



PROGRAMMING WITH PYTHON

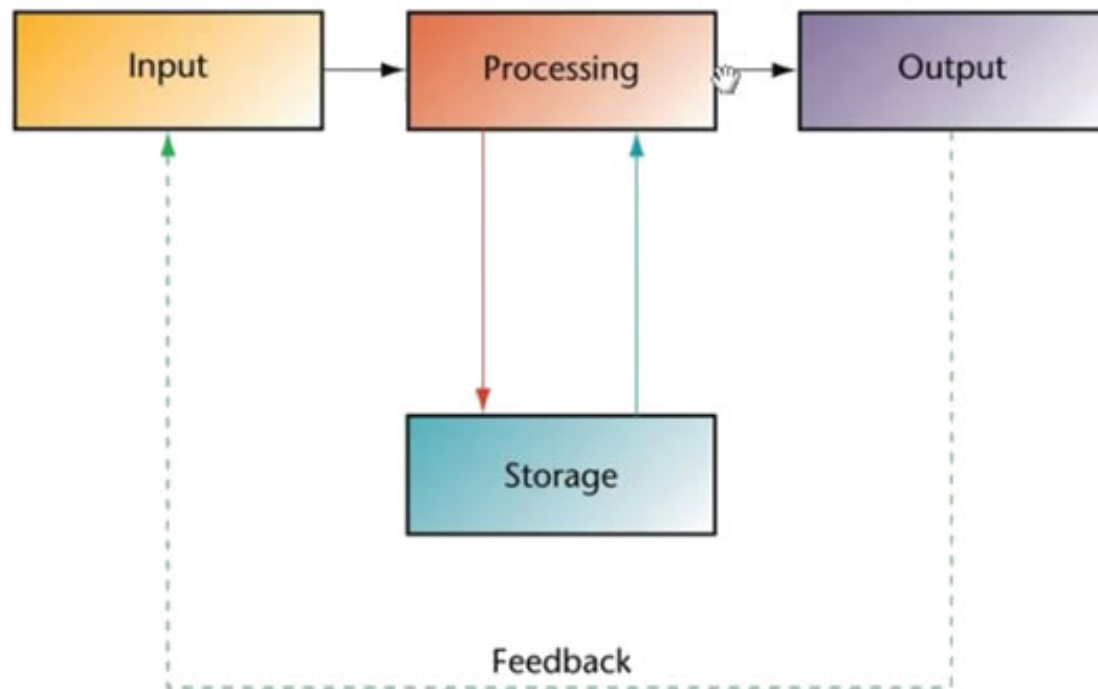
UNDERSTANDING WHAT PYTHON IS AND WHAT IT
CAN BE USED FOR

WHAT IS PROGRAMMING?

A way to instruct a computer to perform tasks.

There are numerous programming languages, the choice of which can depend upon:

- **Availability** within the given context
- **Suitability** for performing a particular task
- **Knowledge** of the programmer and other users



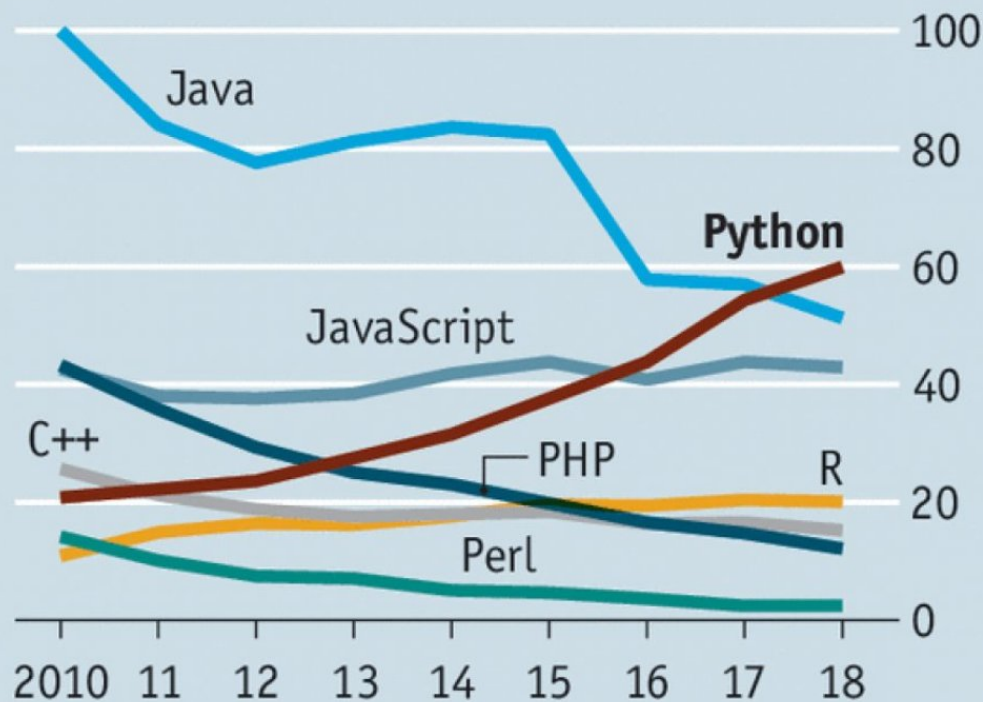
WHAT IS PYTHON?

