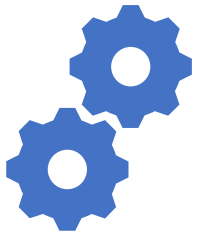
Feimax

Lab 3 Introduction to Python

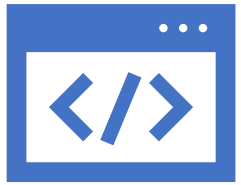
CAN201 – Introduction to Networking

Lab 3

How to use the PyCharm on labs' computer and install python and PyCharm for your computer.



Write a code using raw python and build a virtual Python runtime environment using ***Virtualenv***



Basic Python Syntax:

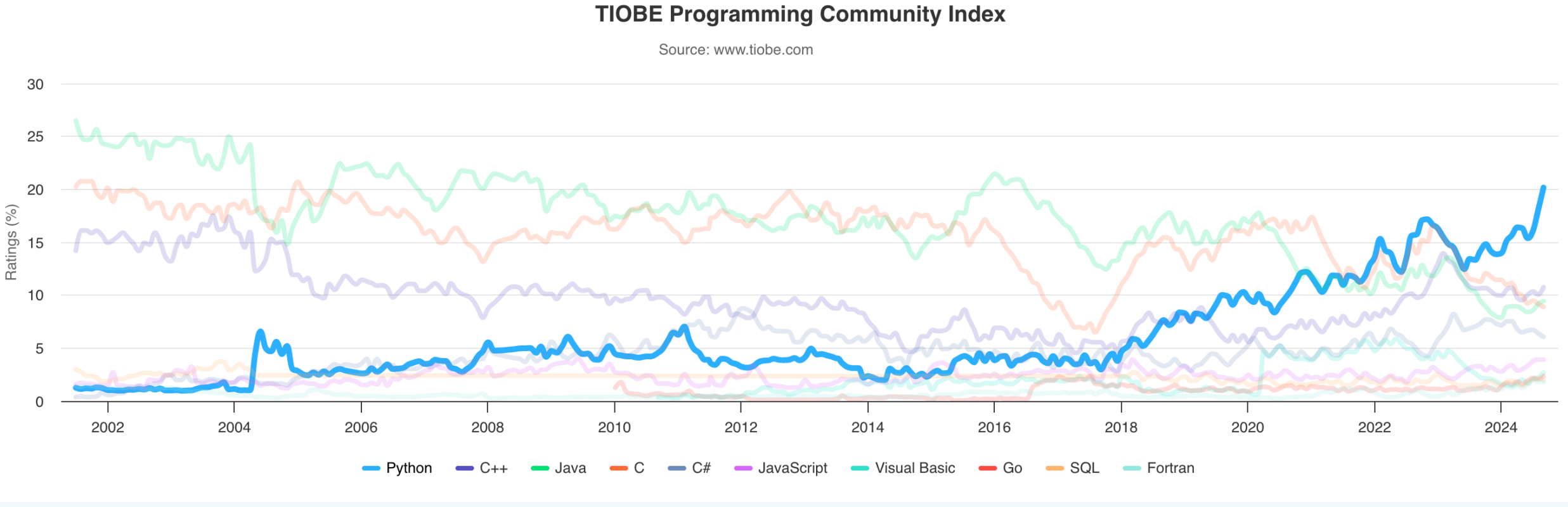
Variables, if, loop…

Python

Sep 2024	Sep 2023	Change	Programming Language	Ratings	Change
1	1		Python	20.17%	+6.01%
2	3	↑	C++	10.75%	+0.09%
3	4	↑	Java	9.45%	-0.04%
4	2	↓	C	8.89%	-2.38%
5	5		C#	6.08%	-1.22%
6	6		JavaScript	3.92%	+0.62%
7	7		Visual Basic	2.70%	+0.48%
8	12	⇈	Go	2.35%	+1.16%
9	10	↑	SQL	1.94%	+0.50%
10	11	↑	Fortran	1.78%	+0.49%

TIOBE September 2024

Python



September 2024

Python

- Python is a programming language that lets you work more quickly and integrate your systems more effectively.

What exactly can Python do?

What can python do?

