

AAE1001 - Introduction to Artificial Intelligence and Data Analytics in Aerospace and Aviation Engineering

Week 8 – Software Installation and Setup (MAC)

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Software Installation and setup Guide

Install VS code in Mac

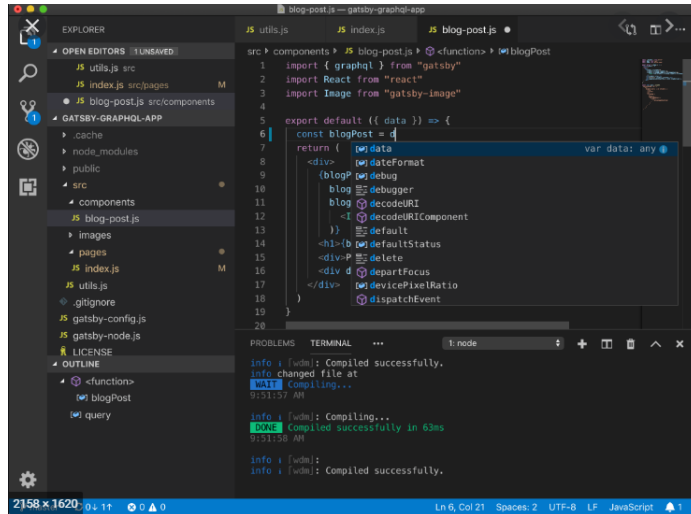
Step 1: Download the latest VS code

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

Tutorial Video:

https://www.youtube.com/watch?v=MZ2w7VU9T4c&ab_channel=POLYUIPNL

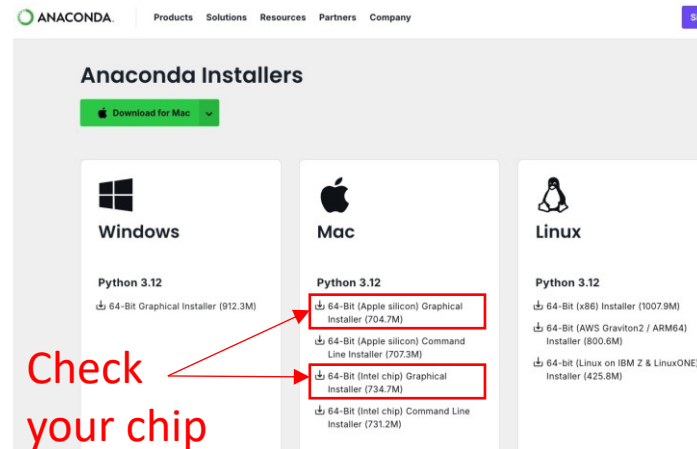
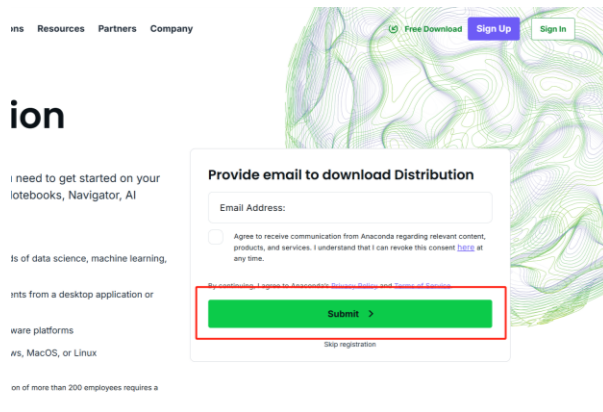
Step 2: Install latest VS code in Mac



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 Anaconda for Python management

