



INTRODUCTION TO

PYTHON

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Python's benevolent dictator for life

“Python is an experiment in how much freedom programmers need. Too much freedom and nobody can read another's code; too little and expressiveness is endangered.”

- Guido van Rossum

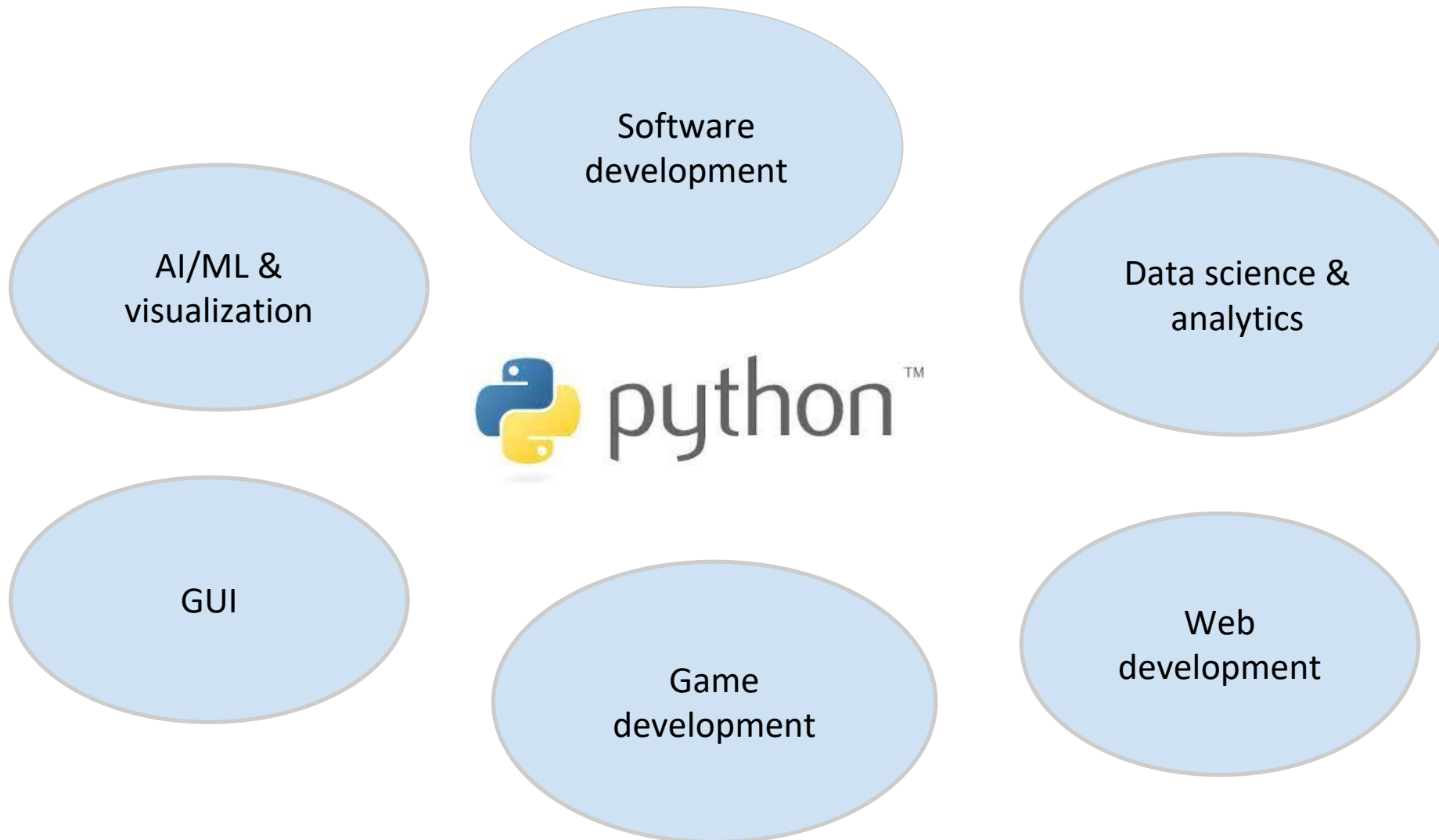
WHY PYTHON

- Easy to understand
- Free and open source
- Huge community support
- Robust standard libraries
- Wide range of applications
- Fast edit-test-debug cycle
- Portable
- Scalable

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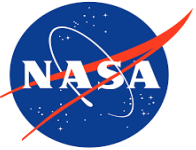
APPLICATION OF PYTHON



APPLICATION OF PYTHON



Large section of YouTube video sharing system is written in Python.



