

Spike: Spike_2**Title:** Spike_Planet Wars**Author:** Le Bao Duy Nguyen 102449993**Goals / deliverables:**

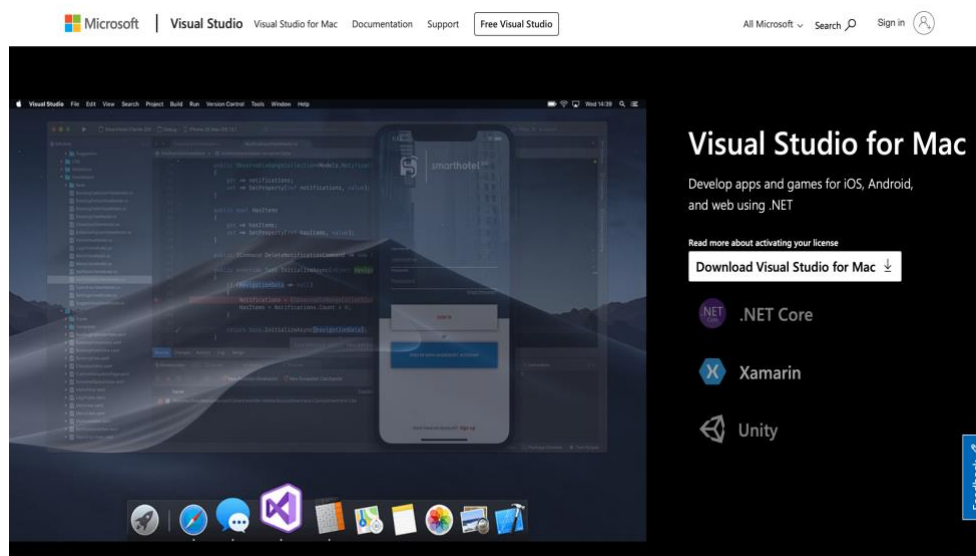
- Short report titled “Spike_Planet Wars”
- Simple.py & Complex.py bots created
- Comparison between 2 bots through numbers and maps

Technologies, Tools, and Resources used:

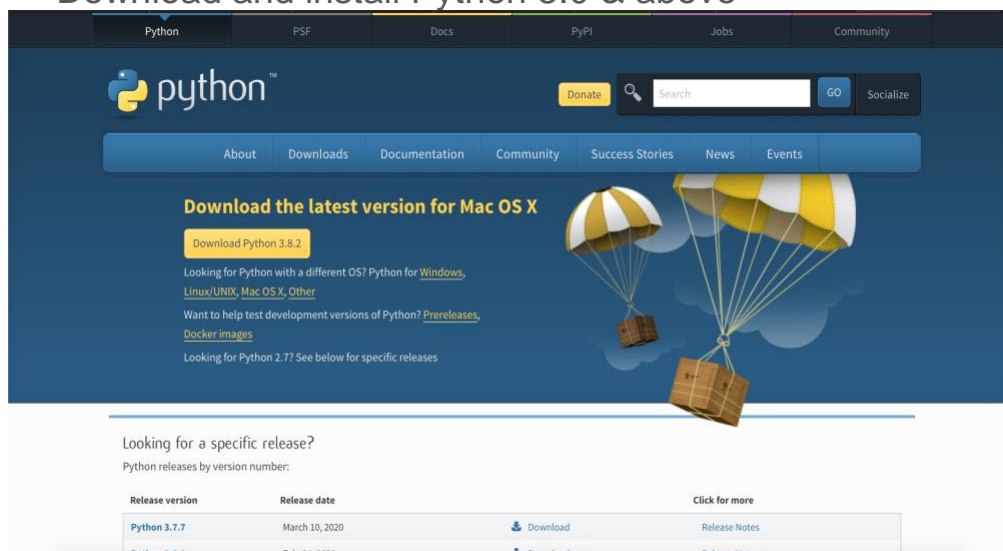
- Visual Studio Code
- Python 3.0+

Tasks undertaken:

- Download and install Visual Studio Code



- Download and install Python 3.0 & above

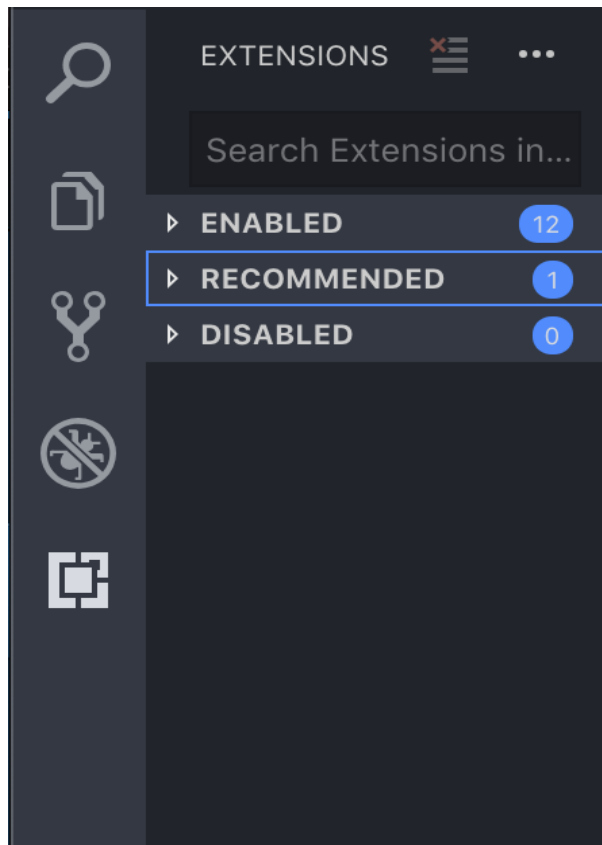


Looking for a specific release?

Python releases by version number:

Release version	Release date	Click for more
Python 3.7.7	March 10, 2020	Download Release Notes
Python 3.8.2	Feb. 24, 2020	Download Release Notes

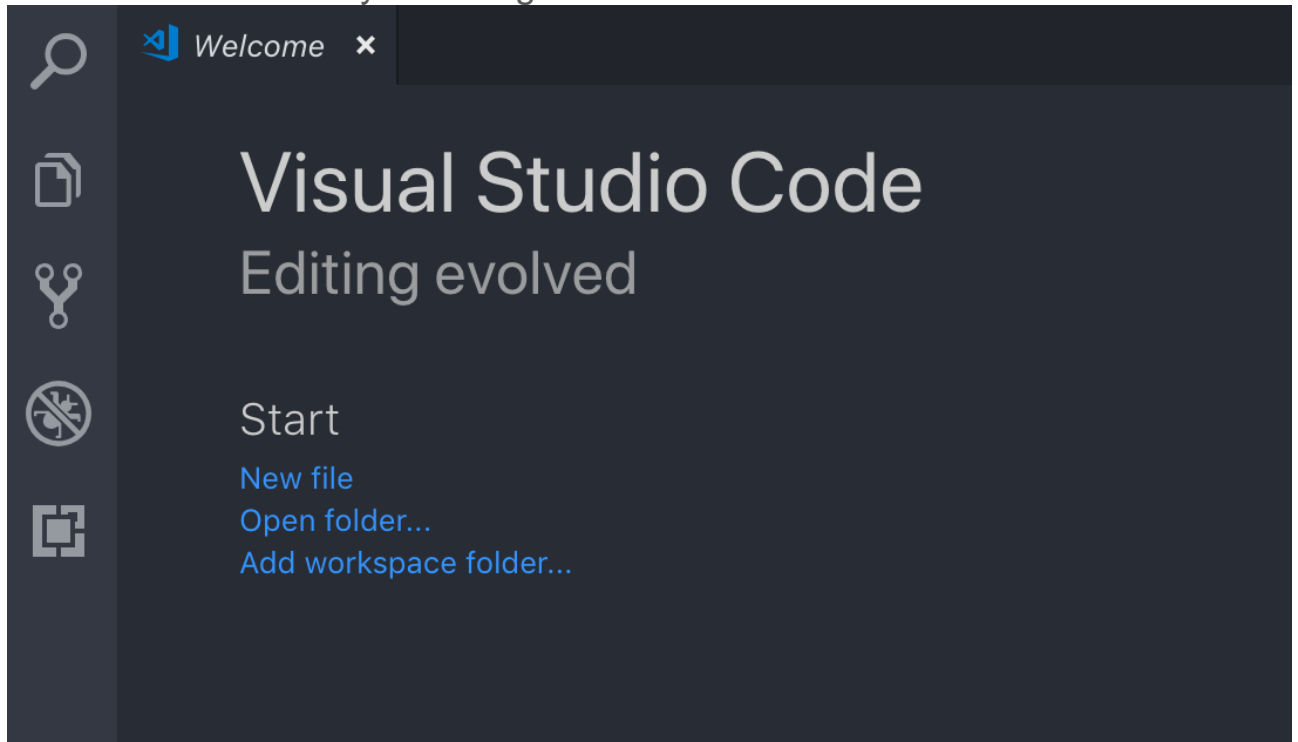
- Download and install Python extension within Visual Studio Code
- 1/ Go to Extensions



