# Python Applications

Py4Econ in Ulaanbaatar, 2024

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# Welcome everyone!

# About the course

1. Basic programming know-hows
2. Elementary to Intermediate Python
    - Supplementary materials:
        - Python specific: Data basics, Functions/Class, Coniditional/Loop
        - General programming: Command line interface (CLI), Code editor (VScode), Git/Github
    - **Main topics**: Data cleaning, SQL, Visualization/Dashboard, Webscraping, Machine learning (ML/DL), Automation (DevOps)

# Organization

- Lecture sessions: 3 hours at 17 p.m on Saturday, 8 sessions through 10 Aug - 29 Sep.
  - At the same zoom link emailed to all of you.
- Supplementary materials will be uploaded on Monday. To be studied by the lecture on Saturday. I will keep you informed in due course.
- Homework (practice problems after each session). To be submitted by the next session via Github repo.
- Every session will be recorded fully and be shared on a Google drive, to stay there until Google goes bankrupt. All codes will be shared via Github. Facebook chat group?
- A Zoom session lasts 40 minutes. We regather after 5 minutes.
- Asking questions is highly encouraged!

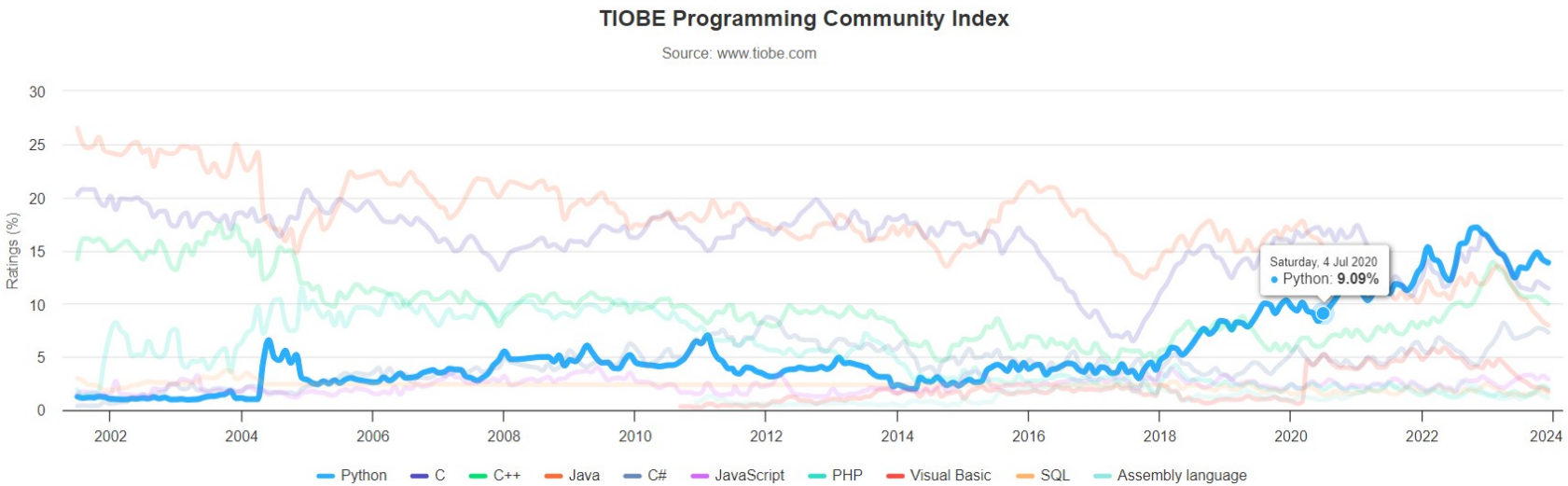
# Let's get to know each other :)

- I am
  - Your instructor: This course since Oct 2021; Python online contents since 2018 (Py4Econ Official YouTube channel).
  - Education: Bach. in Economics, IFE Mongolia, Master in Finance, Czechia
  - 4 years of banking experience in Mongolia
  - 2 years of experience in Macroeconomic consultancy in Czechia
  - Currently pursuing a Ph.D in Macroeconomics at the Bonn Graduate School of Economics, Germany
  - Data is everywhere, couldn't escape. Love coding.