NASA uses Python to perform many specific tasks.



Web search system uses Python.



Server & Client software of Dropbox storage use Python.

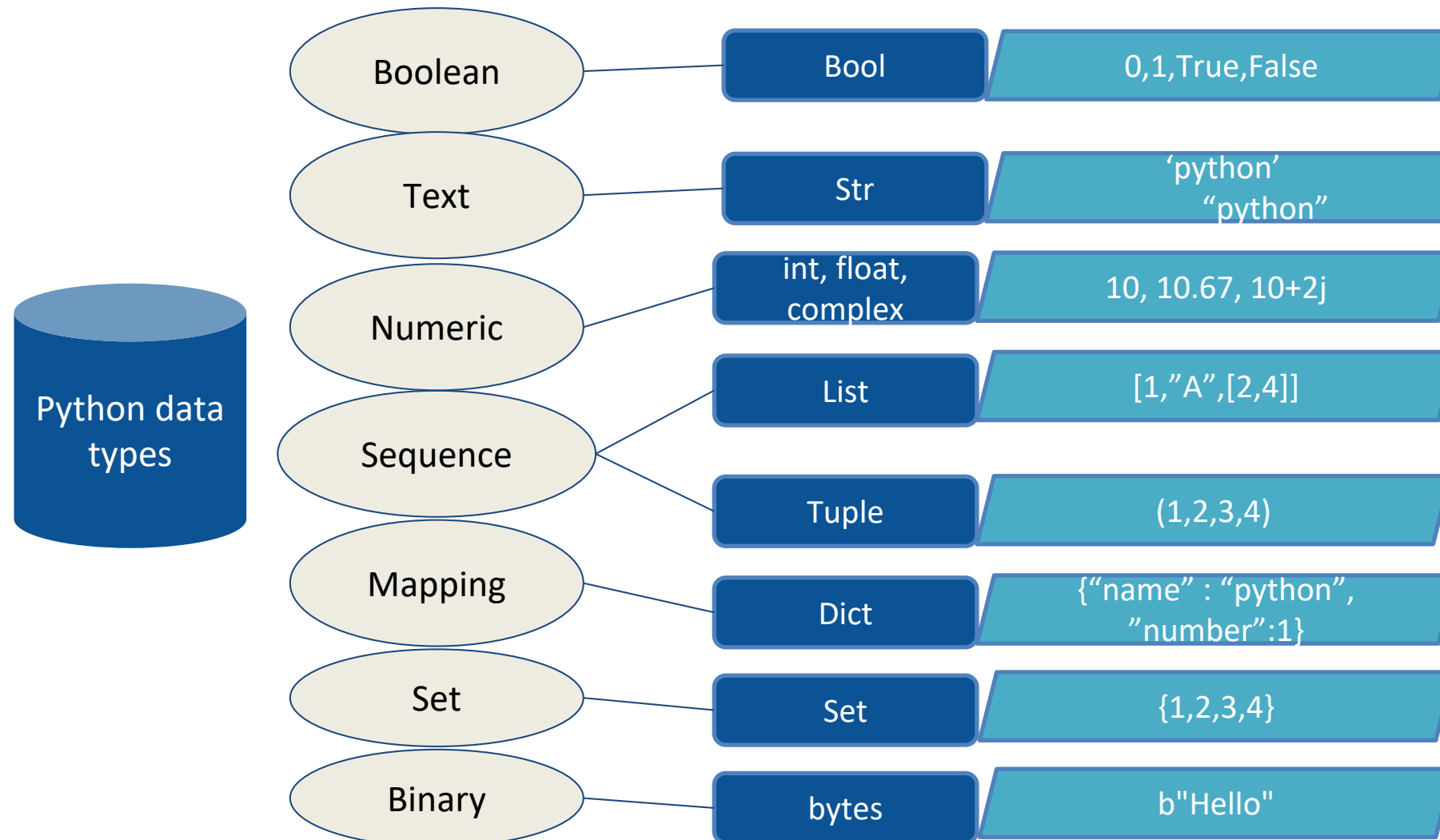


Peer to peer file sharing system started with Python.

