

# Introduction to Python

Sugarkhuu Radnaa

Py4Econ in Ulaanbaatar

*py4econ@gmail.com*

# About the course

- ① Basic programming know-hows
- ② Elementary to Intermediate Python
  - Python topics covered: data structures, control flow, functions, modules, classes, files
  - Python topics not covered: data analysis, web development, ML & AI
- ③ 1 project

# About the course

- Tips for success
  - Do homeworks in time
  - Ask questions

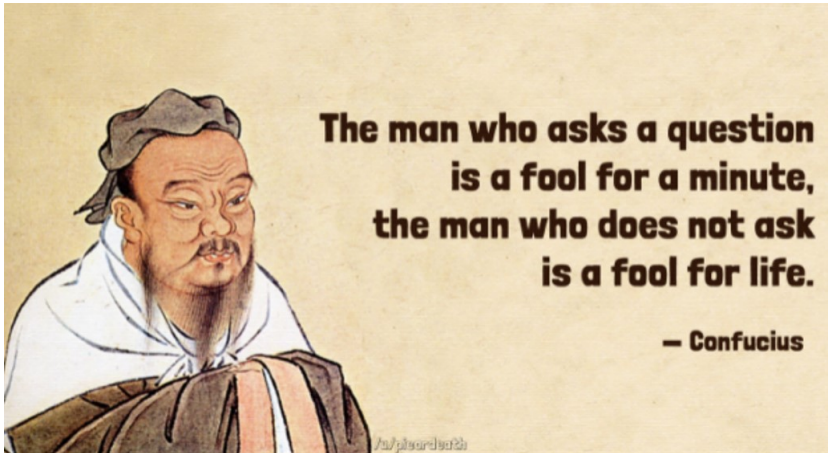
# Week 1: Learning objectives

- 1 Overview of Python
- 2 Computer basics
- 3 Communities
- 4 Folder structures, Path, Shell
- 5 Python /Anaconda/
- 6 Text editor, notebook, IDE
- 7 Git & Github

## 1 Background

## 2 Programming basics

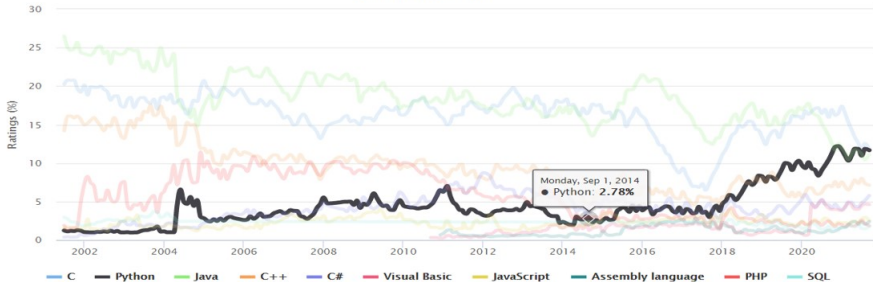
# Ask ask and ask!



# Why Python?

TIOBE Programming Community Index

Source: [www.tiobe.com](http://www.tiobe.com)



+

Beginner friendly

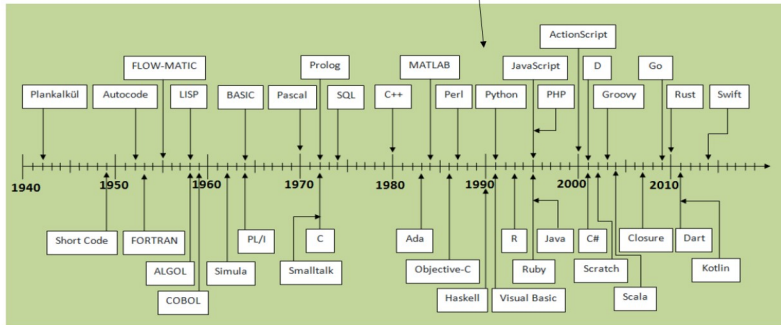
# Popular applications of Python

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



# Python was first released in 1991

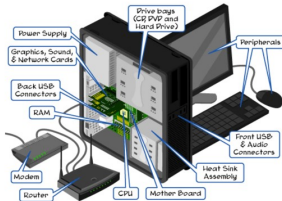
## Timeline Of Programming Languages :



Source: <https://javaconceptsoftheday.com/history-of-programming-languages/>

# Computer basics

## Processor

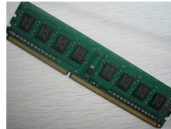


## Data units

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](http://www.byte-notes.com))