# Week 1: Learning objectives

1. Background information
2. Computer basics (Folder structures, Path, Shell)
3. Python /Anaconda/
4. VScode, Jupyter notebook and other IDEs
5. Git & Github

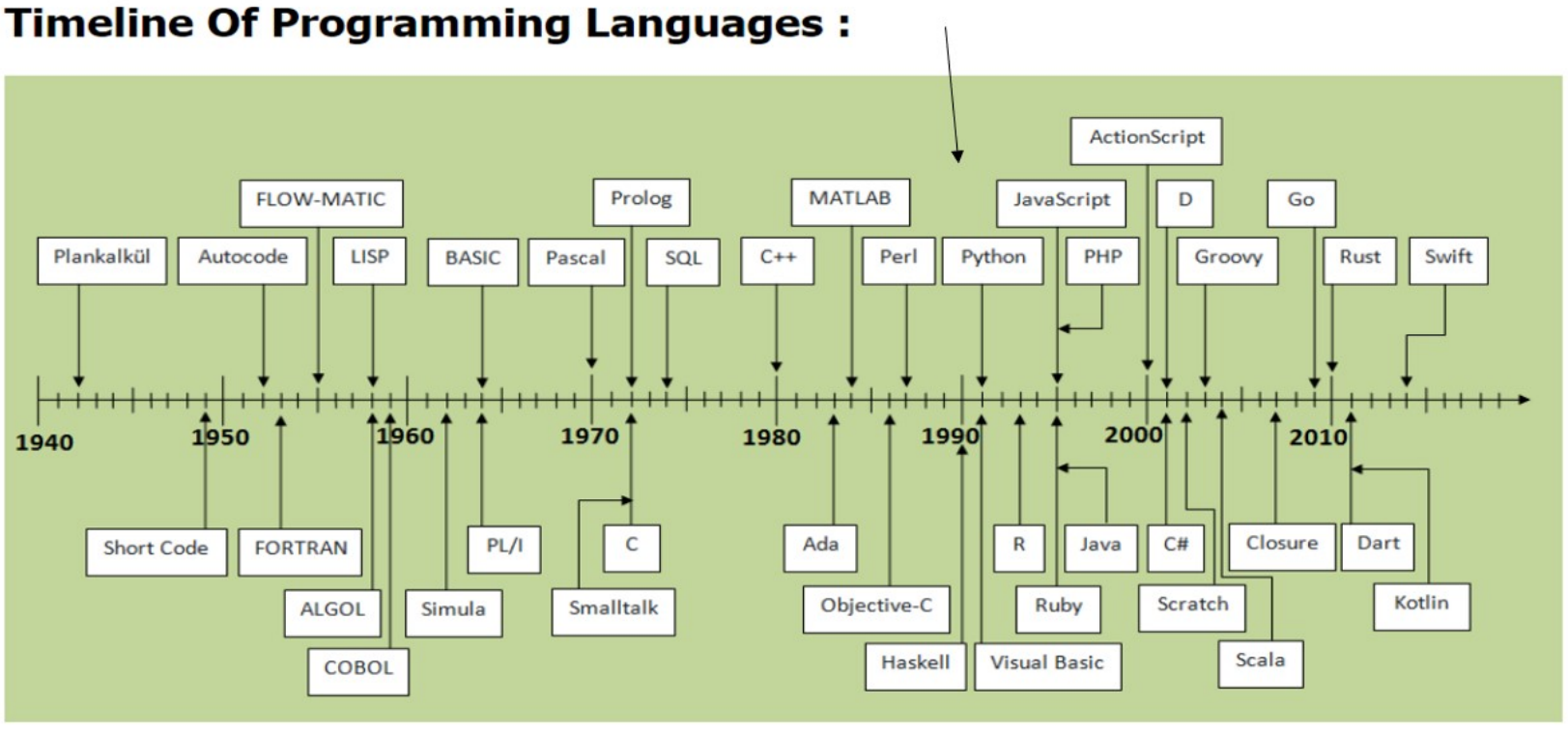
# Why Python?


TIOBE Programming Community Index
Source: www.tiobe.com
Ratings (%)
30
25
20
15
10
5
0
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020
2022
2024
Saturday, 4 Jul 2020
Python: 9.09%
Python
C
C++
Java
C#
JavaScript
PHP
Visual Basic
SQL
Assembly language

# Popular applications of Python

1. Data science and data visualization
2. Machine learning & AI
3. Scientific computing (incl. Financial modelling)
4. Automation, Algorithmic trading
5. Web & Game development
6. Desktop applications & Software & GUI