- **Almost everything**

- AI (+ Tensorflow, PyTorch, Scikit-Learn)
- Data mining (+ Numpy, Pandas, Matlotlib, Jupyter Notebook)
- Scientific Computing (+ Scipy)
- Computer vision (+ OpenCV)
- Web and network (+Django, web.py, flask, socket, requests)
- Web Crawler (+ beautifulsoap, selenium)
- To exe (+ Pyinstaller)
- GUI (+ tkinter, wxPython)
- …

Features

- Simple and rich syntax – list, tuple, dict ···
- Without RAM management;
- A rich library of module packages (pypi) - numpy, scipy
- C/C++ connection – glue language
- .....

How to Start

- Difficulty in starting - so many ways to start!

  - Raw Python
  - Virtualenv
  - Anaconda
  - IPython: Interactive shell for python
  - Jupyter: GUI for Ipython

  - Spyder
  - PyCharm
  - VsCode
  - IDLE: idle…

Run Python using different ways

- On Labs Ubuntu
  - RAW Python
  - Virtual environment

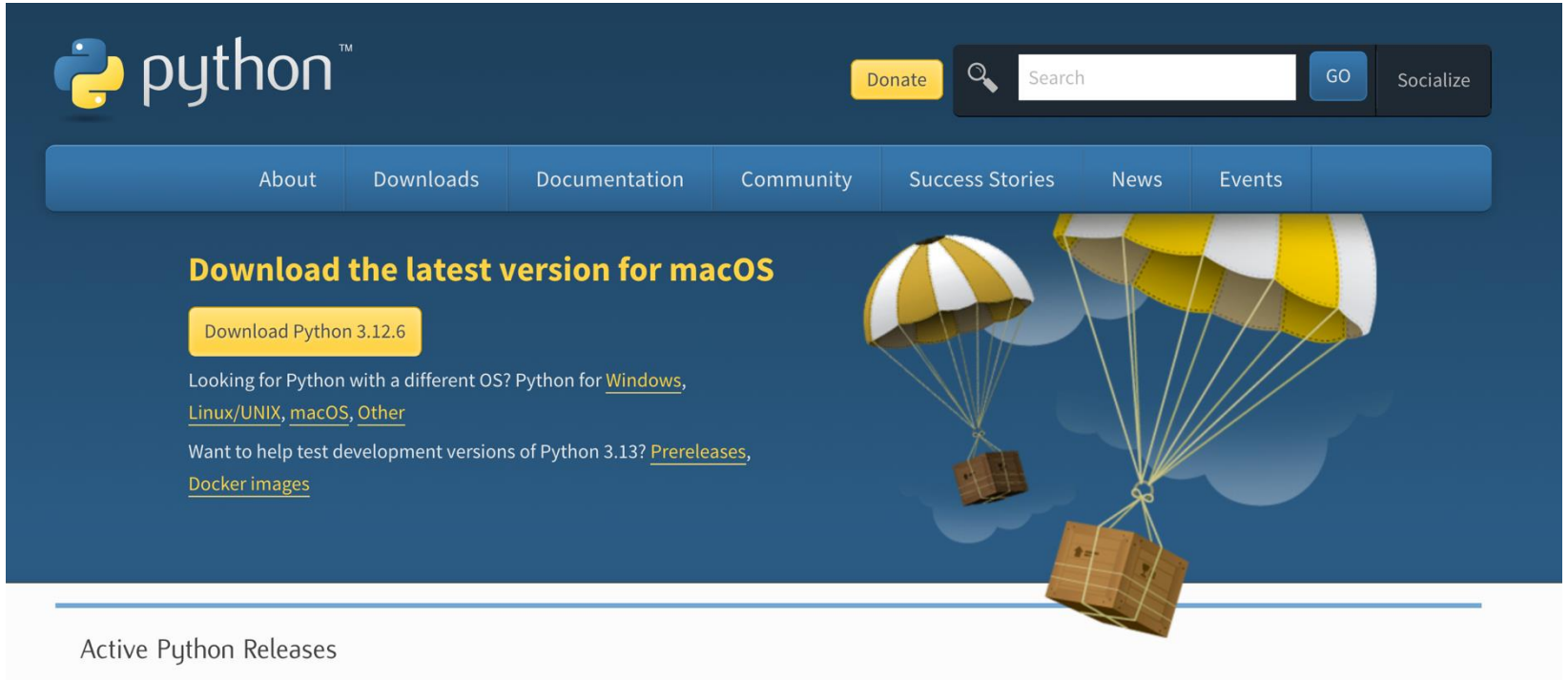
- On your computer(optional, strongly recommended)
  - RAW Python
  - Virtual environment