## RAM



## Hard disk



## CPU (chip)



# Operating systems

Mac, Linux,  
Windows



# Communities and learning platforms

- |                             |                                               |
|-----------------------------|-----------------------------------------------|
| 1 Python - Official         | 8 Real Python                                 |
| 2 Stack overflow - Forum    | 9 Programiz                                   |
| 3 Medium - Blog             | 10 Kaggle - Competition and Learning resource |
| 4 Towardsdatascience - Blog | 11 DrivenData                                 |
| 5 Tutorialspoint            | 12 TopCoder                                   |
| 6 Geek for geeks            | 13 DataHack                                   |
| 7 W3schools                 |                                               |

1 Background

2 Programming basics

# 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.

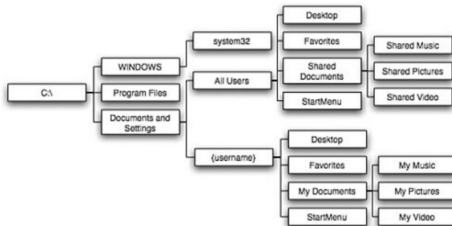
Wikipedia

```
1  
2  
3  print("Hello Py4Econ!")  
4  
5
```

# Folder structure

## Folder structure

Figure 4.7. Windows XP file structure.



### Copy path:

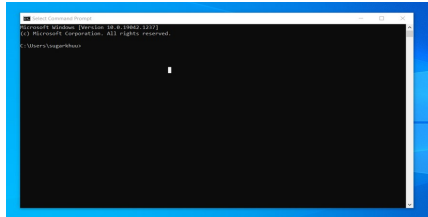
- Ctrl + L = folder path
- Shift + Right mouse > copy as path (a) = file path

### 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
- Linux: Bash
- Mac: Terminal (zsh)

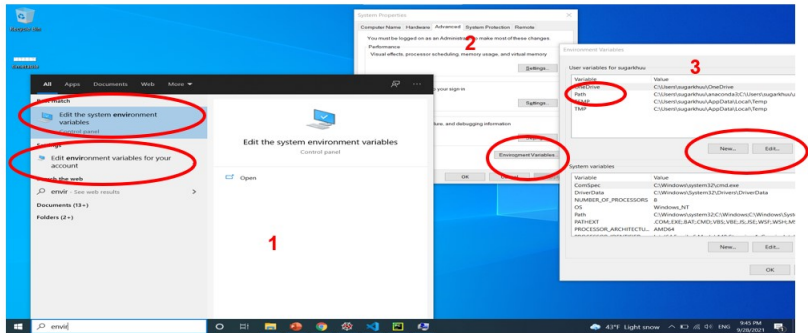


# Common CMD/Bash commands

- `cd [cd]` – change directory. `/?` - help
- `dir [ls]` – directory content
- `copy [cp]` – copy file
- `ren [mv]` – rename file
- `del [rm]` – delete file
- `mkdir [mkdir]` – create new folder
- `exit [exit]` - close terminal
- `cls [ctrl+L]` – clear terminal

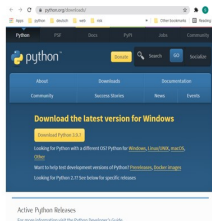
# Path (environment variable)

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



# Getting Python

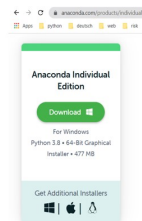
## Standalone Python



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

Pre-installed all  
packages useful  
for data science

## Anaconda (incl. python)

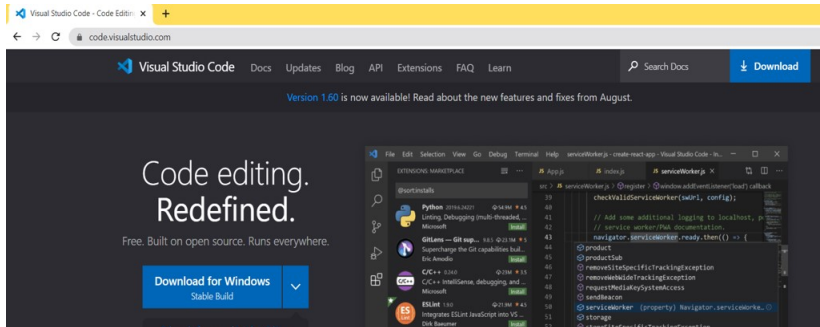


<https://www.anaconda.com/products/individual>,  
<https://www.datacamp.com/community/tutorials/installing-anaconda-windows>

# 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



# Python basic concepts for today:

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

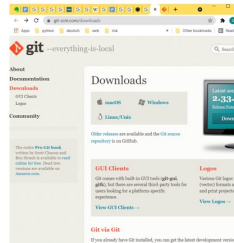
# Git – Version control system (VCS)