PYTHON & ITS FEATURES

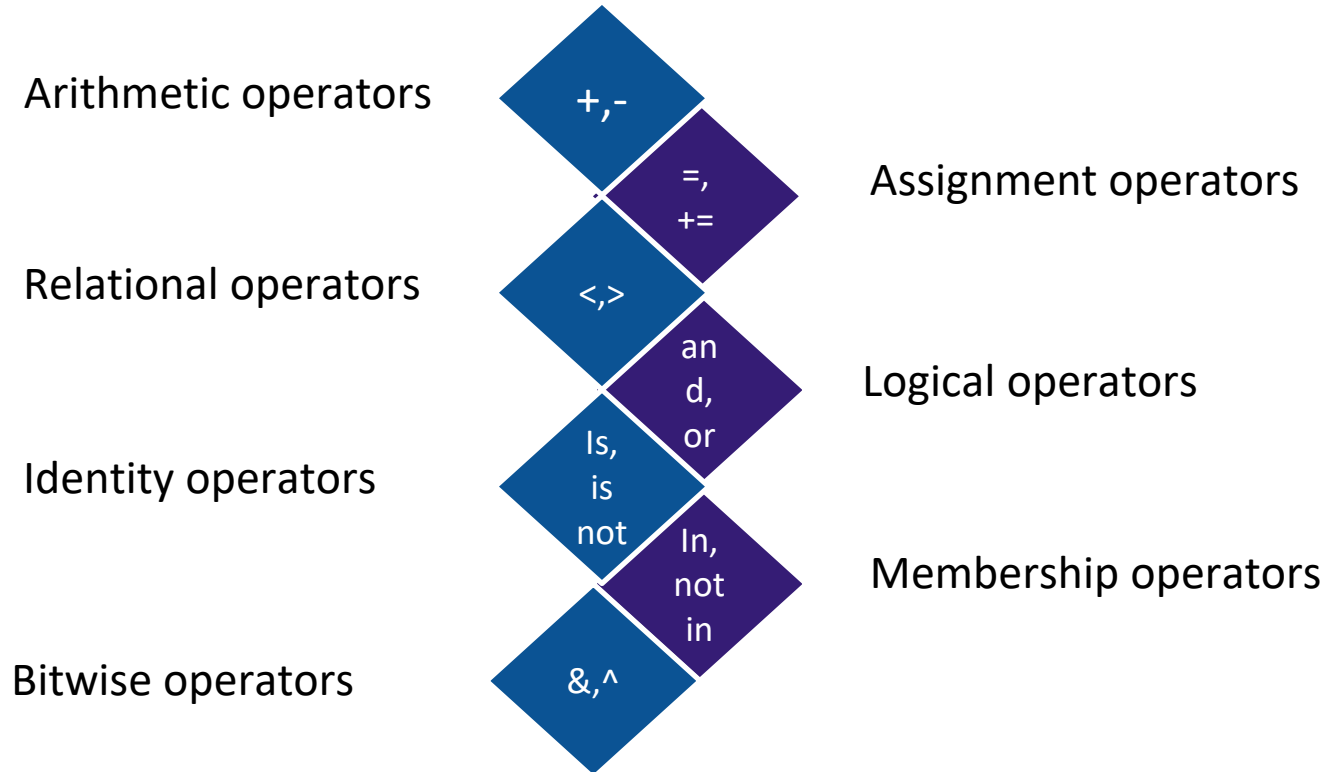
- Object oriented programming
- Interpreted language
- High-level programming
- Dynamic semantics
- High-level built in data structures
- Automatic garbage collection

