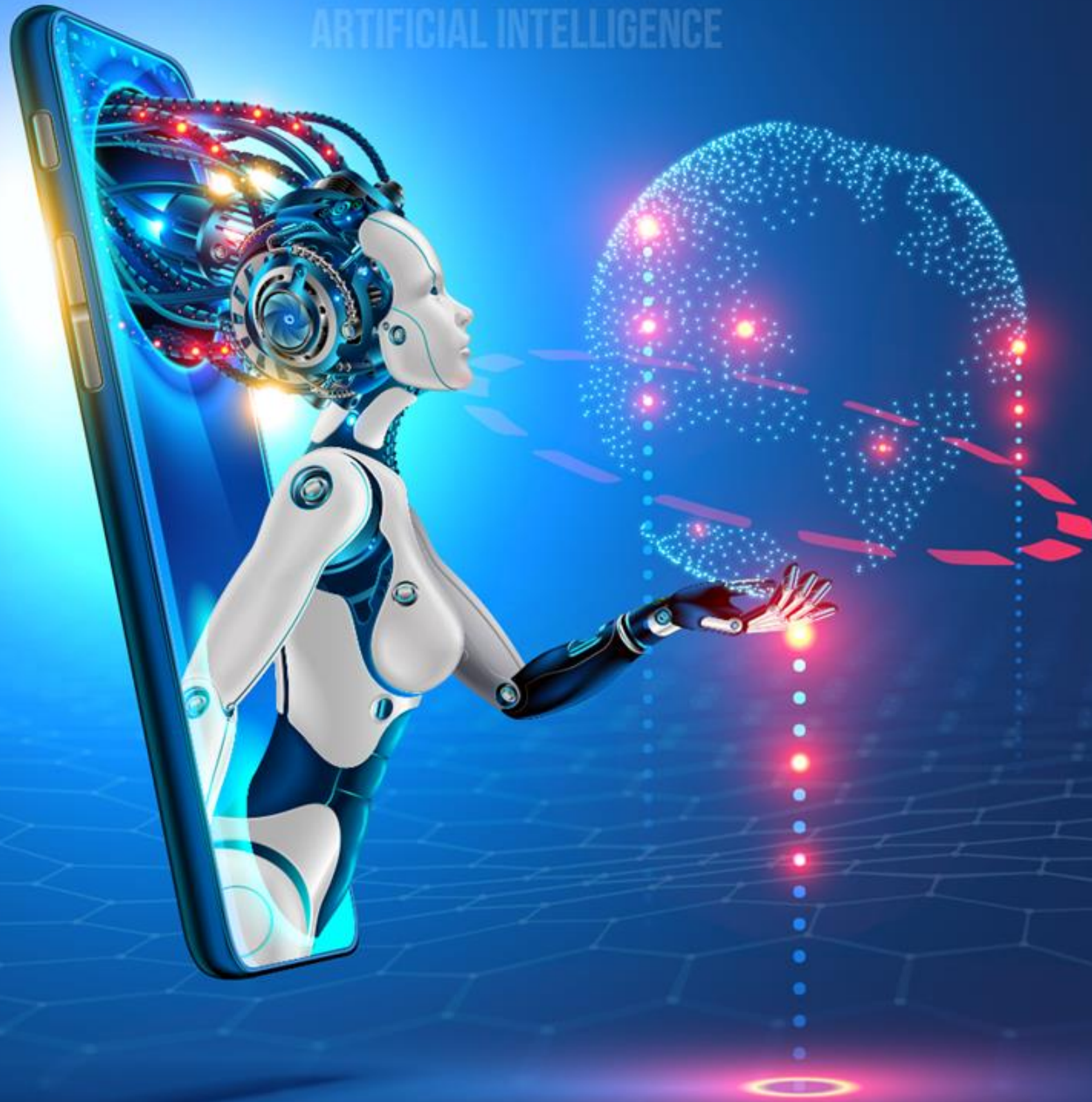


DATA AND
ARTIFICIAL INTELLIGENCE



Programming Basics and Data Analytics with Python

DATA AND ARTIFICIAL INTELLIGENCE



Programming Environment Setup

Learning Objectives

By the end of this lesson, you will be able to:

- 🕒 Define Python and its features
- 🕒 List the frequently used libraries in Python
- 🕒 Describe Anaconda and its uses
- 🕒 Download and set up Python console



DATA AND ARTIFICIAL INTELLIGENCE

Python

What Is Python?

