ENG1003 Freshman Seminar for Engineering
AAE
Design of Path Planning Algorithm for Aircraft Operation

Week 3: Introduction to Path Planning, Python and GitHub

Dr Li-Ta Hsu

Assisted by Dr Weisong Wen

Teaching Assistant Information

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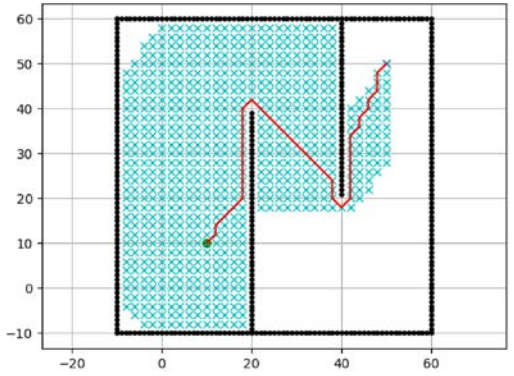
- Office Hour: by appointment

- **Expertise:** Autonomous driving, Navigation, Sensor Integration

What you are expected to learn?



Academic level of algorithm designs

- Design of a path planning algorithm
  - 2D path planning for simplicity

Make use of the **open-resource** to work on coding-project **remotely**.

- Programming and coding
  - Python
- Online coding collaboration
  - GitHub

Install Python and Debugger Visual Studio Code in Win10

Install Python in Windows 10

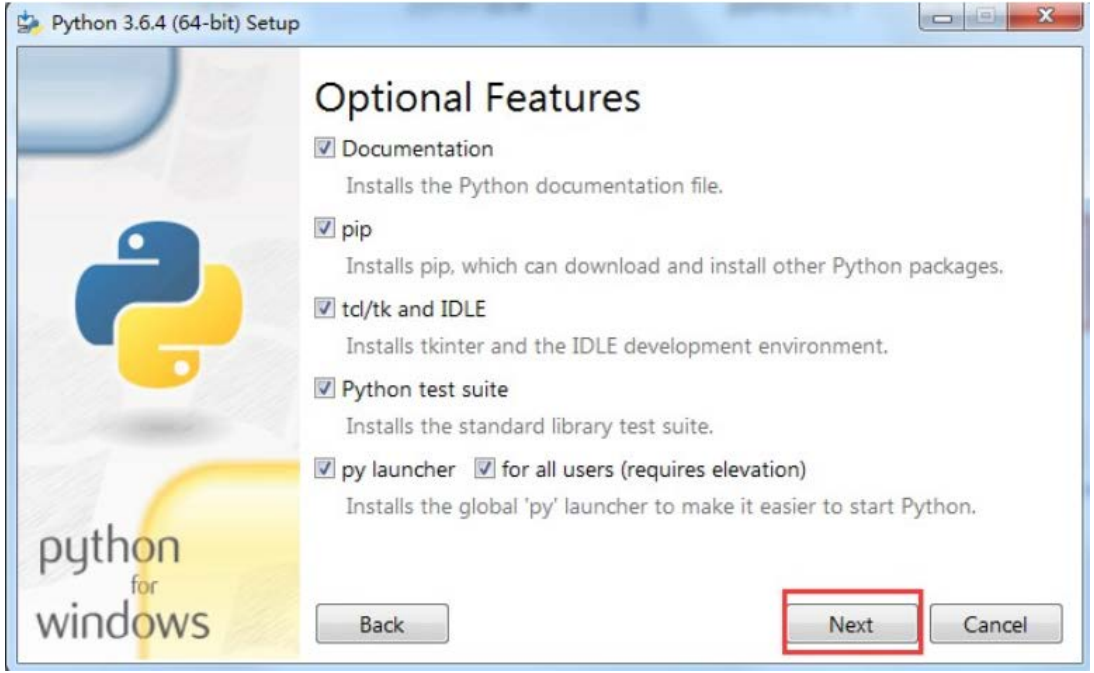
Step 1: Download Python 3.6.4

https://www.python.org/ftp/python/3.6.4/python-3.6.4-amd64.exe

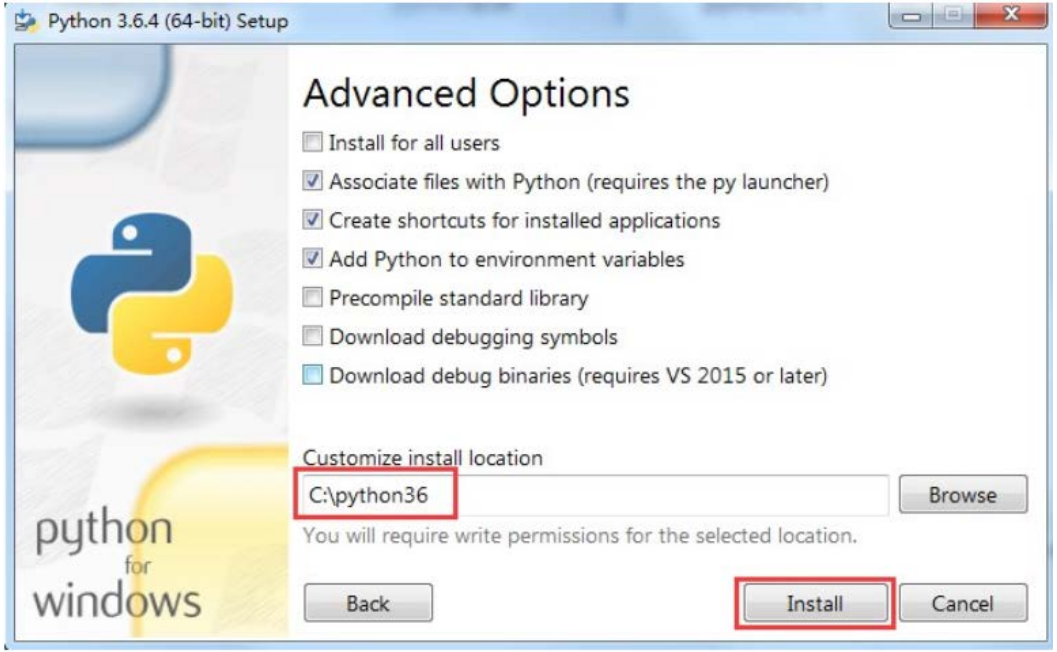
Step 2: Install Python 3.6.4 in Windows 10

Python is an interpreted, high-level, general-purpose programming language. Created by Guido van Rossum and first released in 1991, Python's design philosophy emphasizes code readability with its notable use of significant whitespace.

