

Python for Finance 101

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What?

- "Python is **powerful**... and **fast**; plays well with others; runs everywhere; is **friendly & easy to learn**; is **Open**" [▶ Python Documentation](#)
- Its popularity has grown in recent years among people of all ages and industries.
- Since it's relatively easy to learn, Python has been adopted by many non-programmers such as accountants and scientists
- Today it's a programming language used by top-tech companies due to its simplicity and efficiency in specified use cases. **Even YouTube is powered by Python programming.**

[▶ A Brief History of Python](#)



How?

There are many data science tools that make the process of learning how to code in a new programming language significantly easier:

- [Anaconda](#) is a nice package containing a lot of Python packages already and allows for an easy start into the world of Python [▶ How to install Anaconda?](#)
- Introducing [Kaggle Scripts](#)
- [Google Colab](#) lets you write, run and share Python code directly in your web browser using Colab Notebooks [▶ Get started with Google Colaboratory](#)

Further Reading: [▶ Why You Should be Using Jupyter Notebooks?](#)

Motivation

- The most popular language right now was born as [a hobby](#) in December 1989. Guido Van Rossum (his creator) was looking for a project to keep him occupied during his free time on Christmas.
- From the outset, van Rossum prioritized several key design principles and goals for Python:
 - Readability.
 - Simplicity. ▶ Java VS Python
 - Flexibility.
 - Extensibility.
 - Cross-platform compatibility.

▶ The Personal Story Behind the Creation of Python

Why?

- Python is ranked No. 1 on the [PYPL \(PopularitY of Programming Language\)](#) index. Also, Python has been the [TIOBE index](#) annual award winner for 3 times in the last 5 years. It has grown in popularity, due to boosts in the fields of data sciences and artificial intelligence.
- Netflix, IBM, NASA, Pixar, Facebook, and Spotify use Python in their operations. Python is also used in Pinterest and Instagram.
- [Interesting Article.](#) [▶ Coding in the classroom](#)

Why?

The Zen of Python

Python is pure poetry.

A man named Tim Peters composed a poem called 'The Zen of Python'.

▶ 'The Zen of Python'

Simple is better than complex.

Complex is better than complicated.

If the implementation is hard to explain, it's a bad idea.

If the implementation is easy to explain, it may be a good idea.

But, remember, Python is still just **A TOOL!**

Why?

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▶ ‘The Zen of Python’

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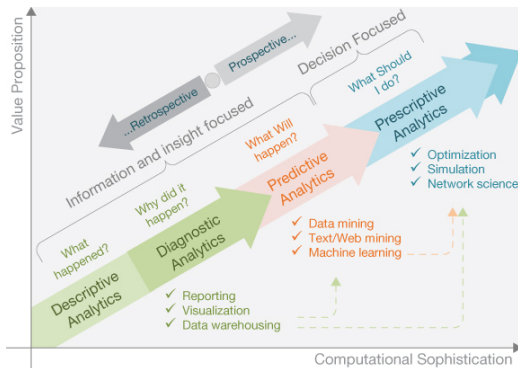
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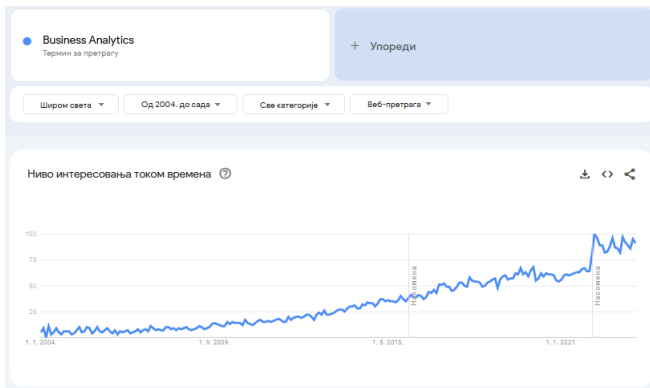
Business Analytics: data-driven decision making and the use of analytical approaches in the decision-making process



Source: Introduction to Business Analytics and Decision-Making

Recommendation: "Enterprise Analytics: Optimize Performance, Process, and Decisions Through Big Data" (Kim and Lev 2013)

Business Analytics



Source: Google Trends

Further Reading:

► Business Analytics Education

► A clever way to estimate enormous numbers

Data Mining In...