# Python was first released in 1991




Source: https://javaconceptoftheday.com/history-of-programming-languages/

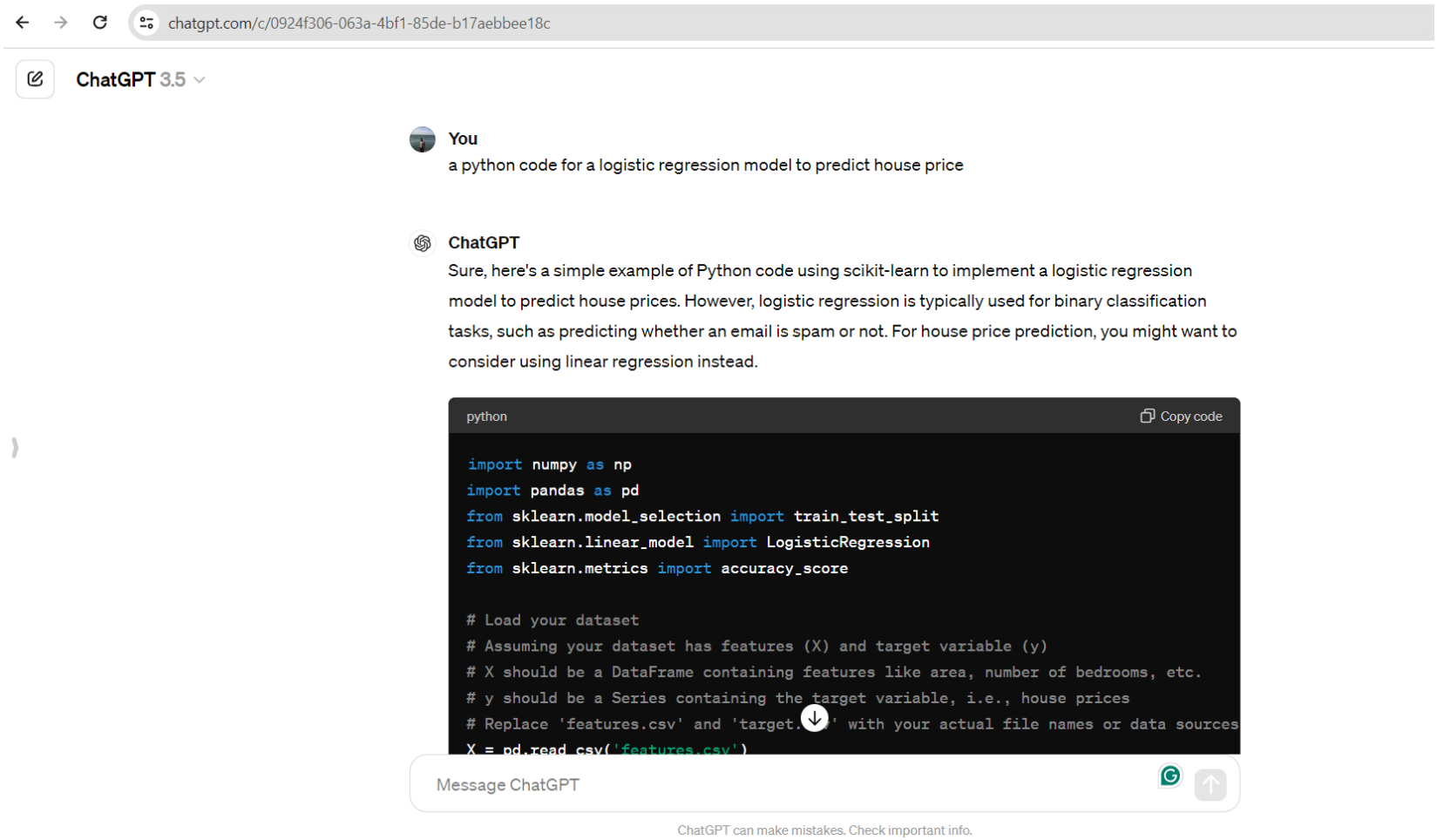
# Guide: Must-have basics for a good programmer

- Data Structure and Algorithm
- A Version Control Tool (Git)
- One Text Editors (VScode)
- IDEs (Spyder or Pycharm)
- Database and SQL
- UNIX (Linux)
- An OOP Programming language (C++, Java or Python)
- One Scripting language (automation)
- *Networking basics*
- *Cloud Platform (AWS, GCP, or Azure)*
- *Containers (Docker and Kubernetes)*

# Communities and learning platforms

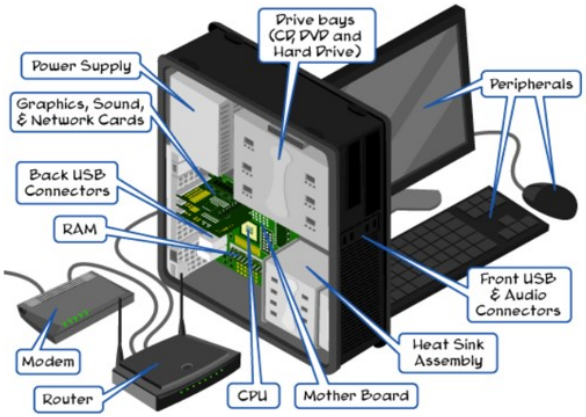
1. ChatGPT!
2. Python - Official
3. Stack overflow - Forum
4. Medium - Blog
5. Towardsdatascience - Blog
6. Tutorialspoint
7. Geek for geeks
8. W3schools
9. Real Python
10. Programiz
11. Kaggle - Competition and Learning resource

