Introduction to Python

Dr.Hajialiasgari

Tehran University
Of
Medical Science

November 10, 2024

TEHRAN UNIVERSITY
OF
MEDICAL SCIENCES

1. Introduction to Python Libraries
2. Kinds of Python Libraries
3. Popular Third-Party Libraries
4. Conclusion

1 Introduction to Python Libraries

2 Kinds of Python Libraries

3 Popular Third-Party Libraries

4 Conclusion

What is a Python Library?

- A Python library is a collection of reusable functions, classes, and modules that provide specific functionality.
- Libraries simplify coding by offering pre-built solutions for common tasks.

1 Introduction to Python Libraries

2 Kinds of Python Libraries

3 Popular Third-Party Libraries

4 Conclusion

1. Standard Libraries

- Built-in libraries that come with Python and require no installation.
- Examples:
  - `math`: Mathematical functions, e.g., `sqrt`, `sin`.
  - `datetime`: Date and time manipulation.
  - `os`: Interacts with the operating system.
  - `sys`: System-specific functions and parameters.
  - `random`: Generates random numbers.

Standard Library Example: `math`

```
1 import math
2 print(math.sqrt(16))  # Outputs 4.0
```

2. Third-Party Libraries

- Libraries developed by others that need to be installed separately.
- Installed via package managers like `pip` or `conda`.
- Examples by domain:
  - **Data Analysis**: `pandas`, `numpy`
  - **Visualization**: `matplotlib`, `seaborn`
  - **Machine Learning**: `scikit-learn`, `tensorflow`
  - **Web Development**: `flask`, `django`

Installing Libraries

- Install using `pip`:

```
pip install library_name
```

- Install using `conda` (for Anaconda users):

```
conda install library_name
```

- Example:

```
pip install pandas  # Installs pandas for data analysis
```

1 Introduction to Python Libraries

2 Kinds of Python Libraries

3 Popular Third-Party Libraries

4 Conclusion

Example: Data Analysis with pandas

```
1 import pandas as pd
2 df = pd.read_csv('data.csv')
3 print(df.head())  # Displays the first few rows of the dataset
```

Example: Plotting with `matplotlib`

```
1 import matplotlib.pyplot as plt
2 plt.plot([1, 2, 3], [4, 5, 6])
3 plt.show()  # Displays a simple line plot
```

1 Introduction to Python Libraries

2 Kinds of Python Libraries

3 Popular Third-Party Libraries

4 Conclusion

Conclusion

- Standard libraries come with Python, while third-party libraries expand functionality.
- Python libraries make coding faster and more efficient.
- Learning to use popular libraries enhances productivity in data science, machine learning, and web development.