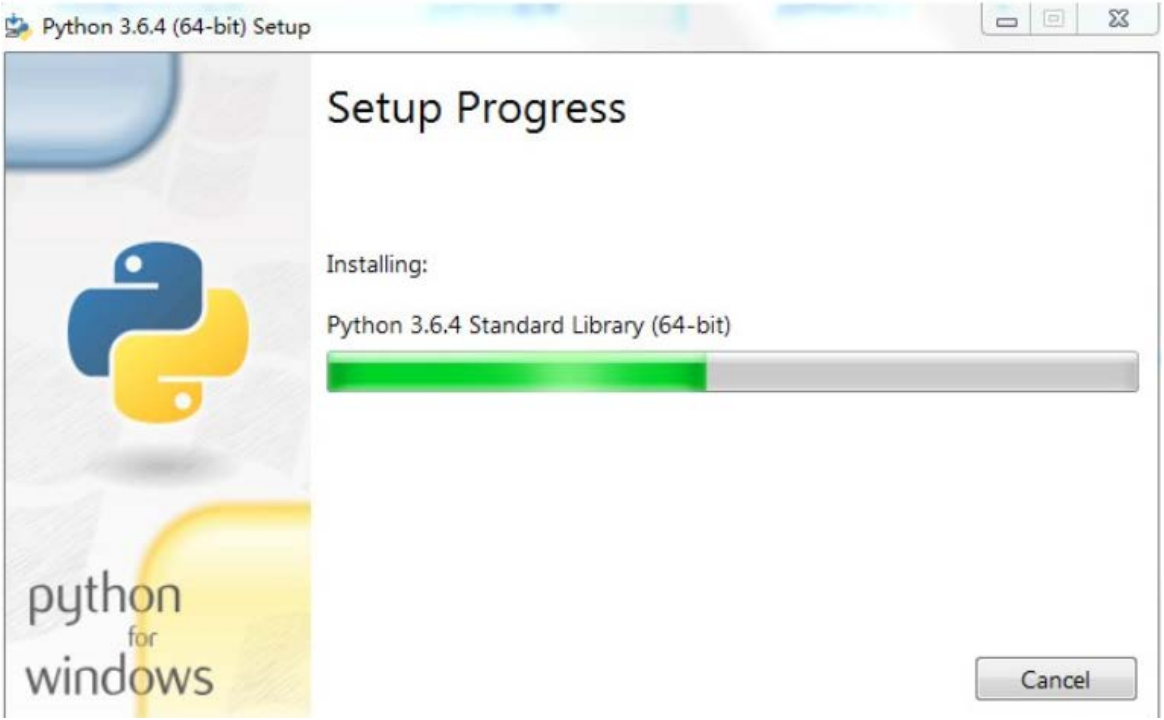
Install Python in Windows 10



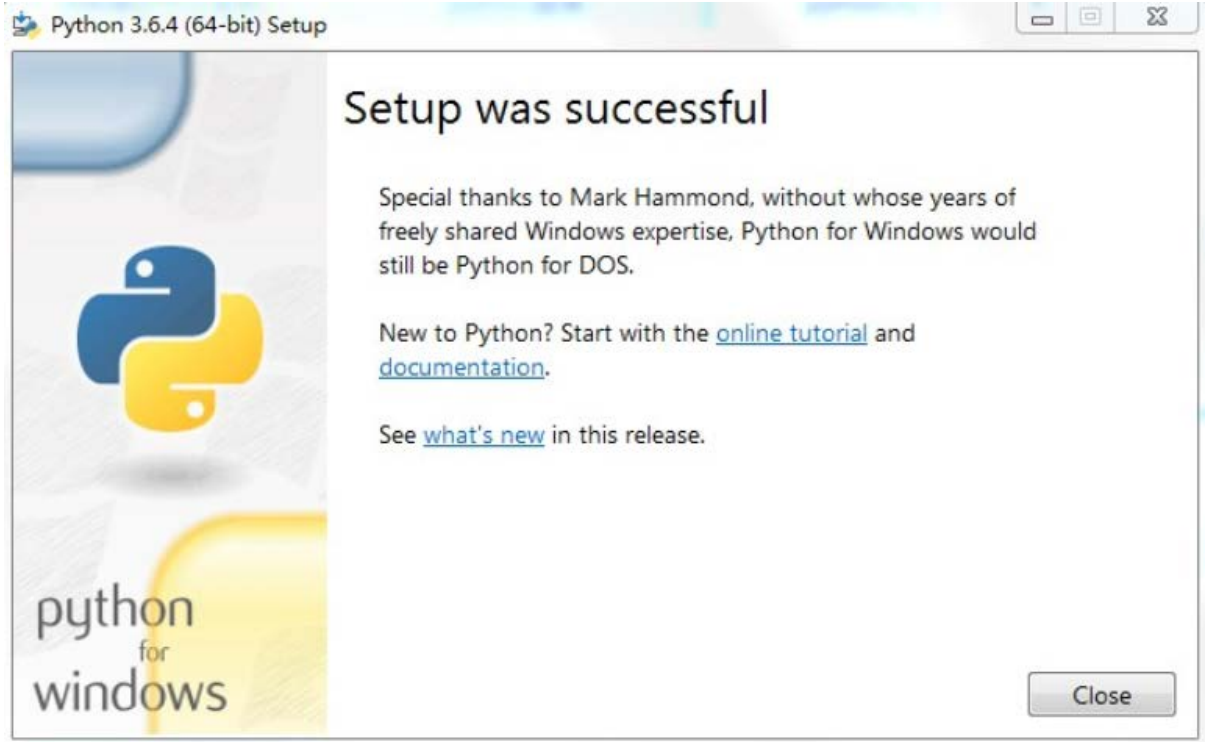
Install Python in Windows 10



Install Python in Windows 10



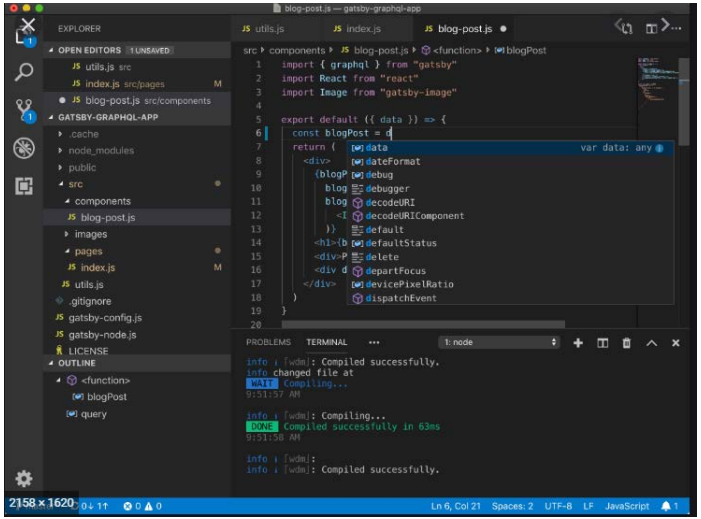
Install Python in Windows 10



Install VS code in Windows 10

Step 1: Download the latest VS code
https://code.visualstudio.com/download

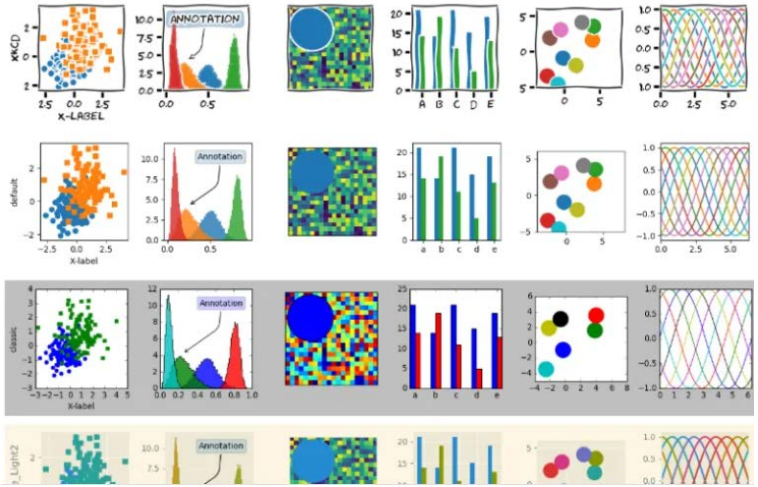
Step 2: Install latest VS code in Windows 10



Visual Studio Code is a free source-code editor made by Microsoft for Windows, Linux and macOS. Features include support for debugging, syntax highlighting, intelligent code completion, snippets, code refactoring, and embedded Git.

Install matplotlib

- pip3 install –user matplotlib
- pip install matplotlib==3.0.3 (use this one)



Source: https://www.gnuband.org/2017/12/29/gallery-of-xkcd-and-other-python-matplotlib-styles/

Matplotlib is a plotting library for the Python programming language and its numerical mathematics extension NumPy. It provides an object-oriented API for embedding plots into applications using general-purpose GUI toolkits like Tkinter, wxPython, Qt, or GTK+.

Python

- What is Python?