# ChatGPT and Github Copilot

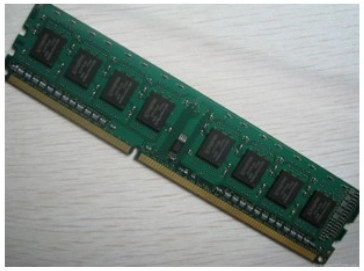


# Computer basics

## Processor




## RAM



## Hard disk

## Data units

| UNIT | ABBREVIATION | STORAGE |
|---|---|---|
| Bit | B | Binary Digit, Single 1 or 0 |
| Nibble | - | 4 bits |
| Byte/Octet | B | 8 bits |
| Kilobyte | KB | 1024 bytes |
| Megabyte | MB | 1024 KB |
| Gigabyte | GB | 1024 MB |
| Terabyte | TB | 1024 GB |
| Petabyte | PB | 1024 TB |
| Exabyte | EB | 1024 PB |
| Zettabyte | ZB | 1024 EB |
| Yottabyte | YB | 1024 ZB |

Storage units (www.byte-notes.com

## CPU (chip)

# Operating systems

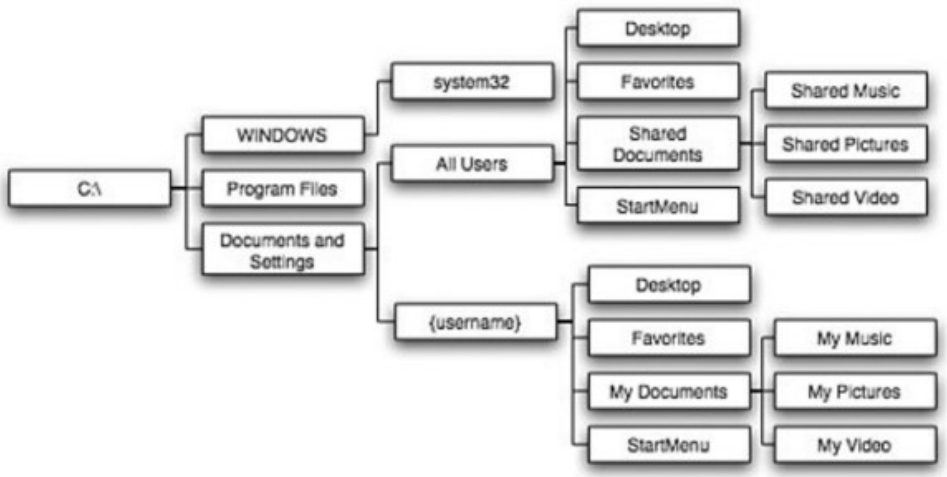
Mac, Linux,

Windows

# Folder structure

## Folder structure

Figure 4.7. Windows XP file structure.