PYTHON BUILT-IN DATA TYPES



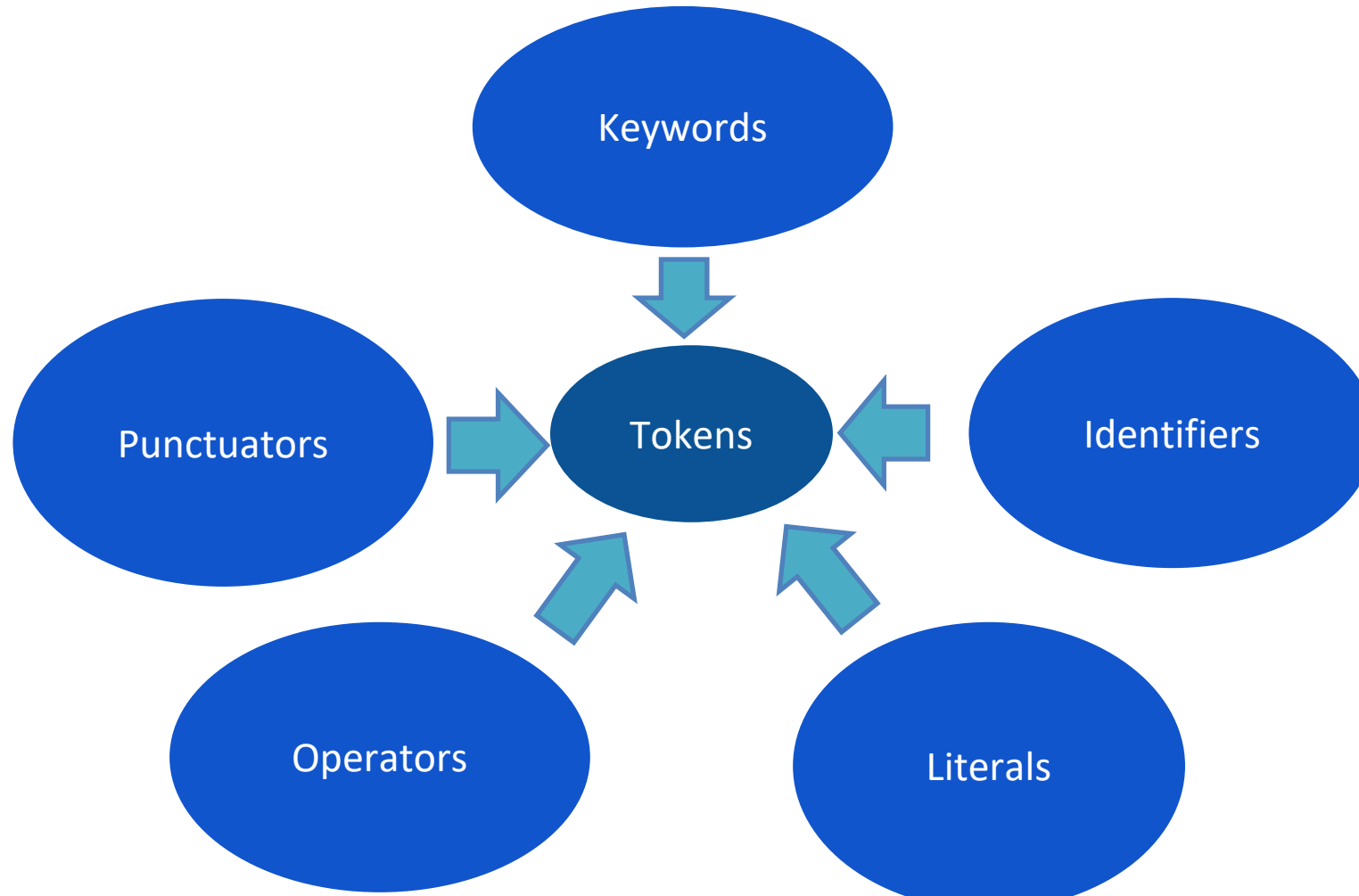
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PYTHON OPERATORS



