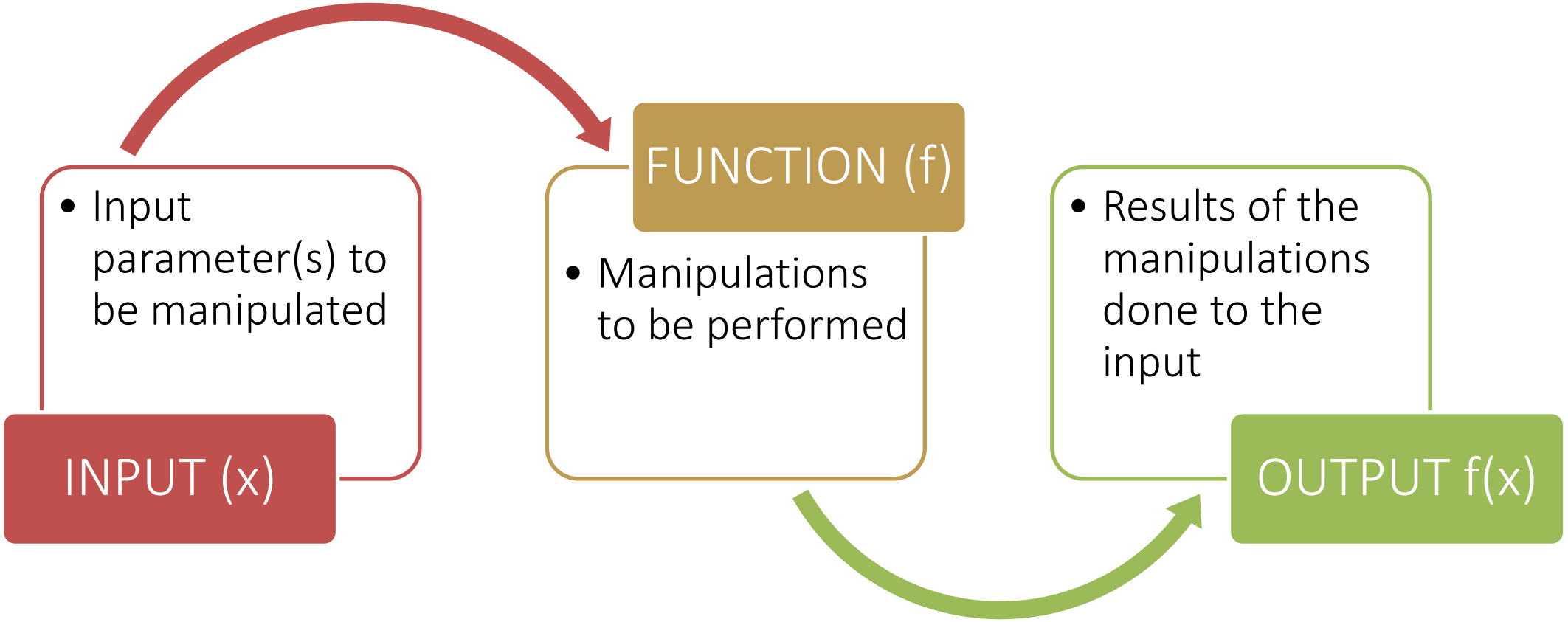
Functions

Functions



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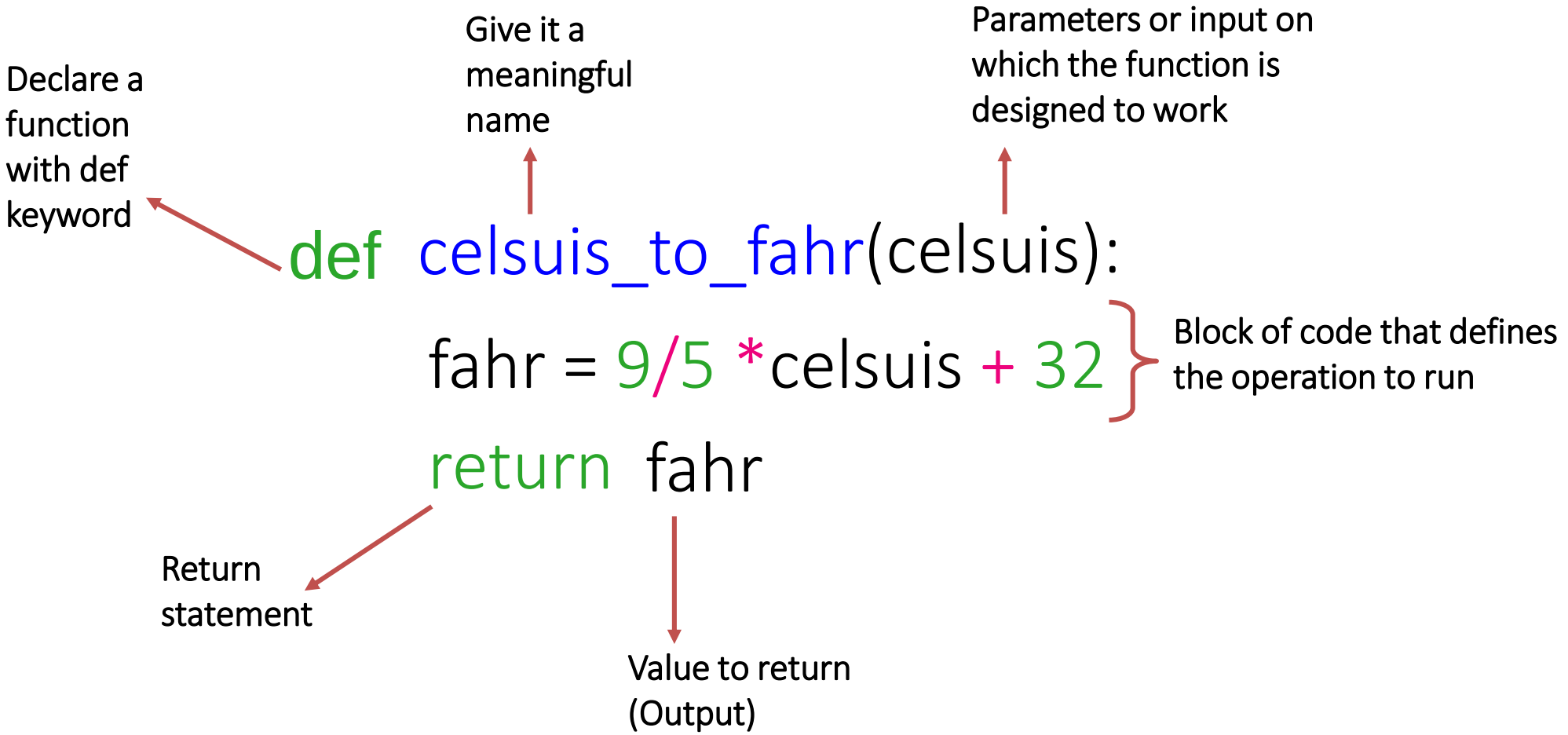
Functions: User-defined Functions



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Functions: Built-in Functions

- Python interpreter has a number of functions and types built into it that are always available.
- print() is an example of built-in function. It prints the given object to the standard output device (screen) or to the text stream file.
- Here is the list of Python's built-in functions.

```
numlist = [4,8,10,15]
```

```
type(numlist)
→ list
```

```
len(numlist)
→ 4
```

```
sum(numlist)
→ 37
```

Functions: Methods

- Functions that are attached to specific class of objects.
- Methods are accessed using the dot expression.
- Methods available to an object can be viewed using "dir" function.

```
b = 'Hello World!'
```

```
b.upper()
→ 'HELLO WORLD!'
```

```
b.isnumeric()
→ False
```

```
b.count('l')
→ 3
```

methods available to string objects only

Functions: Methods

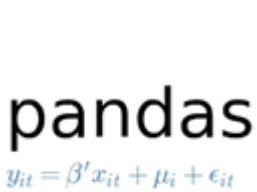
- How are methods supposed to work?
- There are documentations available with information on how a given method is intended to work.
- Python's official documentation for methods of list object
- Easy-to-read documentation provided by w3schools.

```
numlist=[4,8,10,15]
numlist.append(16)
numlist
→[4,8,10,15,16]
```