DEMO

- On Labs Ubuntu
- https://box.xjtlu.edu.cn/f/2375185209654f3882fa/

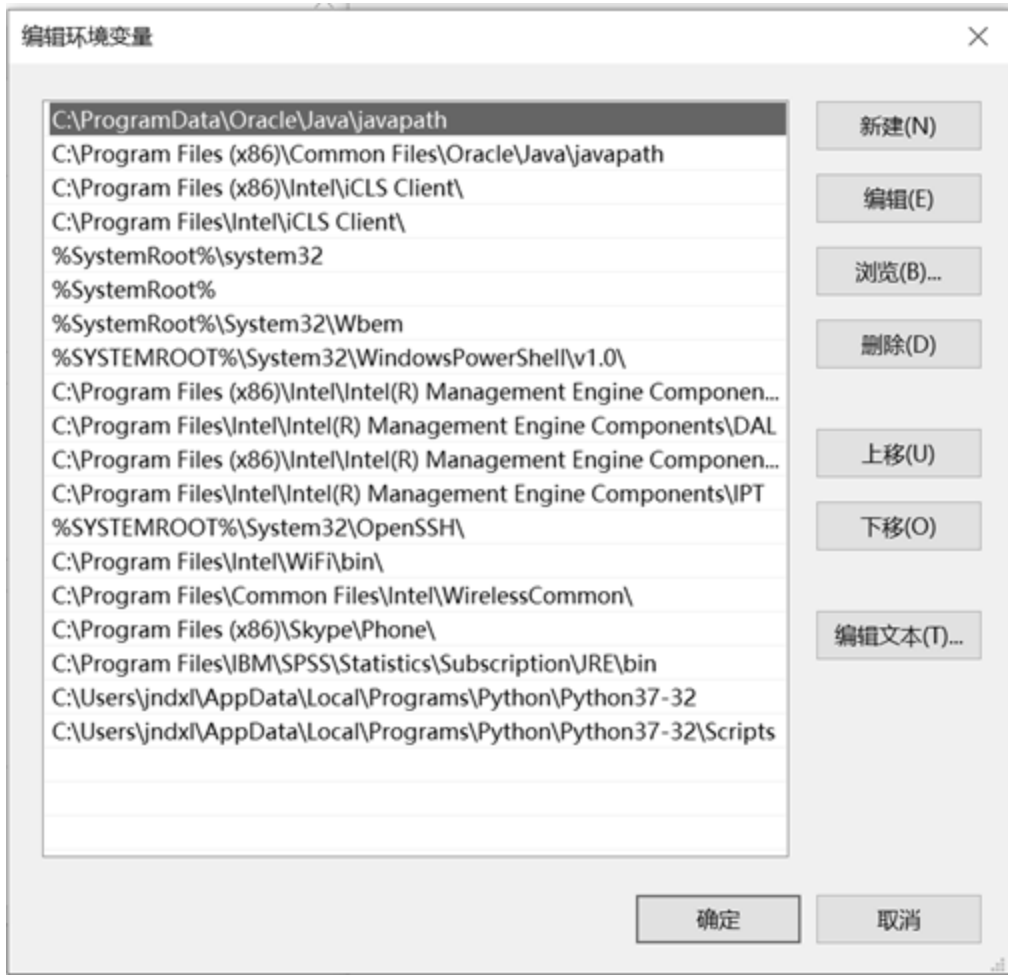
How to get Python

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



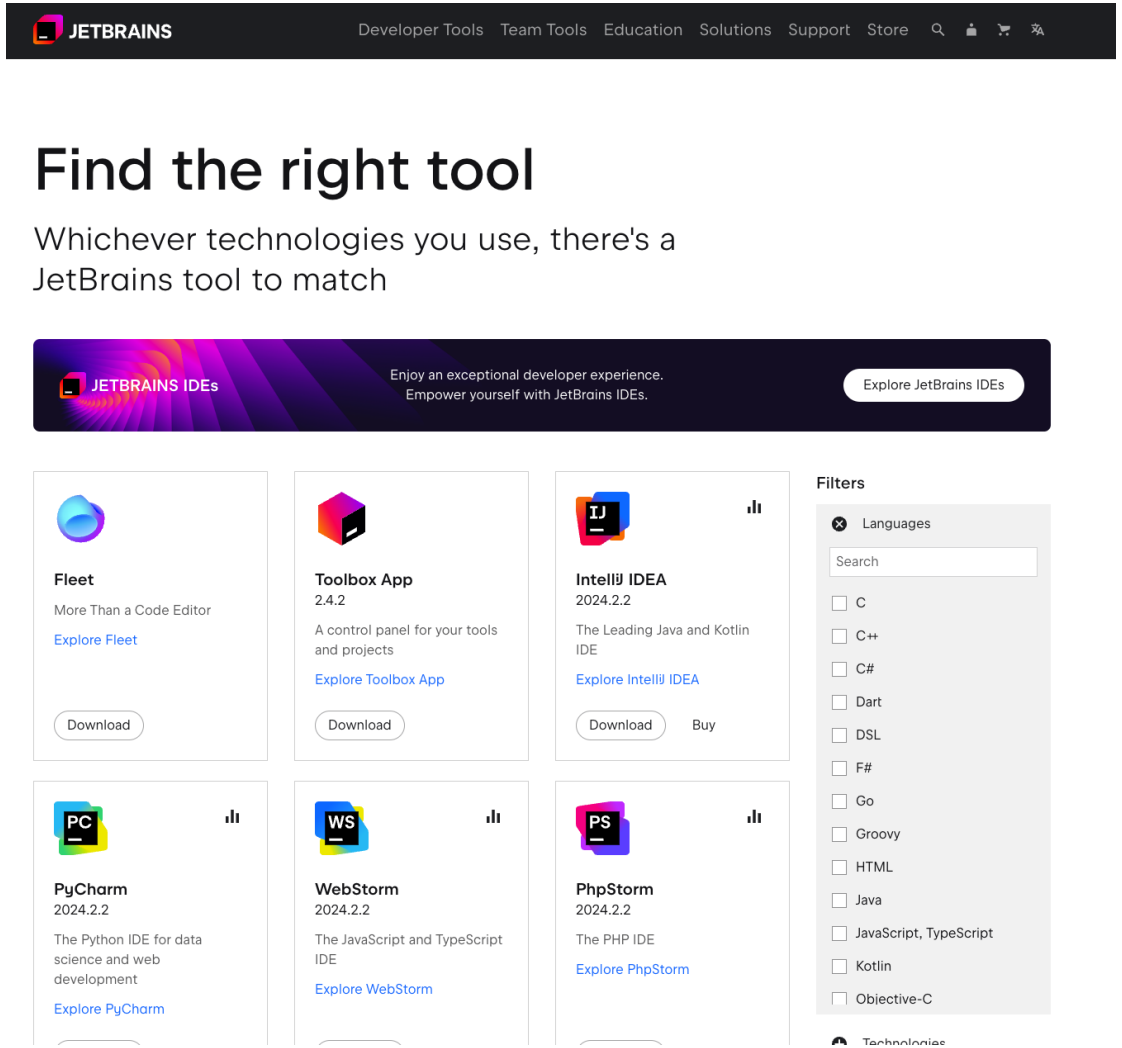
Windows

- Press Win key, select the gear icon on the left - Settings
- Search "Edit the system environment variables "
- Select " Edit the system environment variables "
- At the bottom right of the interface, select "Environment Variables"
- Find Path, in the list of Path
- Add the folder of python and pip
- Normally, path of python is
- C:\Users\xxx.xxx\AppData\Local\Programs\Python\Python37
- Path of pip:
- C:\Users\xxx.xxx\AppData\Local\Programs\Python\Python37\Scripts


编辑环境变量
C:\ProgramData\Oracle\Java\javapath
C:\Program Files (x86)\Common Files\Oracle\Java\javapath
C:\Program Files (x86)\Intel\iCLS Client\
C:\Program Files\Intel\iCLS Client\
%SystemRoot%\system32
%SystemRoot%
%SystemRoot%\System32\Wbem
%SYSTEMROOT%\System32\WindowsPowerShell\v1.0\
C:\Program Files (x86)\Intel\Intel(R) Management Engine Componen...
C:\Program Files\Intel\Intel(R) Management Engine Components\DAL
C:\Program Files (x86)\Intel\Intel(R) Management Engine Componen...
C:\Program Files\Intel\Intel(R) Management Engine Components\IPT
%SYSTEMROOT%\System32\OpenSSH\
C:\Program Files\Intel\WiFi\bin\
C:\Program Files\Common Files\Intel\WirelessCommon\
C:\Program Files (x86)\Skype\Phone\
C:\Program Files\IBM\SPSS\Statistics\Subscription\JRE\bin
C:\Users\jndxl\AppData\Local\Programs\Python\Python37-32
C:\Users\jndxl\AppData\Local\Programs\Python\Python37-32\Scripts
新建(N)
编辑(E)
浏览(B)...
删除(D)
上移(U)
下移(O)
编辑文本(T)...
确定
取消