Python is a high-level, interpreted, object-oriented programming language. It was created by Guido van Rossum in 1991. Python is used for tasks like web development, scripting, web scraping, and data analytics.



Features of Python

Easy-to-learn

Interactive mode

Portable

Extendable

Free and open
source

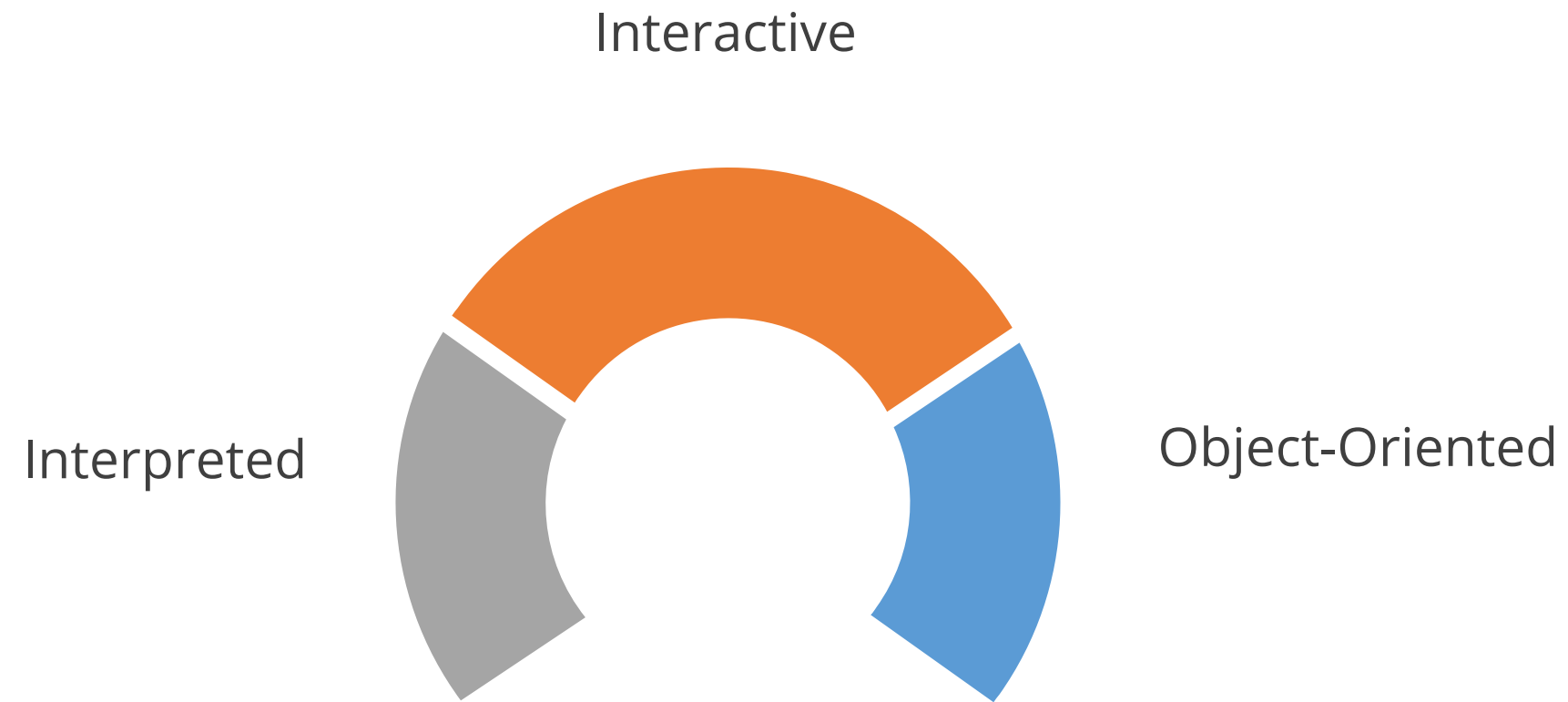
GUI programming

Integrated

Characteristics of Python

- Supports functional and structured programming methods as well as OOP
- Can be used as a scripting language or can be compiled to bytecode for building large applications
- Provides high-level dynamic data types and supports dynamic type checking
- Supports automatic garbage collection
- Can be integrated with C, C++, COM, ActiveX, CORBA, and Java