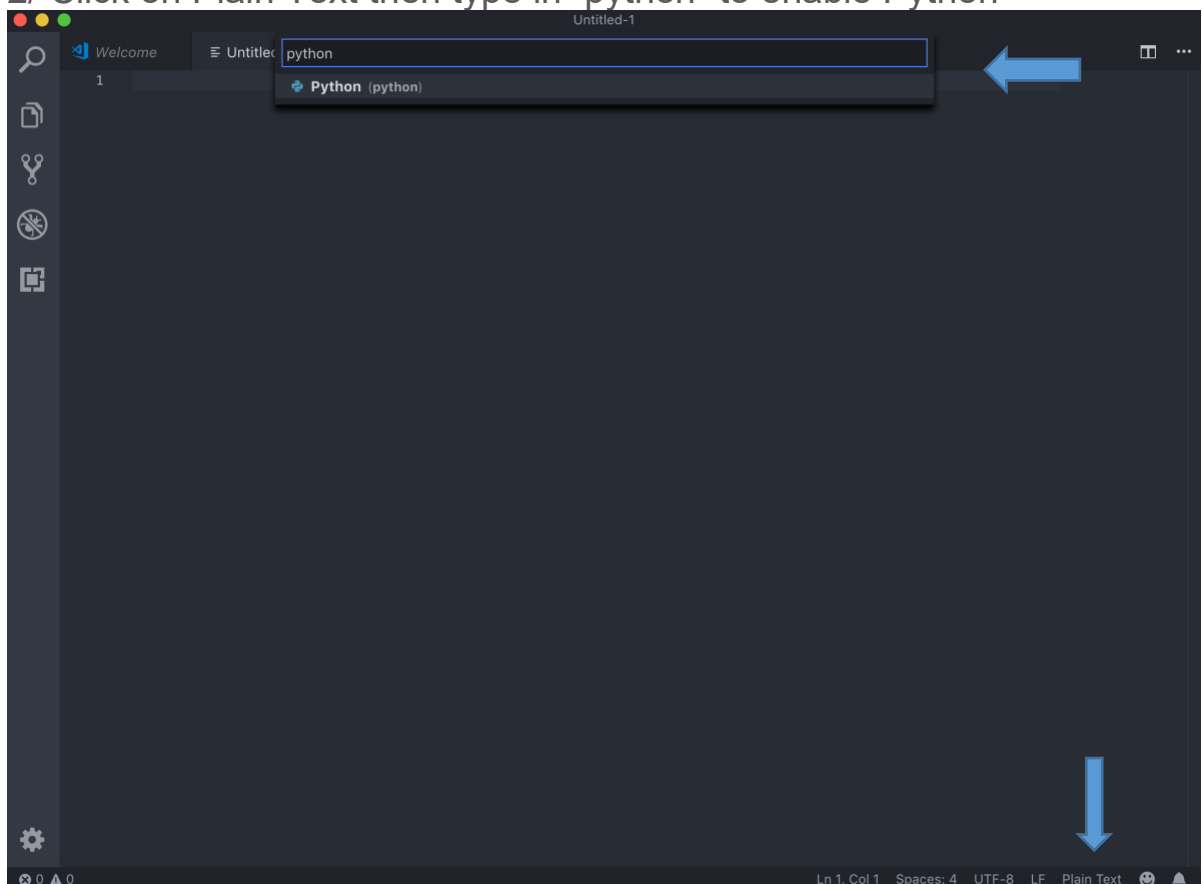
2/ Search “Python” then Install



- Create Simple.py & Complex.py
- 1/ Create a new file by selecting Start > New file