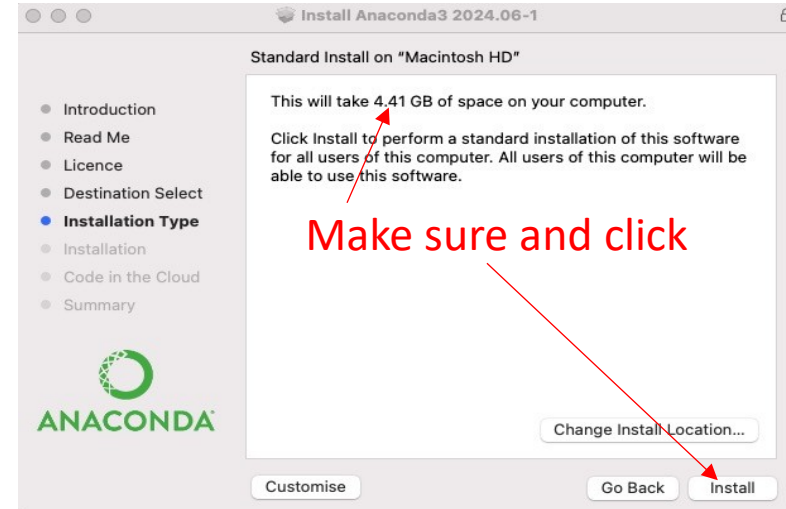
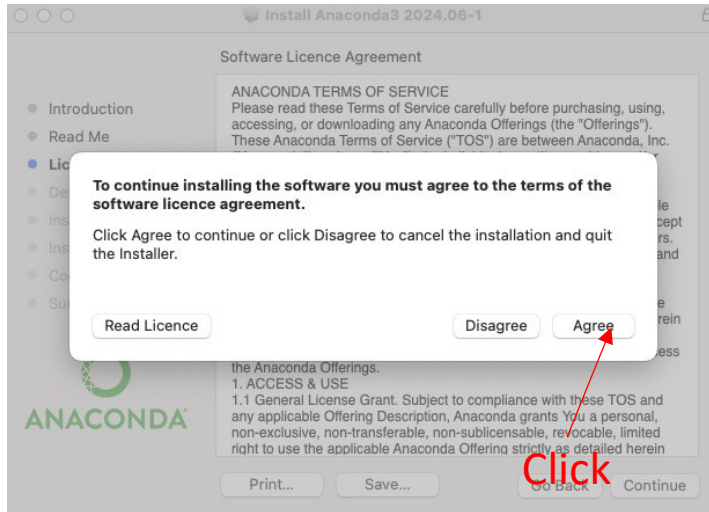
- <https://www.anaconda.com/download>
- **Anaconda** is an open source Python and R distribution designed for scientific computing, data science, machine learning, and big data analysis. It provides a complete set of tools and libraries to facilitate data processing and scientific computing. **It can manage different Python versions.**



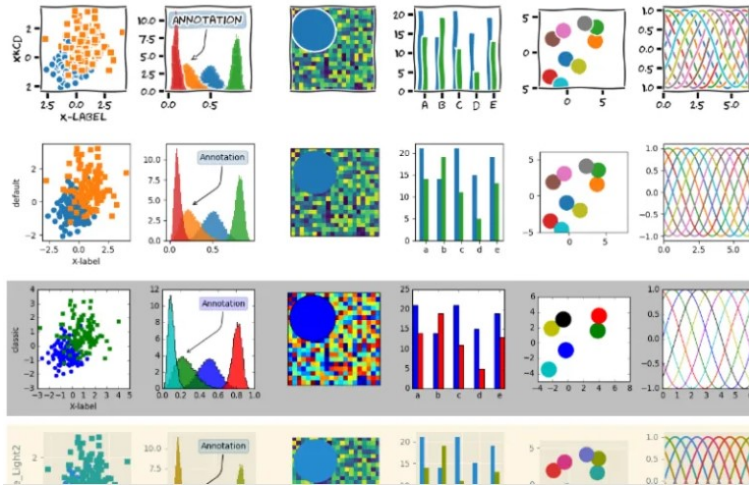
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your chip

Install Anaconda for Python management

- The process of **Anaconda** installation can automatically install the newest **Python** and **Matplotlib**