How to get PyCharm

- https://www.jetbrains.com/products/



Version: 2021.2.1
Build: 212.5080.64
27 August 2021

System requirements
Installation Instructions
Other versions
Third-party software

Download PyCharm

Windows macOS Linux

Professional

For both Scientific and Web Python development. With HTML, JS, and SQL support.

Download .dmg (Intel)

.dmg (Intel)
.dmg (Apple Silicon)

Fre

Community

For pure Python development

Download .dmg (Intel)

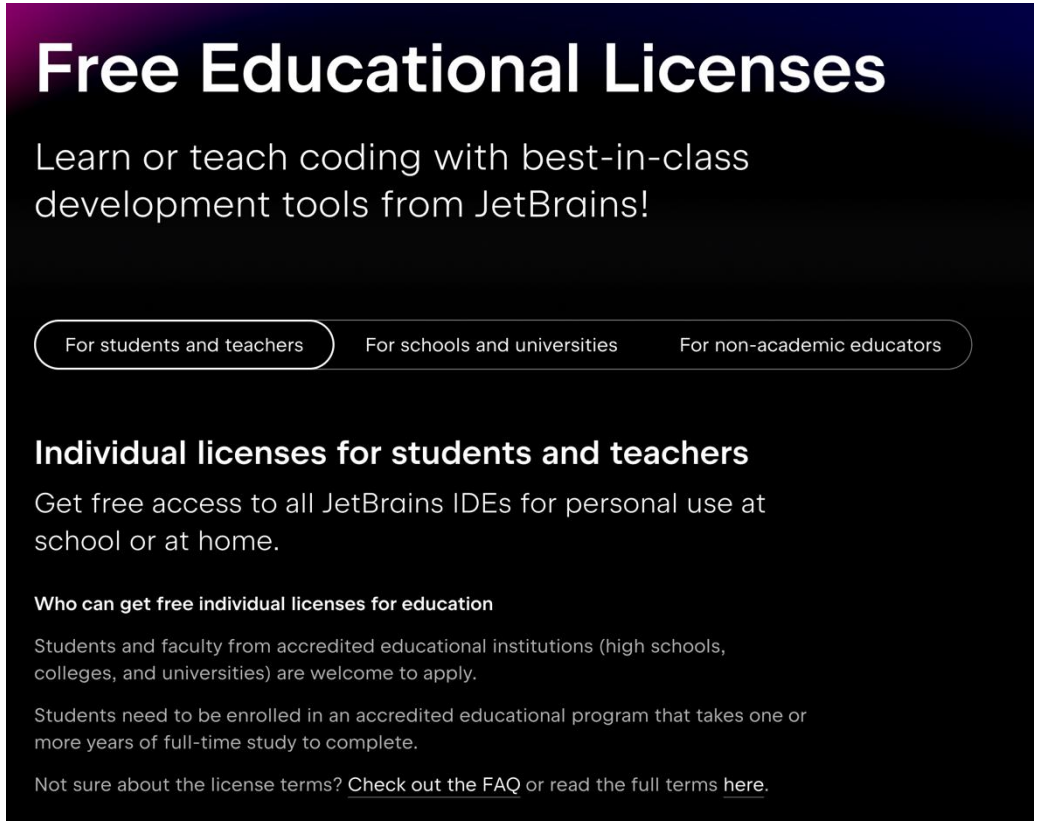
Free, open-source

PyCharm i tel and Apple Silicon

Get the Toolbox App to download PyCharm and its future updates with ease

Student jetbrains account

- https://www.jetbrains.com/community/education/#students



How to receive emails from JetBrains?

- Make sure your email account is right: xxx.xxx22@student.xjtlu.edu.cn
- If you cannot find emails from JetBrains, please try to find emails from https://spam.xjtlu.edu.cn/

How to start to learn computer language?