  - Python is a **popular programming language**. It was created by Guido van Rossum, and released in 1991.
- It is used for:
  - web development (server-side),
  - software development,
  - mathematics,
  - system scripting.
- What can Python do?
  - Python can be used on a server to create web applications.
  - Python can be used alongside software to create workflows.
  - Python can connect to database systems. It can also read and modify files.
  - Python can be used to handle big data and perform complex mathematics.
  - Python can be used for rapid prototyping, or for production-ready software development.

https://www.w3schools.com/python/python_intro.asp

Usages of Python

- Check you Python Version?
  - python --version
- print:
  - `print("Hello, World!")`
- Define variable
  - a=1
  - b=“hello world”
  - Print(a)
  - Print(b)

https://www.w3schools.com/python/python_getstarted.asp

Usages of Python

- if function
  - if 5 > 2:
    - print("Five is greater than two!")
    - `print("Hello, World!")`
- Syntax Error if you neglect the indentation
  - if 5 > 2:
  - print("F
- Syntax Error if you add additional the indentation
  - if 5 > 2:
    - print("Five is greater than two!")
      - print("Five is greater than two!")

https://www.w3schools.com/python/python_getstarted.asp

Python comments

- Single line comments
  - #This is a comment
  - print("Hello, World!")

- multiple lines comments
  - """
  - This is a comment
  - written in
  - more than just one line
  - """
  - print("Hello, World!")

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Python functions

- Definitions of functions
  - A function is a block of code which only runs when it is called. You can pass data, known as parameters, into a function. A function can return data as a result.
- Creating a Function
  - In Python a function is defined using the def keyword:
    - def my_function():
    - print("Hello from a function")

https://www.w3schools.com/python/python_getstarted.asp

Python functions

- Call functions
  - To call a function, use the function name followed by parenthesis:
- Example
  - In Python a function is defined using the def keyword:
    - def my_function():
    - print("Hello from a function")
    - my_function()

To learn more interesting usage of python, we suggest to refer to the following link: https://www.w3schools.com/python/python_variables.asp

https://www.w3schools.com/python/python_getstarted.asp