PYTHON TOKENS

Small units of the programming language

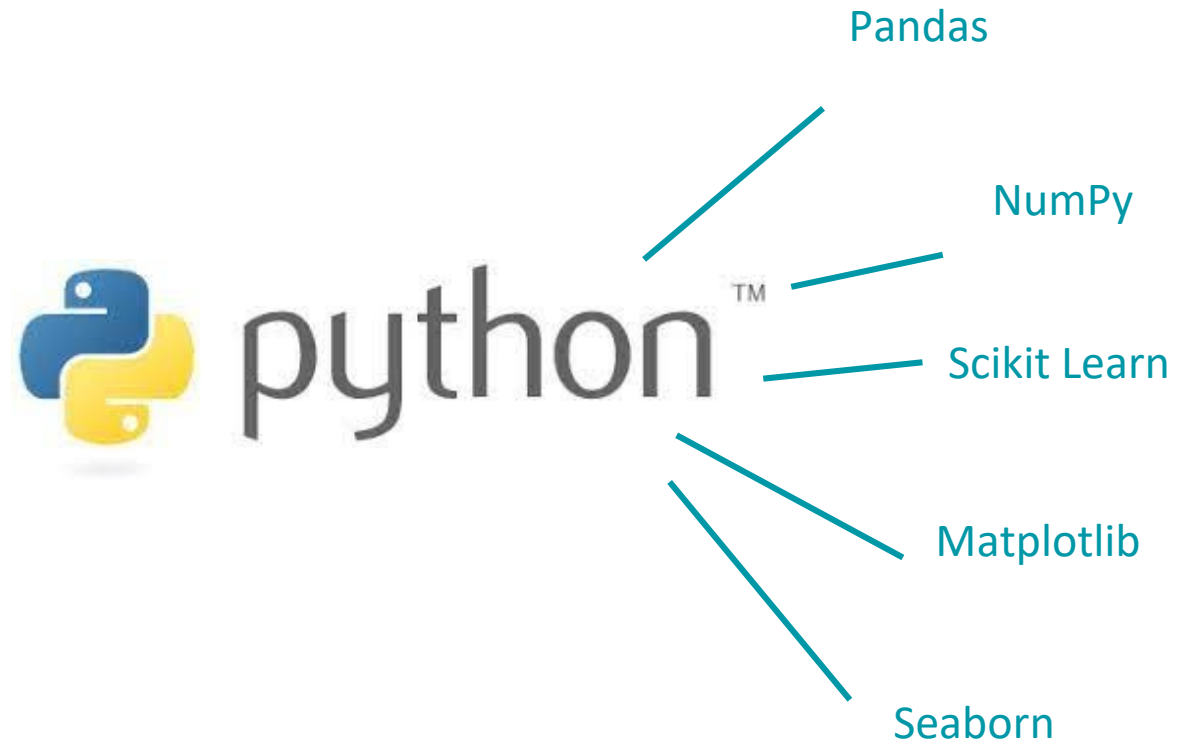


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PACKAGES OVERVIEW

- A Python package usually consists of several modules.
- Has Build-in modules & Open source modules.
- NumPy, Pandas, Scikit Learn, Matplotlib, Seaborn, SciPy, TensorFlow, Keras, and many more.





OPEN SOURCE PACKAGES

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1. NumPy

- Adds support for large, multi-dimensional arrays and matrices, along with a large collection of high-level mathematical functions to operate on these arrays.
- Open source library

NumPy

```
In [72]: # Numpy array
simple_list = [101,102,103,104,105,106,107,108,109,110]
print(simple_list)

type(simple_list)

[101, 102, 103, 104, 105, 106, 107, 108, 109, 110]
```

Out[72]: list

```
In [73]: np.array(simple_list)
```

Out[73]: array([101, 102, 103, 104, 105, 106, 107, 108, 109, 110])

```
In [74]: simple_list_of_lists = [[10,11,12],[20,21,22],[30,31,32]]
simple_list_of_lists
```

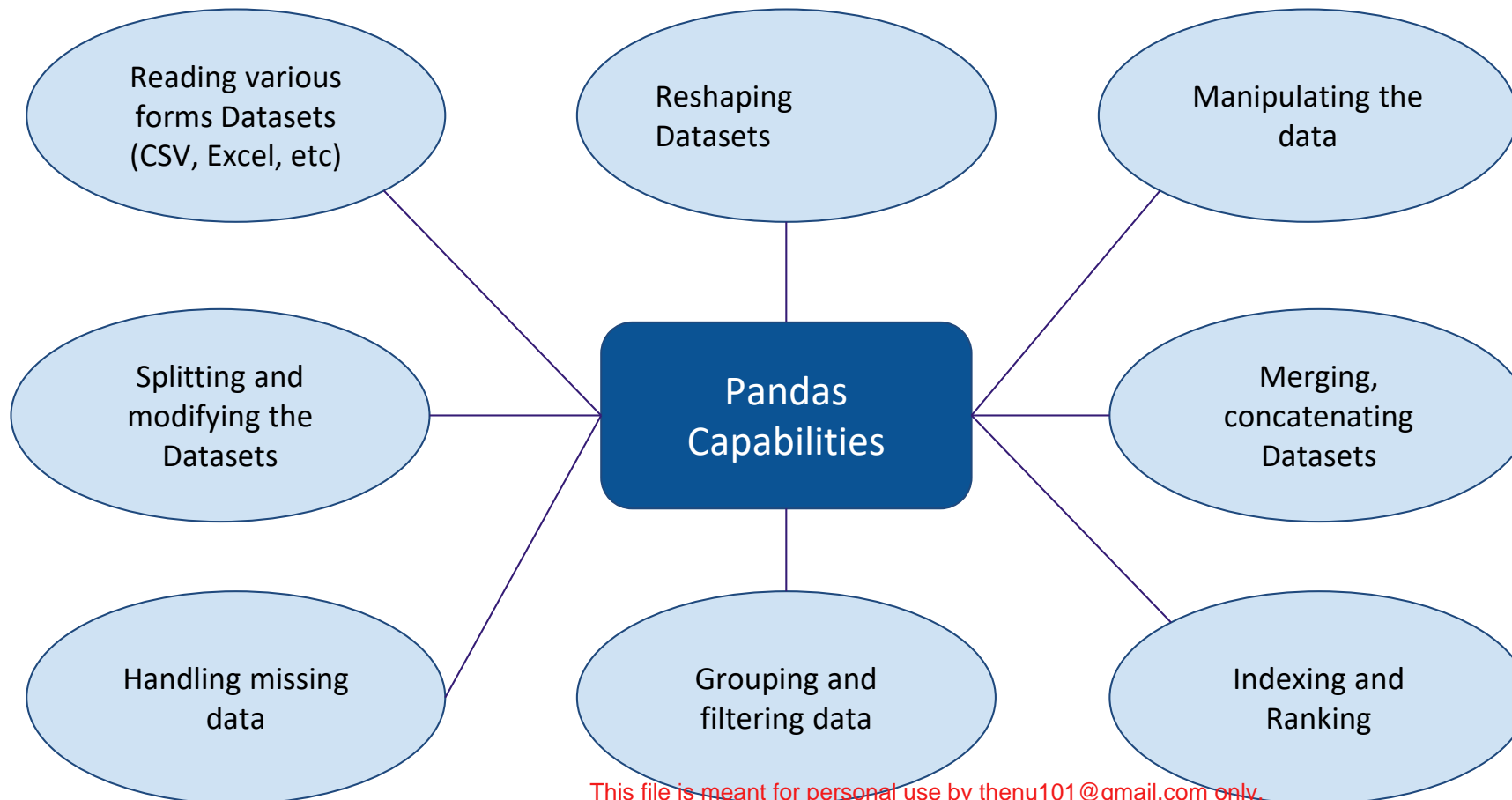
Out[74]: [[10, 11, 12], [20, 21, 22], [30, 31, 32]]

```
In [75]: np.array(simple_list_of_lists)
```