**Copy path:**

- Ctrl + L = folder path
- Shift + Right mouse > copy as path (a) = file path

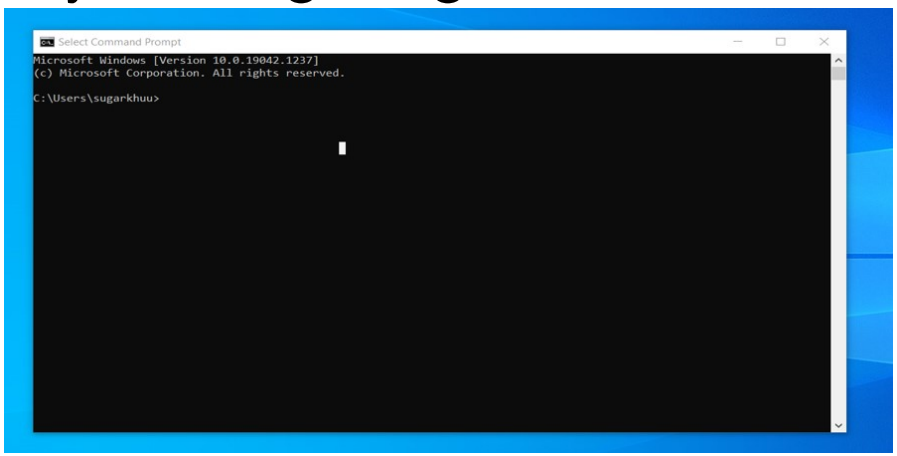
**When naming folder & file:**

- Avoid spaces and uncommon characters
- Use either camel or snake cases

C:\Documents and Settings\sugarkhuu\My Documents\My Video

# Command line interpreters/Shells

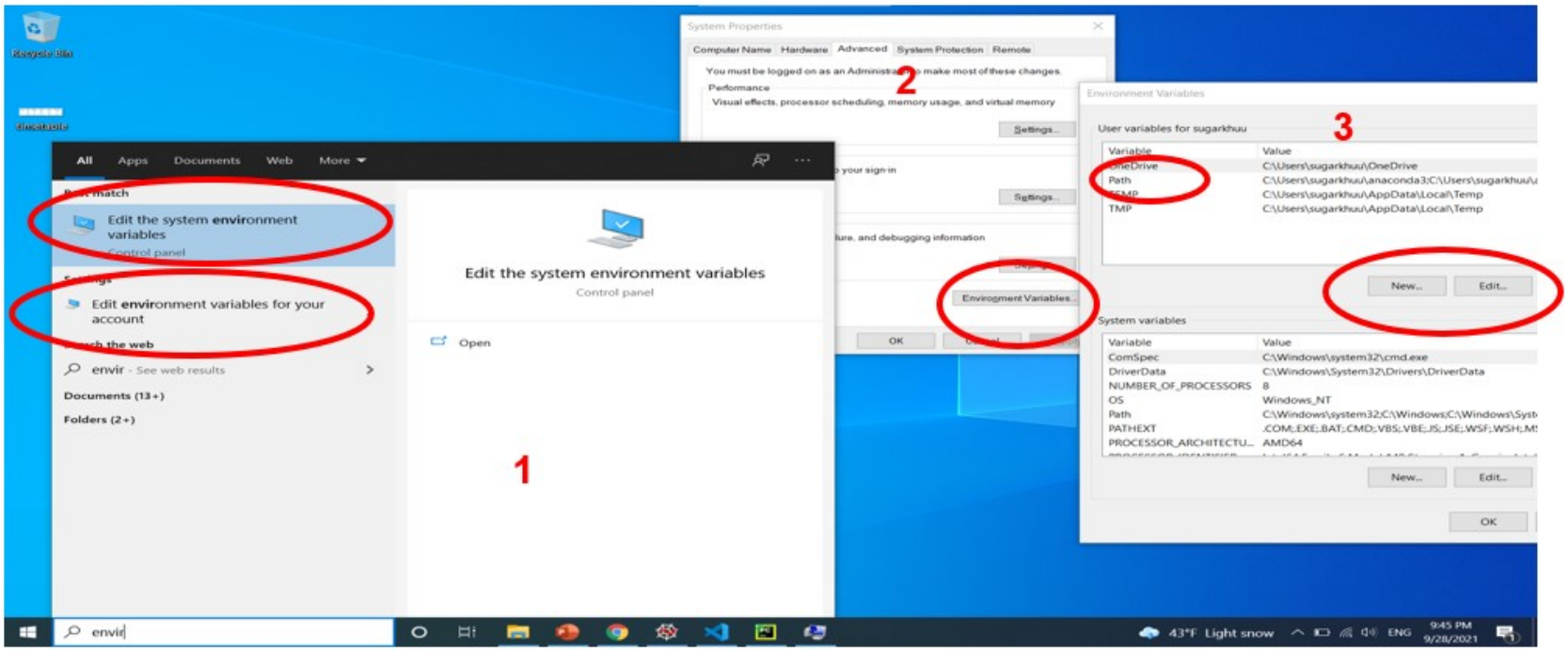
You are able to control your computer through commanding the OS from terminals (Win+CMD, Ctrl+T). More powerful and flexible than usual GUI way of doing things




- Windows: Command prompt, Powershell. More recently, Windows Terminal
  - Sample commands: cd, dir, mkdir, exit, cls
- Linux: Bash, Mac: Terminal (zsh)

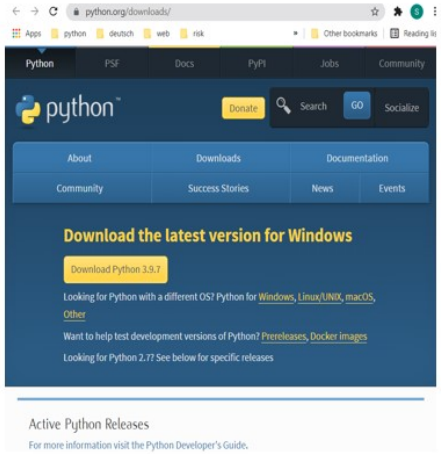
# Path (environment variable)

The PATH variable makes it easy to run commonly used programs located in their own folders.