Benefits of Python



Applications of Python

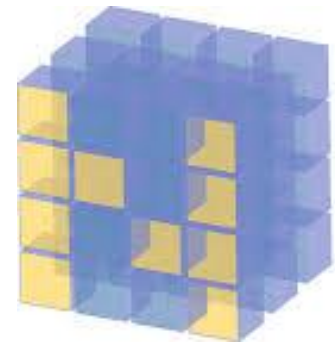
Python is simple and has easy to learn syntax that emphasizes readability.
It supports modules and packages that encourage program modularity and code reuse.

Application:

1. Web Development and GUI Programming
2. Machine Learning
3. Data Analytics
4. Artificial Intelligence
5. Internet of Things



Frequently Used Libraries in Python



NumPy



pandas



SciPy

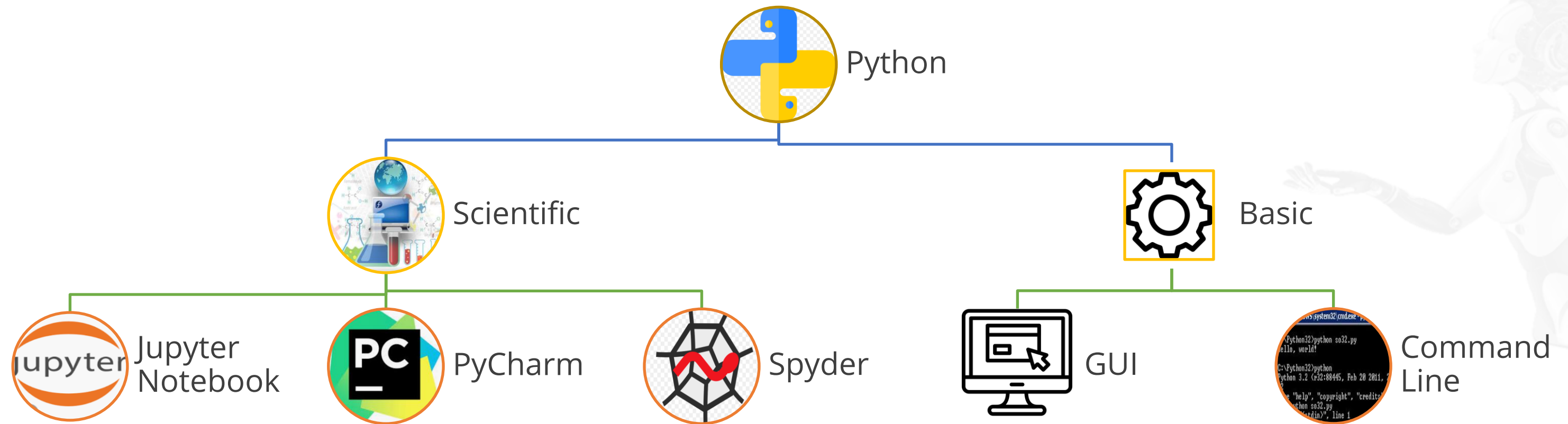
matplotlib



Environments for Python

Environments for Python

Python has both basic and scientific learning environments called IDLEs (Integrated Development and Learning Environment) where code is written and outputs are checked.