Out[75]: array([[10, 11, 12],
[20, 21, 22],
[30, 31, 32]])

2. Pandas

- Mainly used for structured data operations and manipulations.
- Offer powerful data processing capabilities, open source library.



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3. Scikit Learn

- Contains a huge number of Machine Learning algorithms and other key performance-related libraries
 - Regression
 - Classification
 - Clustering
 - Model Selection
 - Dimensionality reduction and many more

```
In [3]: from sklearn import datasets  
iris = datasets.load_iris()  
digits = datasets.load_digits()
```

```
In [4]: digits.target
```

```
Out[4]: array([0, 1, 2, ..., 8, 9, 8])
```

```
In [5]: from sklearn import svm  
svm_model = svm.SVC(gamma=0.001, C=100.)
```

```
In [9]: svm_model.fit(digits.data[:-1], digits.target[:-1])
```

```
Out[9]: SVC(C=100.0, gamma=0.001)
```

```
In [ ]: svm_model.predict(digits.data[-1:])
```

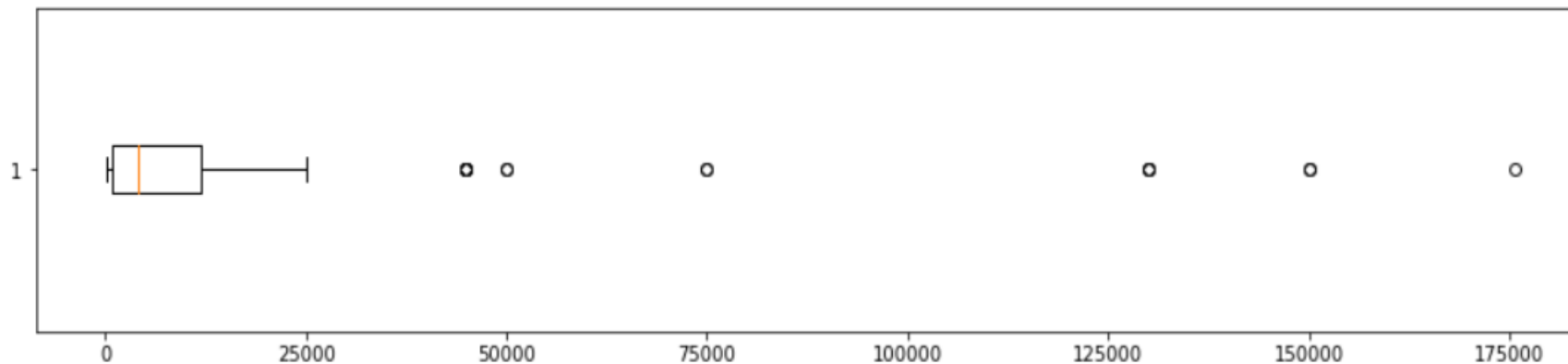
```
In [ ]:
```

4. Matplotlib

- Plotting library for the Python programming language and its numerical mathematics extension NumPy.
- Most of the Matplotlib utilities lies under “pyplot” submodule.