- Insurance

- Forecast claim costs for better business planning
- Determine optimal rate plans
- Optimize marketing to specific customers
- Identify and prevent fraudulent claim activities

- Brokerage and Securities Trading

- Identify and prevent fraudulent activities in trading
 - ▶ Can Benford's Law Detect Tax Fraud?
- Assess the effect of events on market movements
- Forecast the direction of stock fluctuations
- Predict changes on certain bond pricess

Recommendation: "Fraud analytics using descriptive, predictive, and social network techniques: a guide to data science for fraud detection" (Baesens, Van Vlasselaer, and Verbeke 2015)

Data Mining In...

- Customer Relationship Management
 - Identify and treat most valued customers
 - Maximize customer value (cross-, up-selling)
 - Improve customer retention (churn analysis)
 - Maximize return on marketing campaigns
- Retailing and Logistics
 - Minimize losses due to limited shelf life
 - Optimize logistics by predicting seasonal effects
 - Improve the store layout and sales promotions
 - Optimize inventory levels at different locations

Further Reading.

▶ Data Mining Goes to Hollywood: Predicting Financial Success of Movies

▶ Transitioning from Excel to Python

Let's Start Coding

Data Structures

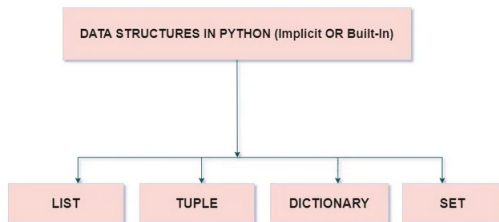


Figure 1: Implicit Data Structures Python

In Python, we use this syntax to create a variable and assign a value to this variable: `< var_name >=< value >`

Data Operators

Relational and arithmetic operators can be applied to [numeric variables](#)

- Arithmetic operation

- For addition: +
- For subtraction: -
- For multiplication: *
- For division: /
- For powers: **

- Relational Operators

- For test of equality: ==
- For test of inequality: !=
- < for smaller than and \leq for smaller of equal than
- > for greater than and \geq for greater or equal than

Modules, Packages and Libraries

- **Method:** a function doing a certain task
- **Module:** a file with methods, that can be used over and over again
- **Package:** a collection of modules
- **Library:** a collection of modules and/or packages that can be installed to your environment

The standard python installation comes with a set of preinstalled libraries

There are many (over 100,000) libraries written by others that can be additionally installed

You can install libraries with `!pip install [name of module]` and load them with `import [name of module]`

Modules, Packages and Libraries

Most Popular Python Libraries:

- **Pandas:** [documentation](#)

▶ How to Import Excel and CSV files into Python using Jupyter Notebooks

▶ How To Combine Data in Python

- **Scikit-learn:** [documentation](#)

- **Matplotlib:** [documentation](#)

- **NumPy:** [documentation](#)

- **Random**

- ...

▶ Turtle Module: Draw Heart Using Turtle Graphics in Python

▶ Five Interesting Modules you Should Know

Python Best Practices, Tips, And Tricks

- 5 Python Best Practices That Every Programmer Should Follow
- 30 Python Best Practices, Tips, And Tricks
- Common Errors in Python and How to Fix Them
- 5 Python Best Practices That Every Programmer Should Follow



Learning Resources



Practice Python

Books.

- "Learning Scientific Programming with Python", (Hill 2020)
- "Python for Finance: Analyze big financial data", (Hilpisch 2014)
- "Python for Finance Cookbook: Over 50 recipes for applying modern Python libraries to financial data analysis", (Lewinson 2020)

Video Lectures.

- [Python for Everybody](#), University of Michigan
- [Introduction to Computer Science and Programming in Python](#), MIT Open Learning Library

Practice Python

Online Websites.

- Real Python
- w3schools
- Edube Interactive: Online Programming Environment
- Kaggle

Online Community Platforms.

- Stack Overflow
- GitHub

Practice Python

Learning Platforms.

- Udemy, Coursera, StackSkills

IMPORTANT.

▶ How to receive Financial Aid on Coursera to Get Paid Course for Free in 2-Easy Steps?

Your First Task. ▶ 60 Python Projects with Source Code

▶ 180 Data Science and Machine Learning Projects with Python



Thank you for your attention! :)



Additional Materials



Java VS Python.



Figure 2: Popularity of the Fiscal Multiplier Topic and its use in research