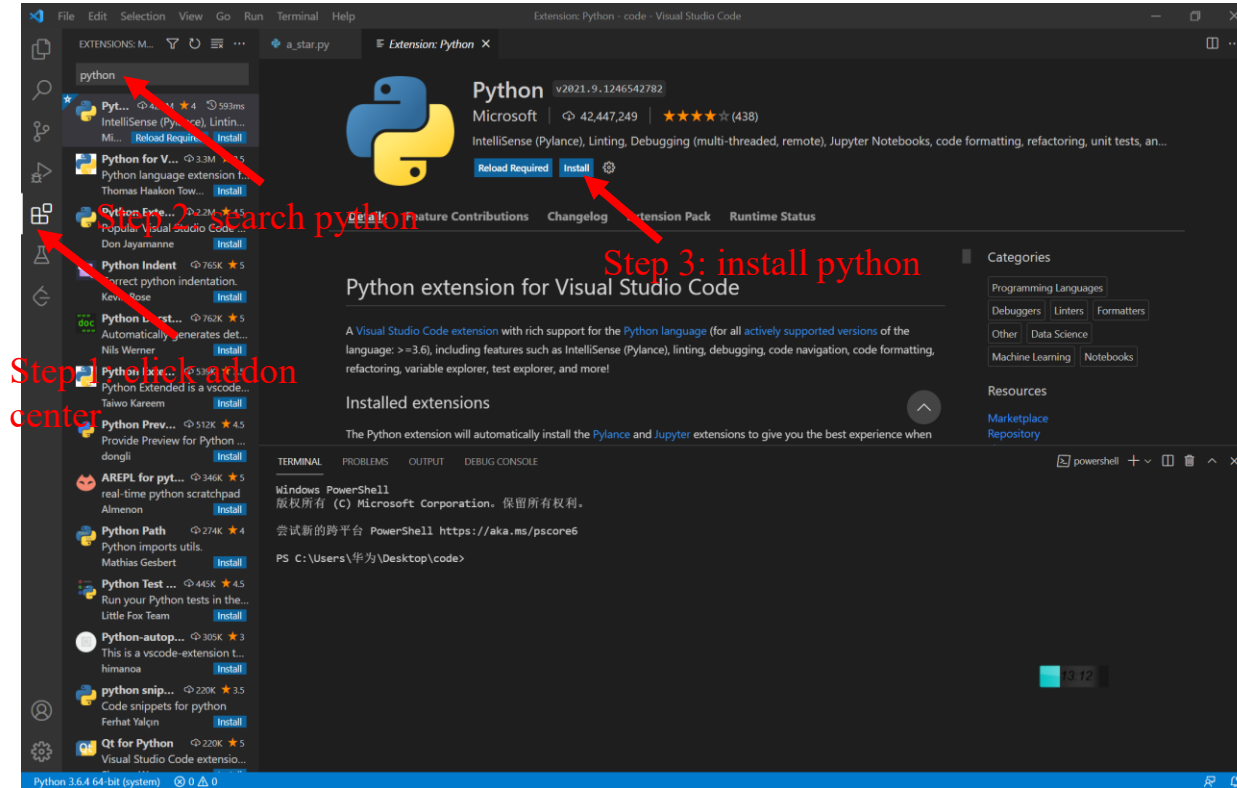


Matplotlib introduction

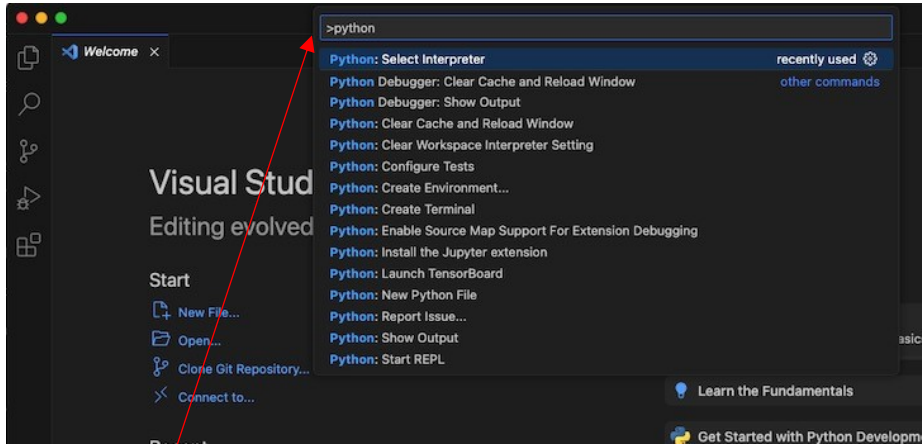


Matplotlib is a plotting library for the Python programming language and its numerical mathematics extension NumPy. It provides an object-oriented API for embedding plots into applications using general-purpose GUI toolkits like Tkinter, wxPython, Qt, or GTK+.