In []: # M - Box

```
fig, ax = plt.subplots(figsize=(15,3))  
ax.boxplot(DB['Amount'],vert=False)  
plt.show()
```



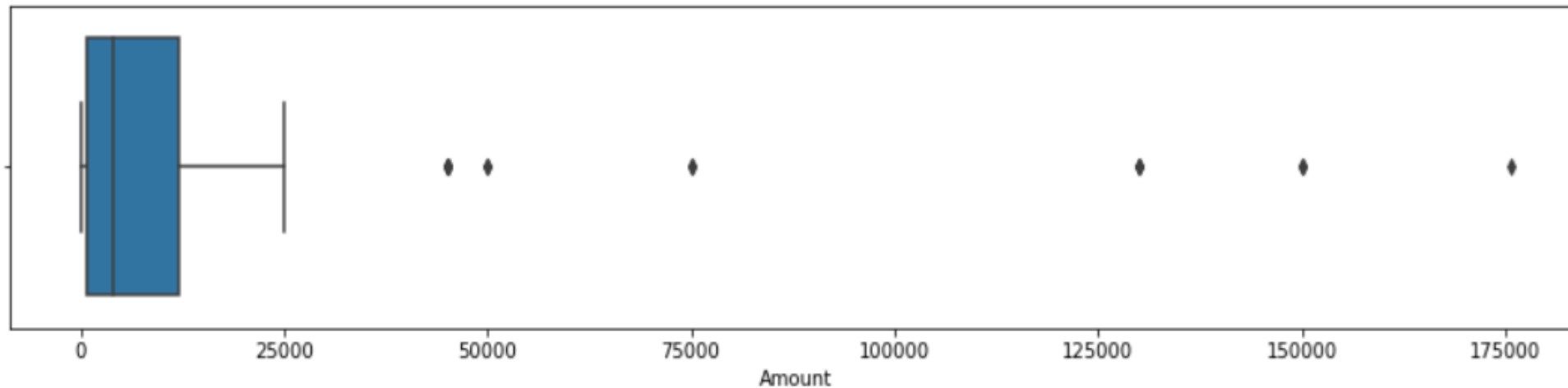
5. Seaborn

- Visualization library for statistical graphics plotting in Python.
- Built on the top of Matplotlib.
- Closely integrated to the data structures from Pandas.
- Seaborn divides plot into the below categories
 - Relational plots
 - Categorical plots
 - Distribution plots
 - Regression plots
 - Matrix plots
 - Multi plot grids
- Examples: displot, boxplot, countplot, etc.

5. Seaborn

S - Box

```
import seaborn as sns
import matplotlib.pyplot as plt
fig, ax = plt.subplots(figsize=(15,3))
sns.boxplot('Amount', data=DB)
plt.show()
```



PYTHON INSTALLATION – Need for Editor

PYTHON IDEs (Integrated Development Environment)

- A text editor helps to automate the tasks and enhance the **productivity and efficiency** of the developer.
- Why IDE ? :
 - Provides an editor designed to handle code (with, for example, syntax highlighting and auto-completion).
 - Provides build, execution, and debugging tools.
 - Some form of source control.



Jupyter



IDLE



PYTHON INSTALLATION – ANACONDA DISTRIBUTION

Anaconda distribution comes with over 250 packages automatically installed, and over 7,500 additional [open-source](#) packages can be installed from [PyPI](#) as well as the [conda](#) package.

Anaconda Individual Edition links:

1. Anaconda 5.2 For Linux Installer - <https://www.anaconda.com/download/#linux>
2. Anaconda 5.2 For macOS Installer - <https://www.anaconda.com/download/#macos>
3. Anaconda 5.2 For Windows Installer - <https://www.anaconda.com/download/#windows>

(You need to download the version compatible with your OS.)