# Getting Python

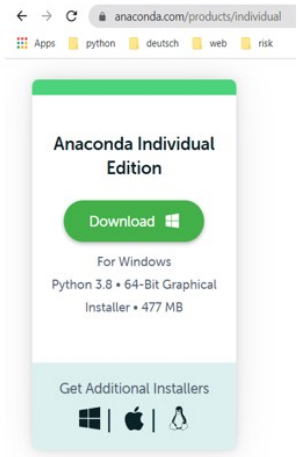
**Standalone Python**




https://www.python.org/downloads/

**Pre-installed all packages useful for data science**

**Anaconda (incl. python)**




https://www.anaconda.com/products/individual,
https://www.datacamp.com/community/tutorials/installing-anaconda-windows

# What is a programming language?

A programming language is a formal language comprising a set of strings that produce various kinds of machine code output. - Wikipedia

# Python basic concepts for today:

Detailed instructions in the supplementary materials next Monday.

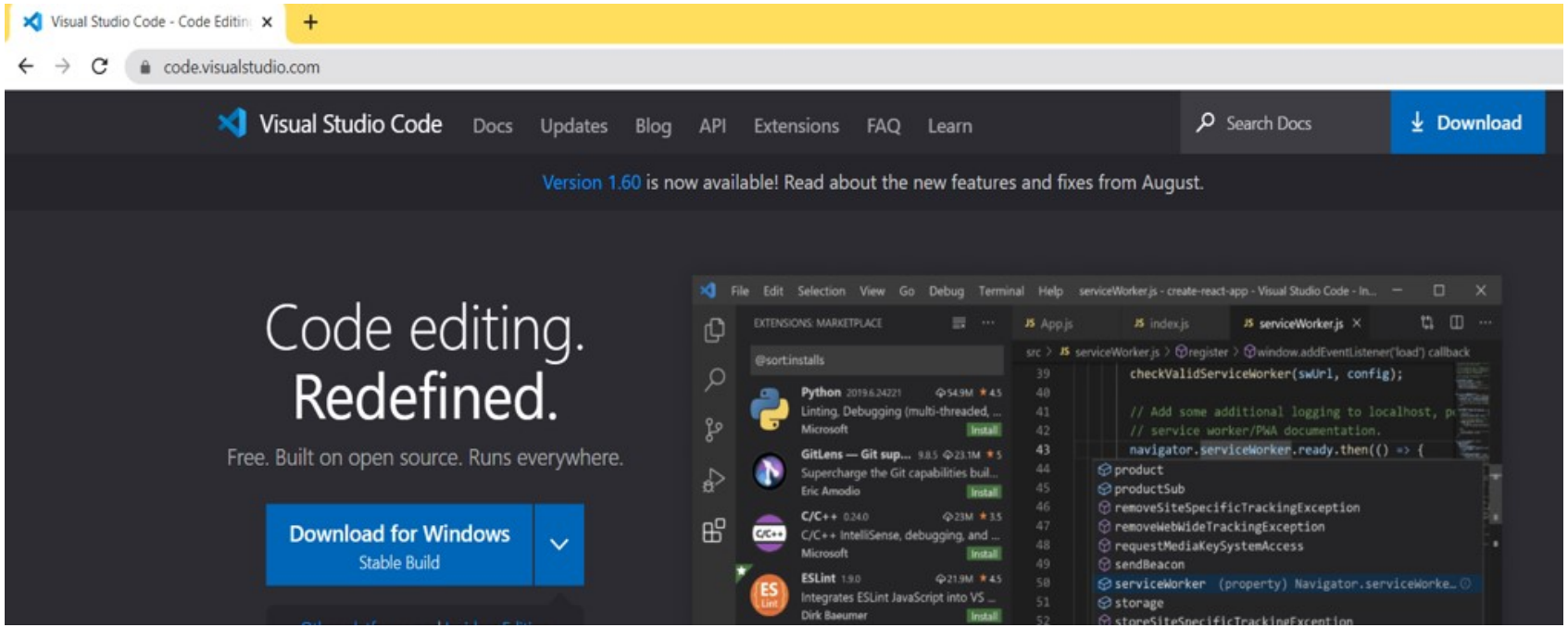
- Basic syntax
- Basic operators
- Packages (+ pip)

# Possible to use Python in many environments

1. Terminal
2. IDEs – Spyder or Pycharm (IntelliJ), VScode
3. Notebook - (Jupyter notebook)

# Using VS code (code editor) for Python

- Extensions
- Various functionalities: Navigation, Search/Replace, Version control, Code execution, Debugging
- Settings



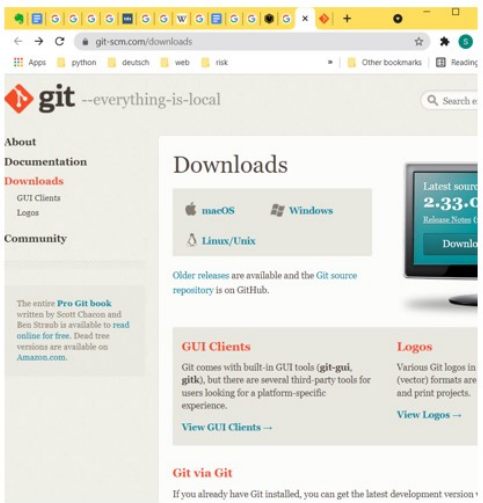
# Git – Version control system (VCS)

## Version control system (VCS):

Version control systems are a category of software tools that helps in recording changes made to files by keeping a track of modifications done to the code.