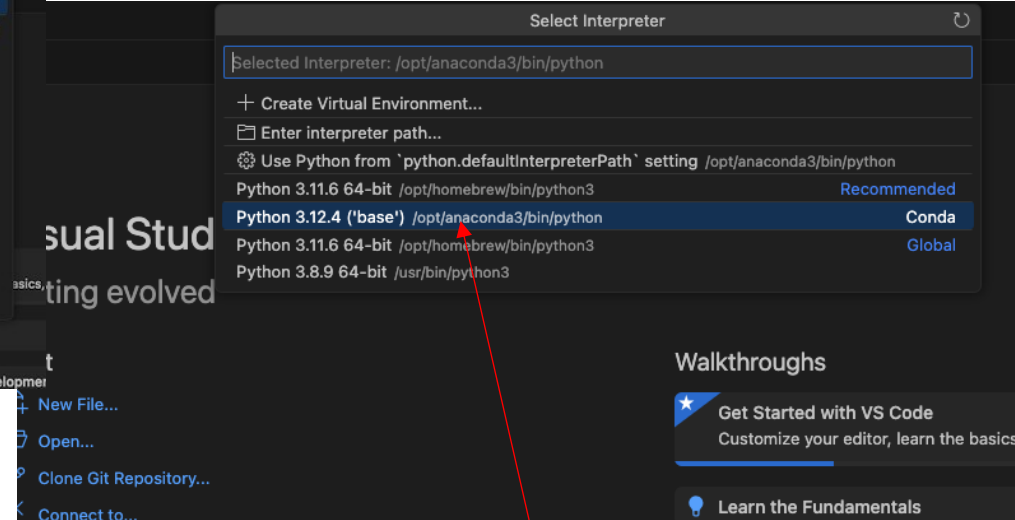
Install Python **addon** in VS code in Mac