## 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.

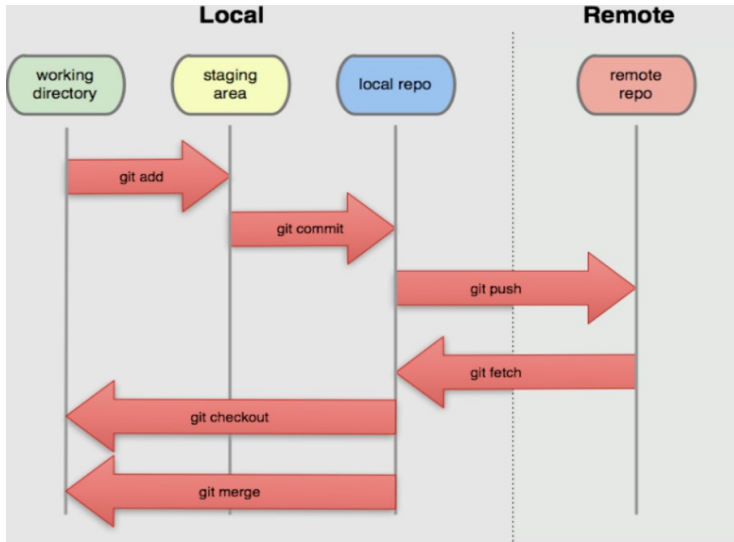
<https://www.geeksforgeeks.org/version-control-systems/>

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



<https://git-scm.com/downloads>

# Git – Version control system (VCS)





# Github – Share everything you want

The screenshot shows the GitHub repository page for 'TheAlgorithms/Python'. The repository is public and has 15 branches and 0 tags. The commit history shows a recent commit by Joe-Sin7h (#4764) 4 days ago, which includes updates to the .github directory, arithmetic\_analysis, backtracking, bit\_manipulation, blockchain, boolean\_algebra, cellular\_automata, ciphers, compression, and computer\_vision directories. The repository is described as 'All Algorithms implemented in Python' and includes a README, MIT License, and no releases published.

Why GitHub? Team Enterprise Explore Marketplace Pricing

Search Sign in Sign up

TheAlgorithms / Python Public

Sponsor Notifications Star 119k Fork 31.7k

Code Issues Pull requests Actions Projects Wiki Security Insights

master 15 branches 0 tags

Go to file Code

Joe-Sin7h Fixed #4764 (#4779) ✓ 502103 4 days ago 2,180 commits

.github	mypy --install-types --non-interactive (#4530)	6 days ago
arithmetic_analysis	Pyupgrade to Python 3.9 (#4718)	21 days ago
backtracking	Pyupgrade to Python 3.9 (#4718)	21 days ago
bit_manipulation	Bit manipulation: get the bit at a given position (#4438)	4 months ago
blockchain	Pyupgrade to Python 3.9 (#4718)	21 days ago
boolean_algebra	Pyupgrade to Python 3.9 (#4718)	21 days ago
cellular_automata	Pyupgrade to Python 3.9 (#4718)	21 days ago
ciphers	from __future__ import annotations (#4763)	6 days ago
compression	Pyupgrade to Python 3.9 (#4718)	21 days ago
computer_vision	feat: CNN classification added to computer vision (#4350)	3 months ago

About

All Algorithms implemented in Python

the-algorithms.com/

python education algorithm practice interview sorting-algorithms learn algos algorithm-competitions sorts hacktoberfest algorithms-implemented community-driven searches

Readme

MIT License

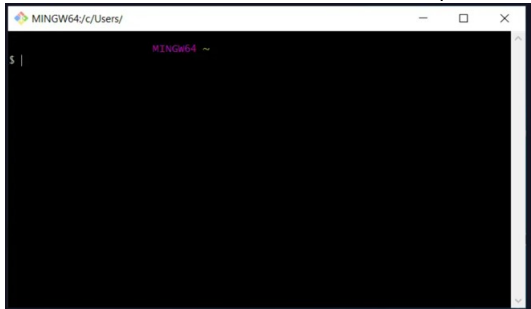
Releases

No releases published

<https://code.visualstudio.com/>

# Git bash (terminal)

A unix based commands on Windows (Emulator)



# 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)*

# Homework

- 1 Task 1
  - 2 Task 2
- Submit your result as a Github repository
  - Deadline: 1 week

# Task 1

- 1 Create a new repository in your Github
- 2 Clone the previous repository to your local machine
- 3 Create a Jupyter notebook in the local repo (in your folder)
- 4 In the notebook, write a code which asks 5 separate questions and receives the answers from the user (we had an example with only one question in the lecture)
- 5 Commit and push your changes question by question one at a time
- 6 Make sure your code follows the good practice

## 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 Jupyter notebook IDE мөн үү?
- 6 Commit, push хоёрын ялгаа юу вэ?
- 7 Push хийхээс өмнө олон дахин commit хийж болох уу?
- 8 Commit хийхэд github репо-д access хэрэгтэй юу?

# Thank you!