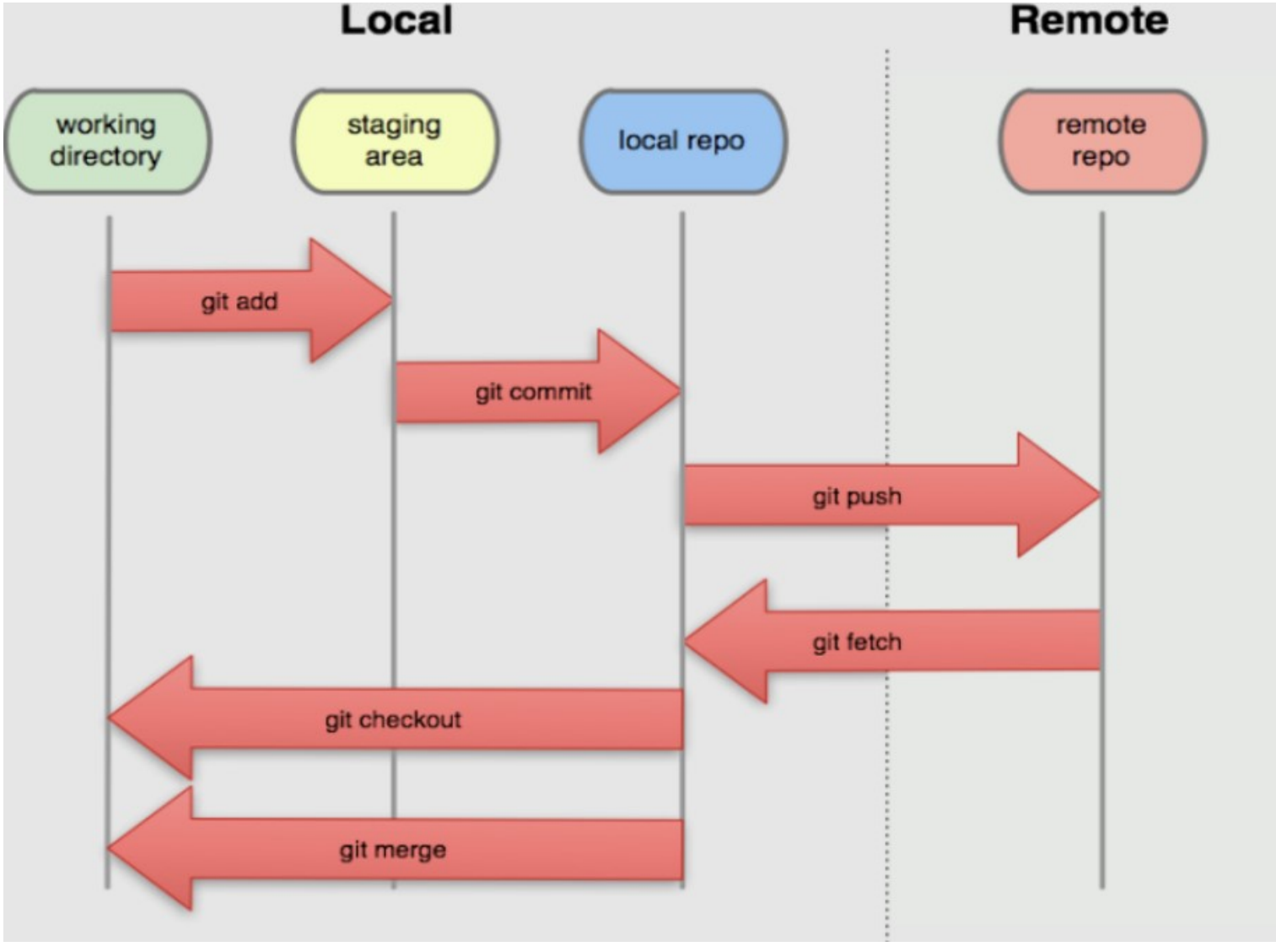
https://www.geeksforgeeks.org/version-control-systems/