1. Install a beautiful IDE
2. Variables: how to define? Type?
3. How to print “hello world”?
4. How to input a number and a string? Know 1 and ‘1’ are different.
5. Know “if” conditional statement.
6. Know “for” loop and “while” statements.
7. Use functions
8. Try to adapt to the non-GUI environment.
9. How to deal with a large number of data? (Array and other data structure)
10. OOP if the language supports.

……

Basic Python Syntax

- Variables: numbers, strings, list
- Identifier: naming rule, python keywords
- Important syntax 1: line, indentation
- Flow Control: if…elif…else; ternary operator; for and while loop

Variables

- Variables in Python can be used without declaration.
  - Simple, fast
  - Ambiguity
- Get type of a variable
  - `type(v)`
  - `isinstance(v, type/class…)`

Variables - String

- Many ways to have a string
  - `'foo', "bar", '''foobar'''`
- String prefix
  - b: byte array
  - r: raw (avoid char escaping)
  - f: formatted
  - u: unicode
- Print string
  - `print()`
  - `pprint()  # a pretty printer`

Variables - Numbers

- int:
  - Binary, Decimal, Octal, Hexadecimal:
    - `int('1001', n) # make a base "n" number to a decimal number`
    - `# bin(d), oct(d), hex(d) convert a decimal number to b / o / x`
  - Rounding
    - `# int(f), round(f), math.ceil(f), math.floor(f)`
- float:
  - `float('0.15')`
- Variables precision
  - Try ***numpy***

Variables

DEMO

https://box.xjtlu.edu.cn/f/558783dd99e546dfb49c/

"Variables" - List

- List: a super array
- Different type for each item!
- Easily nest

```
['a', 'ny', item, [1,2,3], [True, False, {'a': 1}]]
```

"Variables" - List

- Define:
  - `l = []`
- Sort
  - `l.sort([key=func])`
  - unique type / multiple type
- Index
  - `l.count()`
  - `l.index(item, [start, [, end]])`
- An item exist
  - `item in l  # a boolean value`

"Variables" - List

- Put an item
  - `l.append(item)`
  - `l.extend(another_list)`
- Take away an item
  - `l.pop(postion)  # get and remove this item`

List

DEMO

https://box.xjtlu.edu.cn/f/d37d529002ac42be8286/

Identifier

- Definition:
  - identifier ::= (letter | "_") (letter | degit | "_")*
  - letter ::= "a" … "z" | "A"…"Z"
  - digit ::= "0"…"9"
- Name of:
  - variables, functions, class, python keywords

BNF: Backus-Naur form

https://docs.python.org/3/reference/

Coding Style - Name

- Name your classes and functions consistently; the convention is to use UpperCamelCase for classes and lowercase_with_underscores for functions and methods.
- Required by PEP-8: https://www.python.org/dev/peps/pep-0008/

  (Python Enhancement Proposals)

Identifier

- Python keywords (33):
  - `['False', 'None', 'True', 'and', 'as', 'assert', 'break', 'class', 'continue', 'def', 'del', 'elif', 'else', 'except', 'finally', 'for', 'from', 'global', 'if', 'import', 'in', 'is', 'lambda', 'nonlocal', 'not', 'or', 'pass', 'raise', 'return', 'try', 'while', 'with', 'yield']`
- How to know python keywords

```
import keyword
print(keyword.kwlist)
```

Important syntax 1

- Line:
  - Explicit line joining: \
  - Implicit line joining: parentheses (), square brackets [] or curly braces {} can be split over more than one physical line without using backslashes
- Blank lines: spaces, tables, a comment (only)
- `pass #  not a blank line`

Important syntax 1

- Indentation:
  - Leading spaces and ~~tabs~~
  - Indentation is used to represent program blocks / scope
- Coding style:
  - Use 4-space indentation, and no tabs.
  - Wrap lines so that they don’t exceed 79 characters

Flow Control - if

- `if …`
- `if … else …`
- `if … elif … elif … else …`
- `Condition: support a < x <= c`
- ternary operator: `z = x if condition else y`
- No select or switch in Python

if

DEMO

https://box.xjtlu.edu.cn/f/fdec60d9eb264bdcaba5/

Flow Control - loop

- `for item in generator:`
  `do_sth()`
- `while condition:`
  `do_sth()`
- `break` and `continue`: the soul of loops
- No `do... while`: how to simulate?

loop

DEMO

https://box.xjtlu.edu.cn/f/cf35c865af3b4c9c87e7/

Thanks ”