VS code setting



Step1: Type here and choose this

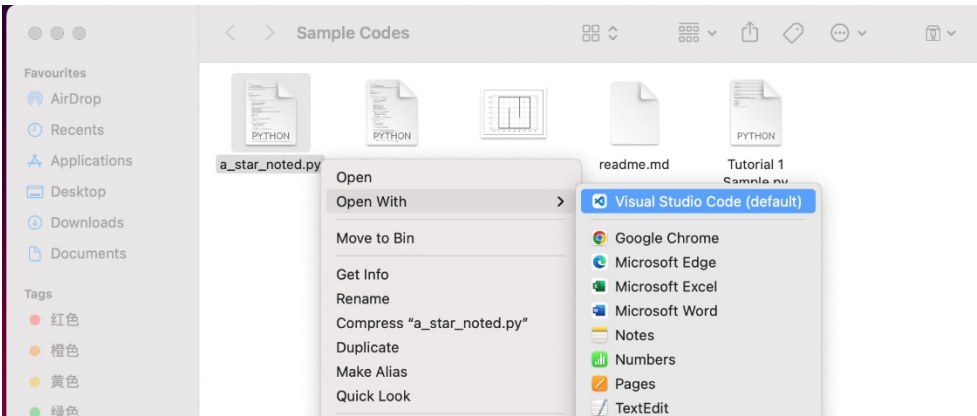


Step2: Choose anaconda

Run A Star in VS code

a_star_noted.py

➤ step 1: Open the code sample by VS code

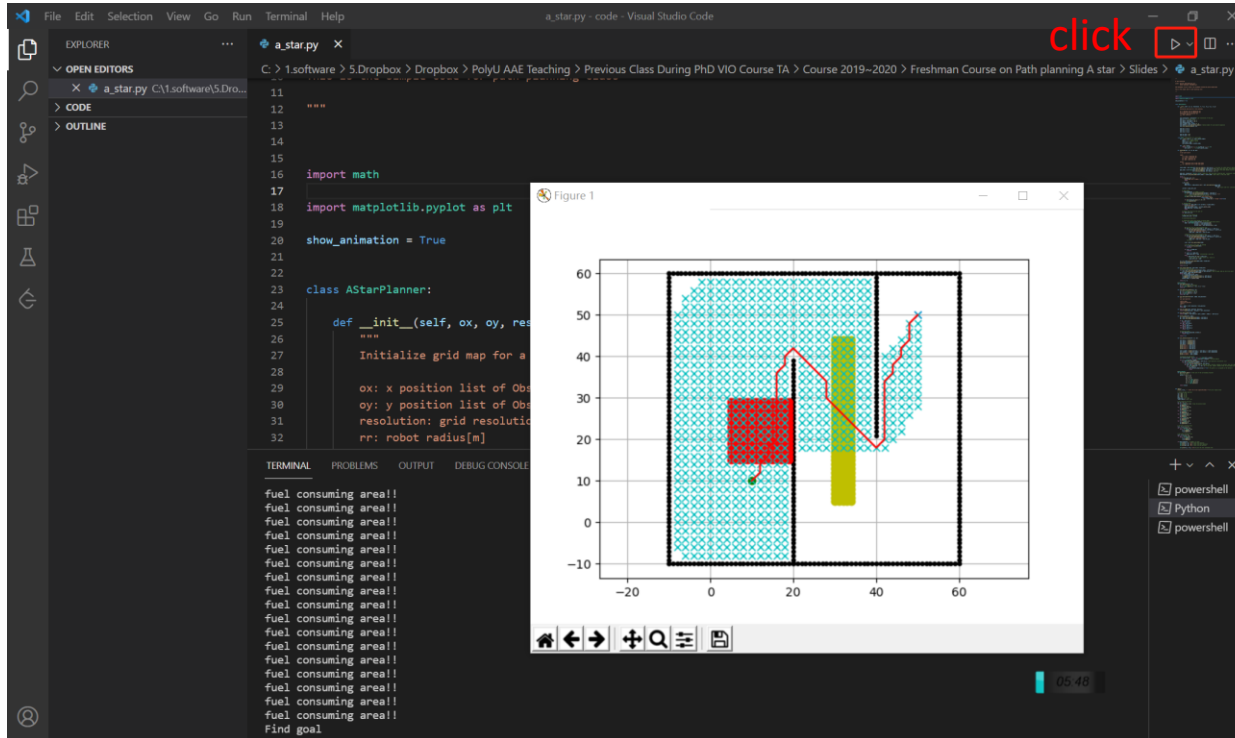



Right click

```
a_star_noted.py 1 X
D:\> Research > course > TA > TAcademy > PolyU_AAE1001_Github_Project-main > PolyU_AAE1001_Github_Project-main > Sample Codes > a_star_noted.py
1  """
2
3  A* grid planning
4
5  author: Atsushi Sakai (@Atsushi_twi)
6  | Nikos Kanargias (nkana@tee.gr)
7
8  See Wikipedia article (https://en.wikipedia.org/wiki/A\*\_search\_algorithm)
9
10 This is the simple code for path planning class
11
12 """
13
14
15 import math
16
17 import matplotlib.pyplot as plt
18
19
20 show_animation = True
21
22
23 class AStarPlanner:
24
25     def __init__(self, ox, oy, resolution, rr, fc_x, fc_y, tc_x, tc_y):
26         """
27         Initialize grid map for a star planning
28
```

Run A Star in VS code

► step 2: Run the demo



click 

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16 import math  
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18 import matplotlib.pyplot as plt  
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20 show_animation = True  
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22  
23 class AStarPlanner:  
24  
25     def __init__(self, ox, oy, res):  
26         """  
27         Initialize grid map for a  
28  
29         ox: x position list of Obstacles  
30         oy: y position list of Obstacles  
31         resolution: grid resolution [m]  
32         rr: robot radius [m]  
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```