Popular VCSs: Git, Subversion, Helix core, Microsoft TFS

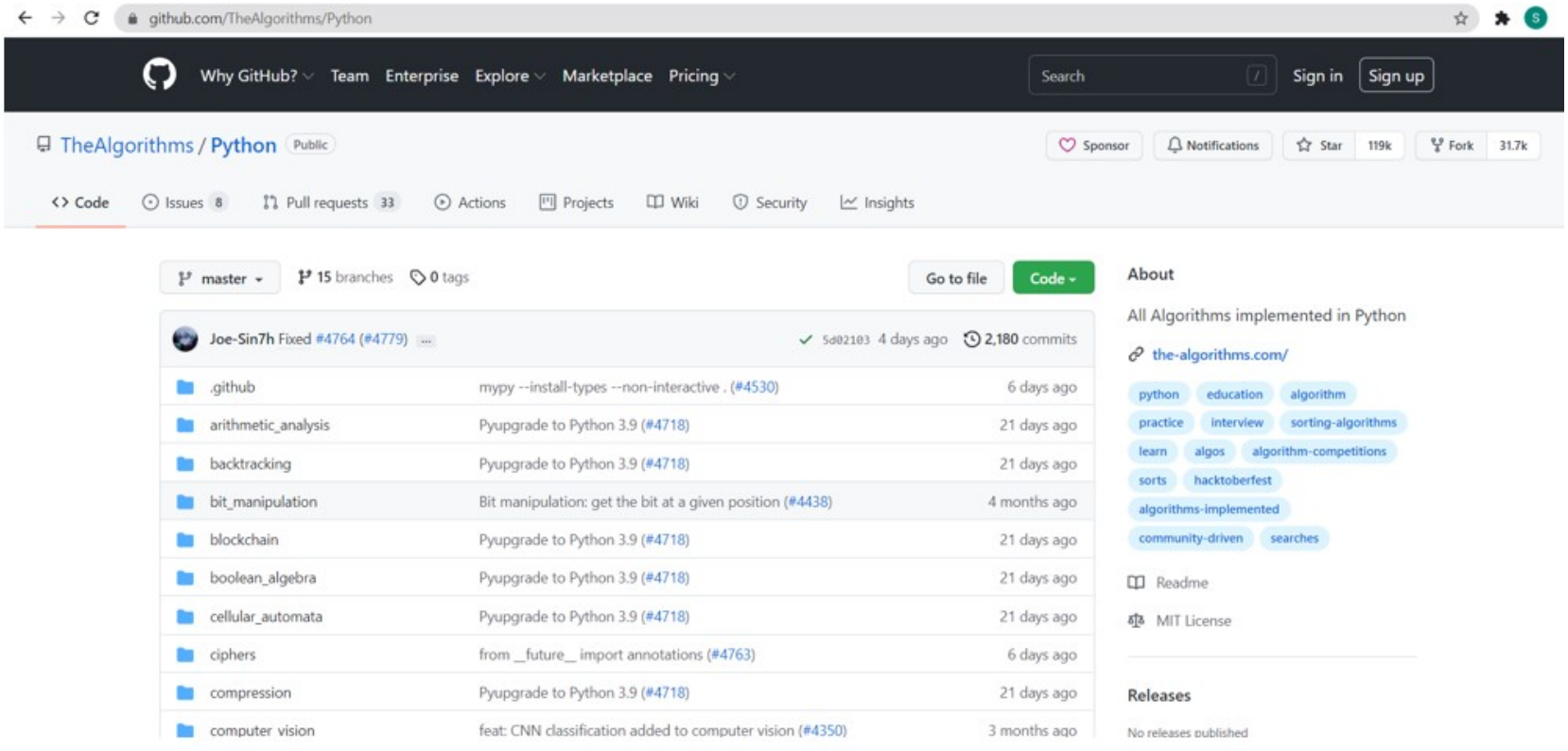



https://git-scm.com/downloads

# Git – Version control system (VCS)



# Github – Share everything you want




https://code.visualstudio.com/

# Git demonstration

- Configure user email and user name on the computer
- Create a new repo on Github and clone locally
- Make changes locally, compare and commit
- Make changes remotely and pull
- git log, git diff
- Repo access and rights

# Homework

1. Task 1
2. Task 2

- Submit your result in a 'Homework' github repo
- Deadline: 1 week

# Task 1

1. Create a new repository in your Github
2. Clone this repository to your local machine
3. Create a python file in the local repo (in your folder)
4. In the file, write a code which asks a question and receives the answer from the user
5. Commit and push your change
6. Create 3 more questions, and commit and push

# Task 2

1. Нэг компьютерт хоёр үйлдлийн систем суулгаж болох уу?
2. Path-д программаа оруулаагүй бол яах вэ?
3. Фолдерийн нэр нь дундаа зайтай байвал фолдерийг танихад ямар асуудал үүсэх вэ?
4. Git, Github хоёрын ялгаа юу вэ?
5. Commit, push хоёрын ялгаа юу вэ?
6. Push хийхээс өмнө олон дахин commit хийж болох уу?
7. Commit хийхэд github repo-д access хэрэгтэй юу?

# Thank you. See you next week!