2/ Click on Plain Text then type in “python” to enable Python



3/ Add missing code

Simple.py

```
from random import choice

class Simple(object):
    def update(self, gameinfo):
        if gameinfo.my_fleets:
            return

        if gameinfo.my_planets and gameinfo.not_my_planets:
            dest = min(gameinfo.not_my_planets.values(),key=lambda p: p.num_ships)
            src = choice(list(gameinfo.my_planets.values()))

            if src.num_ships > dest.num_ships:
                gameinfo.planet_order(src,dest,int(src.num_ships*0.75))
```

Complex.py

```
from entities import Entity

class Complex(object):
    def __init__(self):
        self.orders_list = []

    def update(self, gameinfo):
        if gameinfo.my_fleets:
            src = gameinfo.my_fleets.values()
            dest = gameinfo.not_my_planets.values()
            for f in src:
                for p in dest:
                    if Entity.distance_to(f,p) < f.vision_range() and \
                        int(f.num_ships) > int(p.num_ships) and \
                        int(f.dest.num_ships) > int(p.num_ships):
                        gameinfo.fleet_order(f, p, f.num_ships)
                        break
                return

        if gameinfo.my_planets and gameinfo.not_my_planets:
            dest = min(gameinfo.my_planets.values(), key = lambda p: p.num_ships)
            src = max(gameinfo.my_planets.values(), key = lambda p: p.num_ships)

            if src.num_ships > 50 and Entity.distance_to(src,dest) > 0 and dest.num_ships < 35:
                gameinfo.planet_order(src, dest, int(src.num_ships * 0.30))
```

```
else:
    dest = max(gameinfo.not_my_planets.values(), key = lambda p: p.growth_rate)
    src = max(gameinfo.my_planets.values(), key = lambda p: p.num_ships)

    if src.num_ships > 30:
        gameinfo.planet_order(src, dest, int(src.num_ships * 0.75))
        self.orders_list.append(dest)
```

What we found out:

2 bots were created to enhance the game Planet Wars.

Simple bot can exploit the weakness (number of ships) of another planet to attack accordingly. It uses simple behaviour as a staple i.e. attack the closest non controlled planet with its highest resourced planet using 75% of fleet. Complex bot enhances its tactical analysis by weighing the ability of each planet (distance, vision range, number of ship) to plan the attack. It calculates to attack the closest planet, given that it has more ships than the opponent. It also has the same traits as simple bot with simple behaviour tactical analysis.

Bots were run in tests between each other. Results shown below state that Complex is a stronger bot than the other contestants.

Game	Map	Simple vs Complex (steps)	Simple vs Weapo (steps)	Complex vs Weapo (steps)
1	0	Complex (90)	Weapo (110)	Weapo (71)
2	5	Complex (295)	Weapo (385)	Complex (260)
3	15	Complex (308)	Weapo (244)	Complex (364)

Note: Weapo was a bot created in last lab.

Map 0: Not much action in this map. Map 0 is a very small maps with short distances between planets. Simple bot got out-performed by other bots since it has pretty limited and simple decisions. Suprisingly, Weapo managed to defeat Complex in just within 71 steps.

Map 5: Simple got out-performed again due to its limited tactics. However, it put up fights against Complex and Weapo which was very interesting.

Map 15: The fights were foreseen, and Complex has shown to be the upper hand. However, it went through long fights against other contestants. The

number of long steps taken shown that it is not fully optimal in terms of implementation.

Open issues/risks:

- Background does not show upon running the program.