ANACONDA NAVIGATOR

Anaconda Navigator








File Help

ANACONDA NAVIGATOR

Upgrade Now Sign in to Anaconda Cloud

Home Environments Projects (beta) Learning Community

Applications on root Channels Refresh

 jupyter notebook 5.0.0 Web-based, interactive computing notebook environment. Edit and run human-readable docs while describing the data analysis. Launch	 qtconsole 4.2.1 PyQt GUI that supports inline figures, proper multiline editing with syntax highlighting, graphical calltips, and more. Launch	 spyder 3.1.3 Scientific PYTHON Development Environment. Powerful Python IDE with advanced editing, interactive testing, debugging and introspection features Launch	 anaconda-fusion 1.0.2 Integration between Excel ® and Anaconda via Notebooks. Run data science functions, interact with results and create advanced visualizations in a code-free app inside Excel Try
 glueviz 0.9.1 Multidimensional data visualization across files. Explore relationships within and among related datasets. Install	 orange3 3.4.1 Component based data mining framework. Data visualization and data analysis for novice and expert. Interactive workflows with a large toolbox. Install	 rstudio 1.0.136 A set of integrated tools designed to help you be more productive with R. Includes R essentials and notebooks. Install	

Documentation Developer Blog Feedback

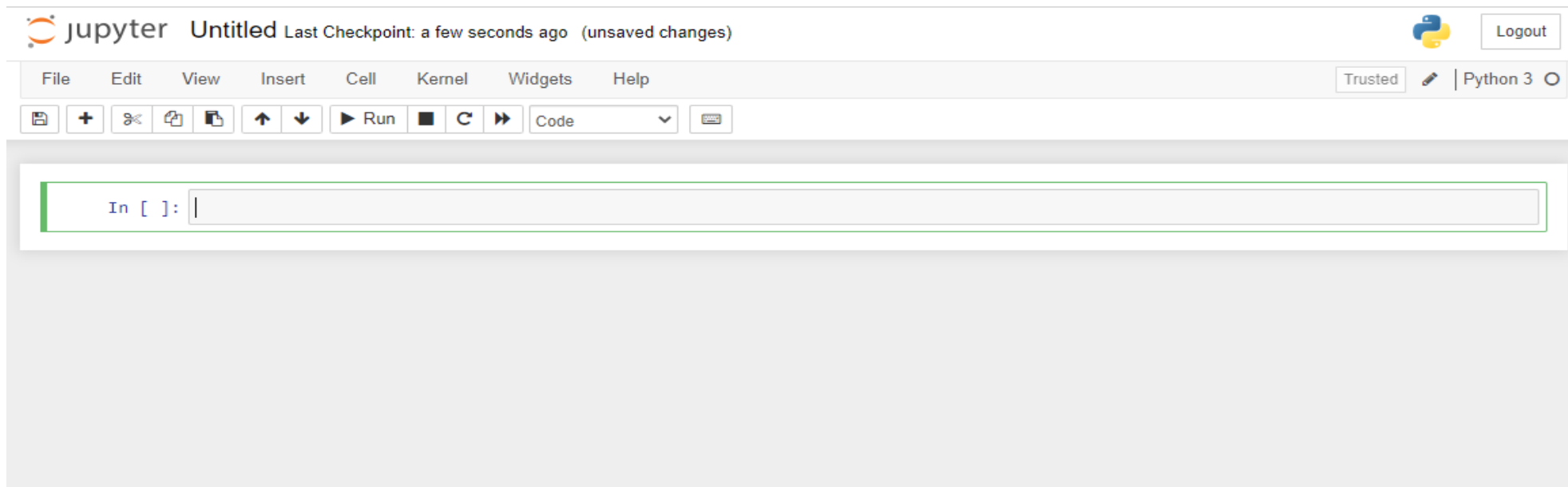
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JUPYTER NOTEBOOK FOR PYTHON



- An open source web application that you can use to create and share documents that contain live code, equations, visualizations, and text.
- Anaconda navigator comes with Jupyter notebook.



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JUPYTER NOTEBOOK SHORTCUTS



Jupyter Notebook Shortcuts

Keyboard shortcuts

Command	Description
enter	enter edit mode
Command +a; Command +c; Command +v	select all; copy; paste
Command +z; Command +y	undo; redo
Command + s	save and checkpoint
Command + b; Command + a	insert cell below; insert cell above
Shift + Enter	run cell, select below
Shift + m	merge cells
Command +]; Command + [indent; dedent
Ctrl + Enter	run cell
Option + Return	run cell, insert cell below
Escape	enter command mode
Escape + d + d	delete selected cell
Escape + y	change cell to code
Escape + m	change cell to markdown
Escape + r	change cell to raw
Escape + 1	change cell to Heading 1
Escape + n	change cell to heading n
Escape + b	create cell below
Escape + a	Insert cell above

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SUMMARY

- Discussed need for python
- Basic features of python
- Variables and operators in python
- Packages in Python
- Editor and Jupyter



Hands-On



Thank you!

Happy Learning :)