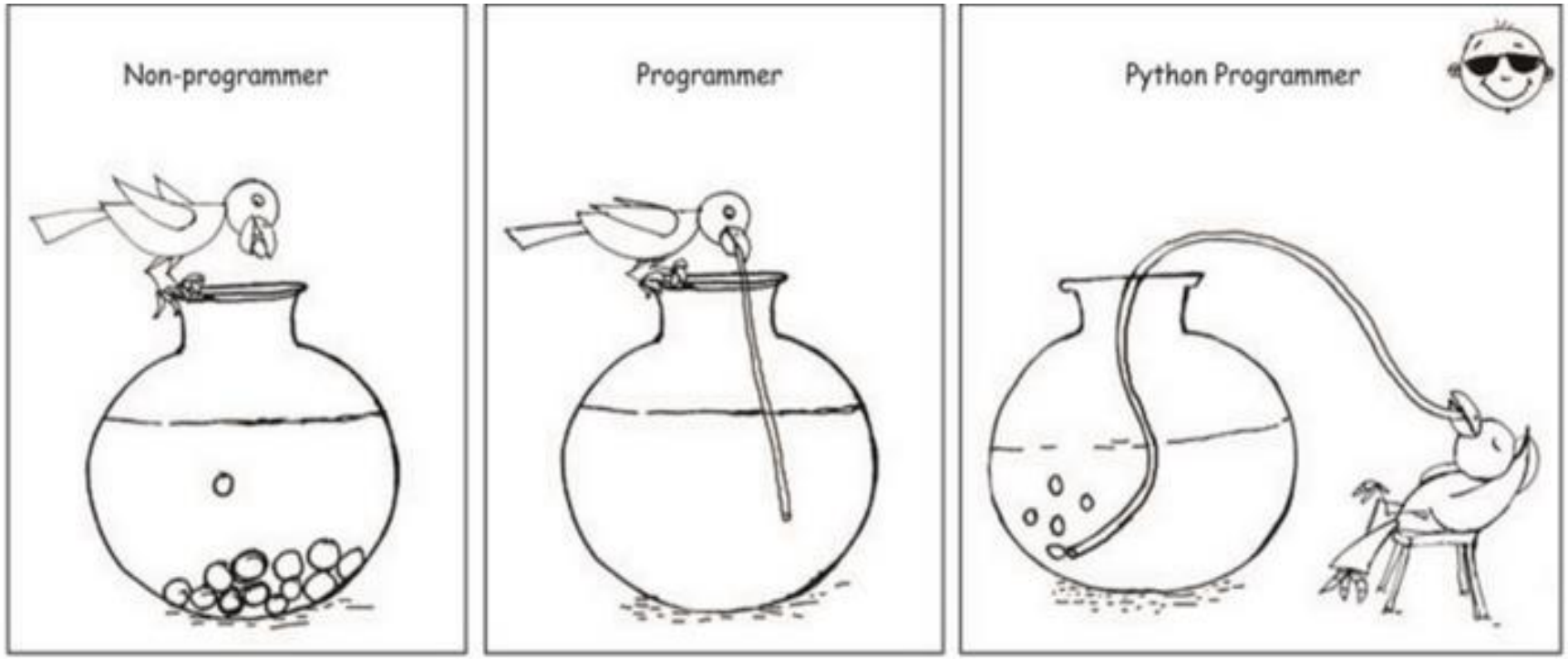
.append is a method available to objects of class list only

Functions: Third Party Packages

- Python has an active supporting community of contributors and users who also make their software available for other Python developers to use under its open source license terms.
- The SciPy ecosystem is a collection of open source software for scientific computing in Python.



Questions?



Who wants to become a Python Programmer?

Thank you