Run A Star in VS code

Run the code

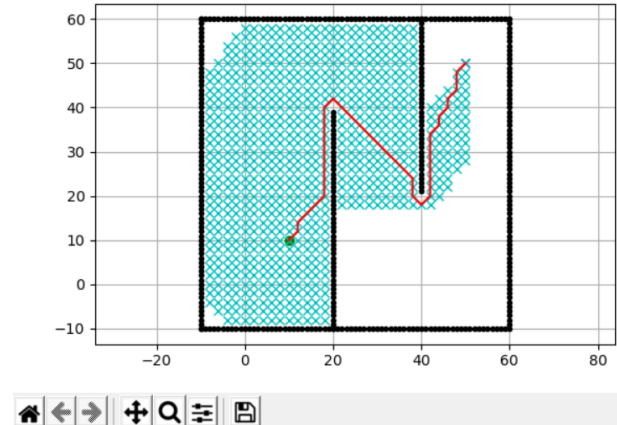
```

a_star.py - PythonRobotics-master - Visual Studio Code
a_star.py x
PathPlanning ? AStar > a_star.py > AStarRunner > planning
self.calc_obstacle_map(ox, oy)
18
19
20
21 class Node:
22     def __init__(self, x, y, cost, parent_index):
23         self.x = x # index of grid
24         self.y = y # index of grid
25         self.cost = cost
26         self.parent_index = parent_index
27
28     def __str__(self):
29         return str(self.x) + "," + str(self.y) + "," + str(
30             self.cost) + "," + str(self.parent_index)
31
32 def planning(self, sx, sy, gx, gy):
33     """
34     A star path search
35
36     input:
37     sx: start x position [m]
38     sy: start y position [m]
39     gx: goal x position [m]
40     gy: goal y position [m]
41
42     output:
43     rx: x position list of the final path
44     ry: y position list of the final path
45     """
46
47     start_node = self.Node(self.calc_xy_index(sx, self.min_x),
48                             self.calc_xy_index(sy, self.min_y), 0.0, -1)
49     goal_node = self.Node(self.calc_xy_index(gx, self.min_x),
50                             self.calc_xy_index(gy, self.min_y), 0.0, -1)
51
52     open_set, closed_set = dict(), dict()
53     open_set[self.calc_xy_index(start_node.x, start_node.y)] = start_node

```

A* is a graph traversal and path search algorithm, which is often used in many fields of computer science due to its completeness, optimality, and optimal efficiency. One major practical drawback is its space complexity, as it stores all generated nodes in memory.

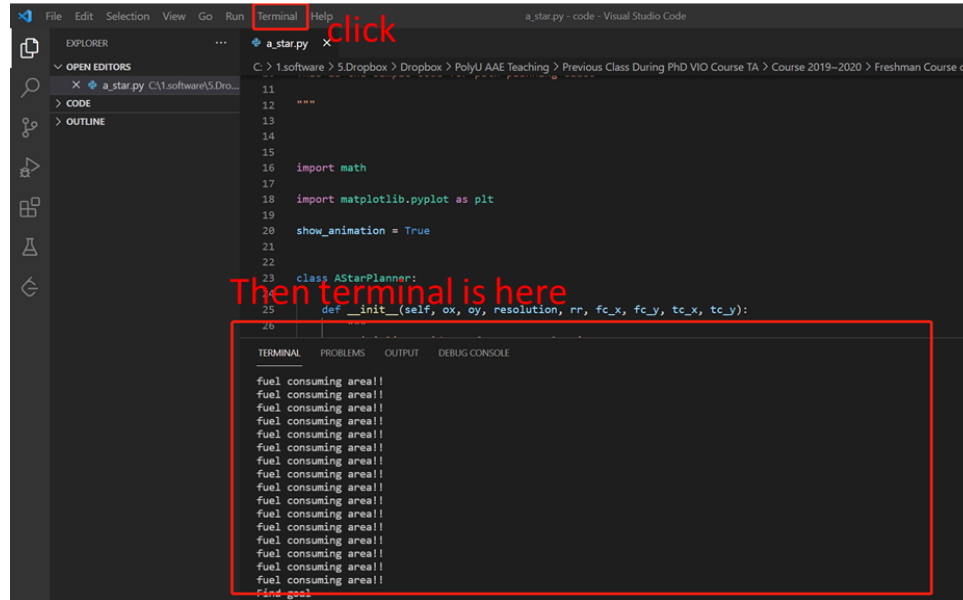
Figure 1



Troubleshoot: Connect Github page via command in VS Code

➤ Input the command below to the terminal (change the blue to your info)

- *git config --global user.name* *aaestudent*
- *git config --global user.email* *aaestudent@gmail.com*



The screenshot shows the Visual Studio Code interface. The Explorer panel on the left shows the file 'a_star.py' in the directory 'C:\1.software\5.Dro...'. The Code panel shows the content of 'a_star.py', which includes imports for 'math' and 'matplotlib.pyplot as plt', a variable 'show_animation = True', and a class 'AStarPlanner' with an '__init__' method. The Terminal panel at the bottom is highlighted with a red box and the text 'Then terminal is here'. The terminal output shows a repeating message: 'fuel consuming area!!'.