Artificial Intelligence
Spring 2022

HW#1 - Search in Pacman

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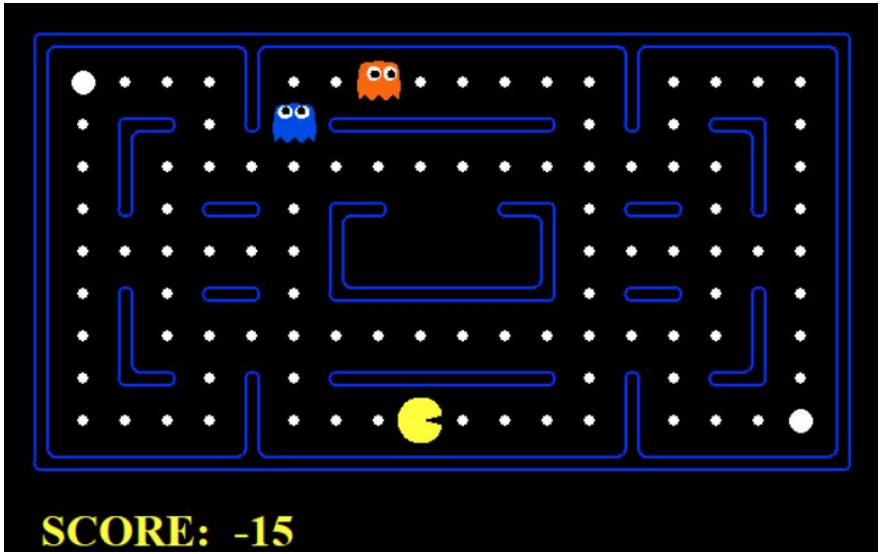
Overview

HW1 deadline : **Monday, 21 MAR 2022 14:20 (UTC+8)**

1. Depth First Search (DFS) - 20pts
2. Breadth First Search (BFS) - 20pts
3. Uniform Cost Search (UCS) - 30pts
4. A star (A*) - 30pts



Detail Info

Files you'll edit:

search.py	Where all of your search algorithms will reside. Please finish DFS, BFS, UCS, A Star!

Files you must look at:

Stack, Queue and PriorityQueue

util.py	Useful data structures for implementing search algorithms. **Please use the data structures here only!** Do not import any data structures from other python tools or package.

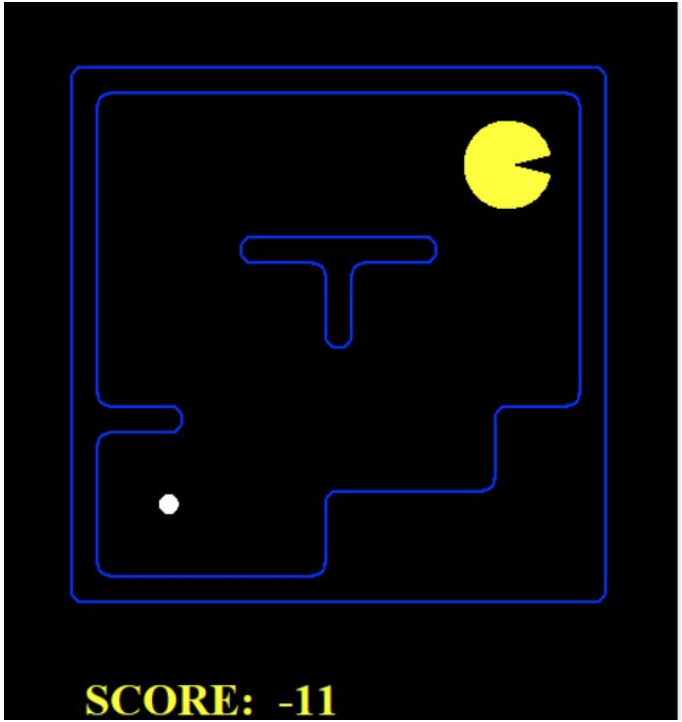
Files you might want to look at: (if you want to understand how pacman works)

pacman.py	The main file that runs Pacman games. This file describes a Pacman GameState type, which you use in this project.
game.py	The logic behind how the Pacman world works. This file describes several supporting types like AgentState, Agent, Direction, and Grid.

Base Code Tutorial

Several Important Function in Search.py

- **problem.getStartState()** - tuple
  - # Return a start state of a problem.
  - **Ex: (5, 5)**
- **problem.isGoalState(state)** - boolean
  - # Check state is goal or not.
  - **Ex: False**
- **problem.getSuccessor(state)** - list
  - # get the legal successors of a state
  - # format - [tuple of (next state, action, cost)]
  - **Ex: [((5, 4), 'South', 1), ((4, 5), 'West', 1)]**



Base Code Tutorial

```
def depthFirstSearch(problem):

    #TODO
    return [ list of actions ]
```

Please use the data structure in util.py only!

Your search functions need to return a **list of actions** consist of:

['North', West', 'East', 'South']

That is, a list of **strings**. That will lead the agent from the start to the goal. These actions all have to be legal moves

Notice for Mac

If you are using **macOS 10.6 or later**, the **Apple-supplied Tcl/Tk 8.5 has serious bugs** that can cause application crashes. If you wish to use IDLE or Tkinter, **do not use the Apple-supplied Pythons**. Instead, install and use a newer version of Python from python.org or a third-party distributor that supplies or links with a newer version of Tcl/Tk.

Error message example :

> DEPRECATION WARNING: The system version of Tk is deprecated and may be removed in a future release. Please don't rely on it. Set TK_SILENCE_DEPRECATION=1 to suppress this warning.

Detail information : IDLE and tkinter with Tcl/Tk on macOS | Python.org

Python2 download link : Python Release Python 2.7.18 | Python.org

Notice for Mac

Python 2.7.18

1. Download the python package from [Python Release Python 2.7.18 | Python.org]
2. Type `which -a python` in the terminal to find the directory of downloaded python
    a. Default directory for downloaded Python:
        i. /usr/local/bin/python
3. Type `/usr/local/bin/python  pacman.py` to run the pacman file.

HW1 - Submission on NTU COOL

Deadline : Monday, 21 MAR 2022 14:20 (UTC+8)

Language : Python2.7

Package : Do not import any other package

Delay Policy : One Day -> points * 0.7
Two Days -> points * 0.5
After Two Days -> 0 points
Everyone has a chance for a one-day late submission this semester!

File Format : r123456xx_hw1.zip
- r123456xx_hw1.py (this is your search.py file)

Do not include other python file except **r123456xx_hw1.py (search.py)*
All file name should be in **lower case and **only zip file** (No rar and 7zip)*
****Incompatible format will not be graded.***

Notice : Zero point for plagiarism!!! (either from internet or copy from classmate)