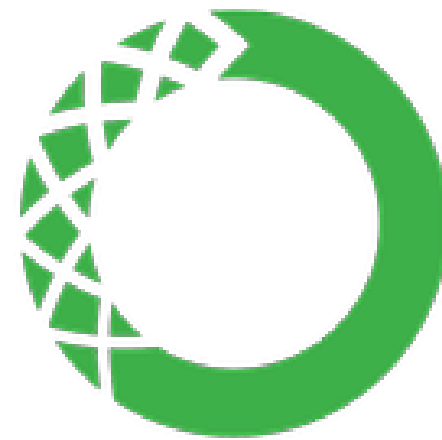


DATA AND ARTIFICIAL INTELLIGENCE

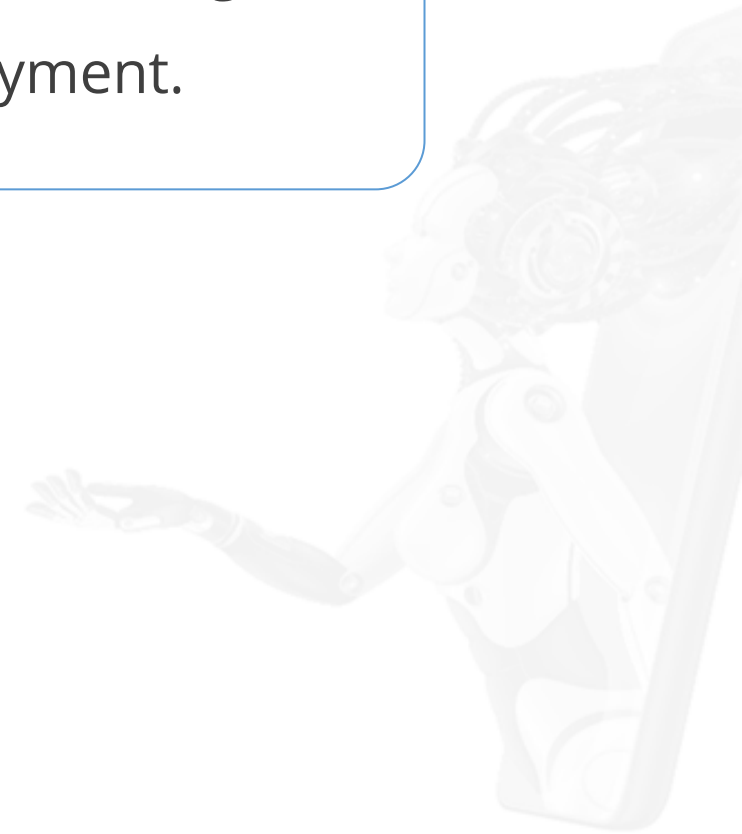
Anaconda

What Is Anaconda?

Anaconda is a free and open-source distribution of Python and R programming languages for scientific computing (data science, machine learning applications, large-scale data processing, and predictive analytics) that aims at simplifying package management and deployment.



ANACONDA®



Why Anaconda?

It is recommended to download Anaconda in order to use Python.

Advantages of Anaconda:

Open-source Python distribution

Enterprise-ready data analytics platform

Multi-workload data analytics

Big data environments

400+ Python packages

Modern data science analytics architecture

Interactive visualizations, governance, security, and operational support

Installation of Anaconda Python Distribution

Installation of Anaconda Python Distribution

Python 2.7 and Python 3.7 are the two versions of Python. However, Python 3.7 is the most recent and preferable version.

Python 3.7 version

64-Bit Graphical Installer (637 MB)
64-Bit Command Line Installer (542 MB)

Python 2.7 version

64-Bit Graphical Installer (624 MB)
64-Bit Command Line Installer (530 MB)

Note: Though the latest version of Python is 3.8, the latest version available in Anaconda is 3.7. The configurations are the same for both versions.

Installation of Anaconda Python 3.7 Distribution

You can install and run the Anaconda Python 3.7 distribution on different platforms.

Windows

macOS

Linux

Python 3.7 version

Download

64-Bit Graphical Installer (462 MB)

32-Bit Graphical Installer (410 MB)



Website URL:

<https://www.anaconda.com/distribution>

Graphical Installer

- Download the graphical installer.
- Double-click the .exe file to install Anaconda and follow the instructions on the screen.

Installation of Anaconda Python 3.7 Distribution

Windows

macOS

Linux

Python 3.7 version

Download

64-Bit Graphical Installer (654 MB)

64-Bit Command Line Installer (424 MB)



Website URL:

<https://www.anaconda.com/distribution/>

Graphical Installer

- Download the graphical installer.
- Double-click the downloaded .pkg file and follow the instructions.