A high-level, popular, general-purpose programming language.

- **High-level**: closer to human languages than machine code; very **readable** and relatively **simple syntax**
- **Popular**: expected to become the most **popular** programming language (and already is by some metrics)
- **General-purpose**: can be used for a wide **variety of applications**, such as games, web apps, and data analysis

Biggus uptickus

US, Google searches for coding languages
100= highest annual traffic for any language



Source: Google Trends

PYTHON FOR DATA ANALYSIS

- Numerous [open-source packages](#) created and maintained by an active and growing Python community, to [simplify programming](#) for:
 - Data [processing](#), [analysis](#) and [visualisation](#)
 - Data collection via [APIs](#) and [web scraping](#)
 - [Machine learning](#) and predictive modelling

PYTHON FOR DATA ANALYSIS

- Ability to **handle larger volumes of data** in a more **robust, repeatable** manner and with greater control than traditional spreadsheet applications such as Excel
 - Repeated operations are carried out more efficiently
 - Program logic is not hidden within the user interface

WHERE PYTHON CAN BE WRITTEN AND EXECUTED

- via the **command-line** interface
 - **Command Prompt** on Windows or **Terminal** on Mac / Linux
 - text-based with **limited formatting** of outputs
- via an **IDE** (Integrated Development Environment)
 - typically with features such as **syntax highlighting** and **debugging tools**
- via an **interactive notebook** interface
 - typically with features such **formatted display of code output** and the ability to **combine code with other media** such as **text** and **images**

JUPYTER NOTEBOOK

A web-based, interactive computing notebook interface:

- Create documents containing live **code**, **visualisations** and **narrative text**
- Embed **HTML**, **images** and **videos** and use **interactive widgets**
- Support for **numerous programming languages** (originally Julia, Python and R)



Language of choice



Share notebooks



Interactive output

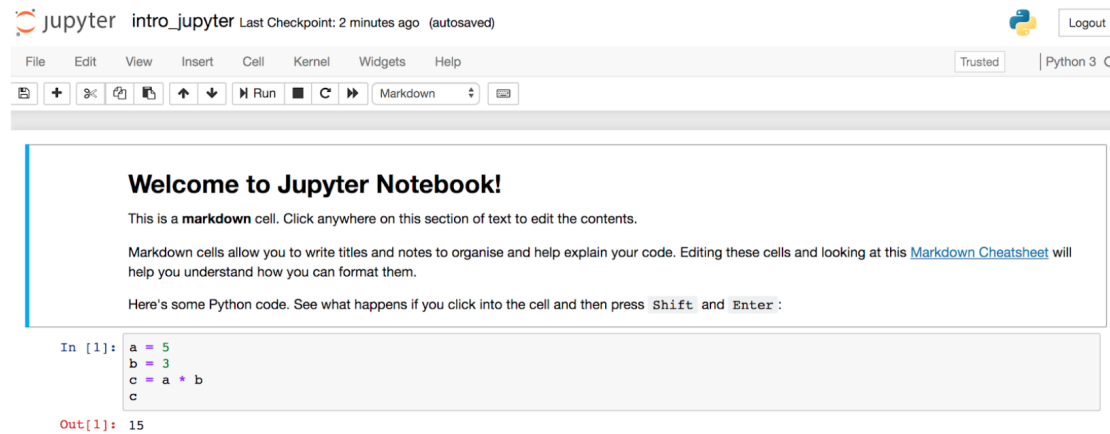


Big data integration

NOTEBOOK COMPONENTS

- A **kernel** is a program which runs the code cells in a notebook
 - such as our installation of **Python**
- A notebook is made of different types of **cells**:
 - **Markdown cells** can be used to add headings, notes and text lists
 - **Code cells** contain code compatible with the selected kernel
- Additional functionality and numerous **extensions** available, such as:
 - Slideshow creation
 - Code formatting tools

USER INTERFACE



The screenshot displays the Jupyter Notebook interface. At the top, the header shows the Jupyter logo, the text "jupyter intro_jupyter", and a status message "Last Checkpoint: 2 minutes ago (autosaved)". On the right, there is a Python logo and a "Logout" button. Below the header is a menu bar with options: File, Edit, View, Insert, Cell, Kernel, Widgets, and Help. To the right of the menu bar are buttons for "Trusted" and "Python 3". Below the menu bar is a toolbar with icons for file operations (new, open, save, print), cell navigation (up, down), execution (run, stop, restart), and a dropdown menu currently set to "Markdown".

The main content area contains a large text cell with the following text:

Welcome to Jupyter Notebook!

This is a **markdown** cell. Click anywhere on this section of text to edit the contents.

Markdown cells allow you to write titles and notes to organise and help explain your code. Editing these cells and looking at this [Markdown Cheatsheet](#) will help you understand how you can format them.

Here's some Python code. See what happens if you click into the cell and then press `Shift` and `Enter` :

```
In [1]: a = 5
        b = 3
        c = a * b
        c
```

Below the code cell, the output is displayed:

```
Out[1]: 15
```



Introduction to Jupyter Notebook
`intro-jupyter-workbook.ipynb`