Command Line Installer

- Download the command line installer.
- In your terminal window, type the command listed below and follow the given instructions:

Python 3.7:

```
bash Anaconda2-4.0.0-macOSX-x86_64.sh
```

Installation of Anaconda Python 3.7 Distribution

Windows

macOS

Linux

Python 3.7 version

Download

64-Bit (x86) Installer (506 MB)

64-Bit (Power8 and Power9) Installer (320 MB)



Website URL:

<https://www.anaconda.com/distribution/>

Command Line Installer

- Download the installer.
- In your terminal window, type the command line shown below and follow the instructions:

Python 3.7:

```
bash Anaconda2-4.0.0-Linux-x86_64.sh
```

Jupyter Notebook

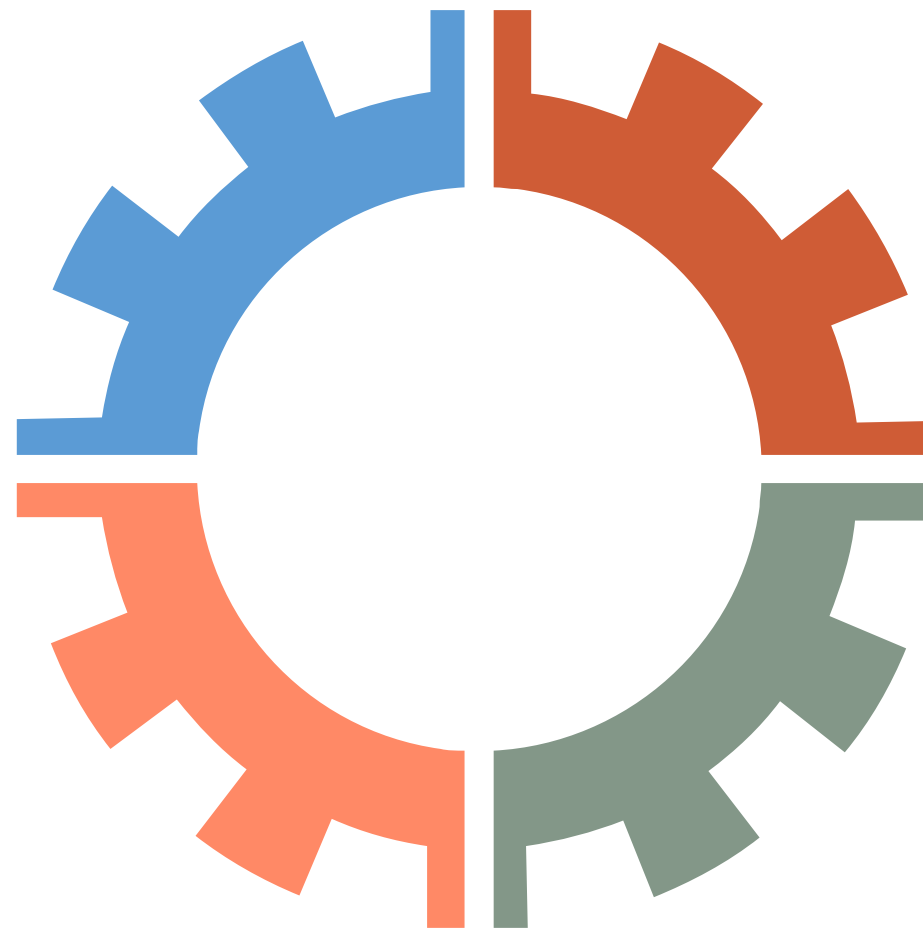
Jupyter Notebook

Jupyter is an open-source and interactive web-based Python interface for data science and scientific computing.

Advantages of Jupyter Notebook

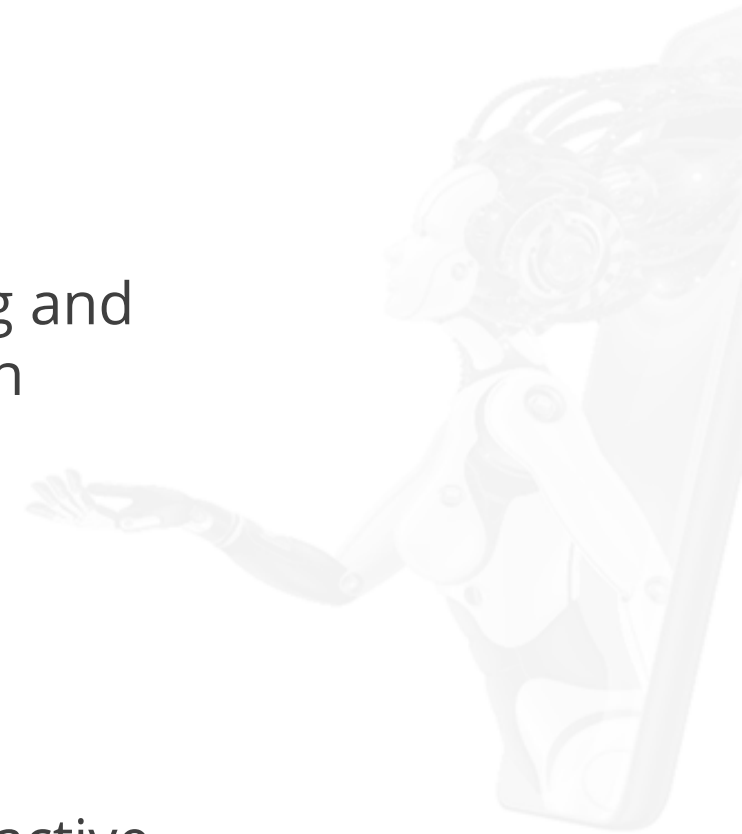
Python language support

Big data platform integration



Content sharing and contribution

Built-in interactive widgets



Getting Started with Jupyter Notebook

The screenshot shows a Jupyter Notebook interface with a browser window at `localhost:8888/notebooks/Practice.ipynb`. The notebook is titled "Practice" and shows the last checkpoint on 05/02/2019. The interface includes a menu bar (File, Edit, View, Insert, Cell, Kernel, Widgets, Help) and a toolbar with icons for saving, adding cells, and running code. The notebook contains seven input cells, each with a corresponding output cell. Annotations with orange arrows point to specific parts of the code:

- In [1]:** `import sys` → Import sys module
- In [2]:** `print sys.version` → Print sys version
Output: `'3.7.11' |Anaconda 2.5.0 (64-bit)| (default, Feb 16 2016, 09:58:36) [MSC v.1500 64 bit (AMD64)]`
- In [3]:** `import platform` → Import platform library
- In [4]:** `platform.python_version()` → View python version
Output: `'3.7.11'`
- In [5]:** `# A Hello world example` → Comment line
`print('hello world')` → Test string
Output: `hello world`
- In [6]:** `3+5` → Test number operation
Output: `8`
- In [7]:** `8*4` → Test number operation
Output: `32`

Install Python



Problem Statement: A software developer at a company is required to install Python and Anaconda on his or her local system.

Steps to Perform:

1. Download Python
2. Click on Install Now
3. Download Anaconda
4. Click the Next button to start the installation
5. Click the Install button for installing Anaconda
6. Click the Finish button to complete the installation

ASSISTED PRACTICE

First Python Program



Problem Statement: Write a simple Python program to print a string of characters, an integer value, and a float value.

Steps to Perform:

1. Declare variables as integer value, float value, and string
2. Print the variables

ASSISTED PRACTICE

FULL STACK



Knowledge Check

Knowledge Check

1

Jupyter is not an open-source and interactive web-based Python interface for data science and scientific computing.

- a. True
- b. False



**Knowledge
Check**

1

Jupyter is not an open-source and interactive web-based Python interface for data science and scientific computing.

- a. True
- b. False



The correct answer is **b**

Jupyter is an open-source and interactive web-based Python interface for data science and scientific computing.

Knowledge Check

2

Which of the following commands helps to print the version of Anaconda in Python?

- a. --version
- b. sys.version
- c. print version
- d. print sys.version



Knowledge
Check

2

Which of the following commands helps to print the version of Anaconda in Python?

- a. --version
- b. sys.version
- c. print version
- d. print sys.version



The correct answer is **d**

The command `print sys.version` helps to print the version of Anaconda in Python.

Knowledge Check

3

Which of the following is NOT an appropriate way to print in Python?

- a. Print ('Hi')
- b. Print ("Hi")
- c. Print Hi
- d. All of the above



Knowledge Check

3

Which of the following is NOT an appropriate way to print in Python?

- a. Print ('Hi')
- b. Print ("Hi")
- c. Print Hi
- d. All of the above



The correct answer is **c**

Print Hi is not an appropriate way to print in Python.

Key Takeaways

- Python is a high-level, interpreted, object-oriented programming language
- The frequently used libraries in Python are Numpy, Pandas, Scipy, Matplotlib, and Scikit-learn.
- Anaconda is the open source free distribution of Python.
- Jupyter is an open-source and interactive web-based Python interface for data science and scientific computing.

