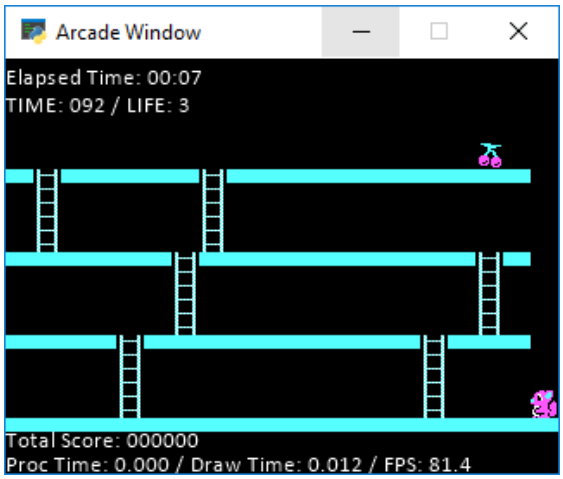
Fall 2018 - CSC 380 Written Assignment 5

November 19, 2018

Total: 90 points
Due: December 7, 2018

1 [30 points] Navigation with Path Finding



1.1 [10 points]

Assume that your agent needs to navigate a simple environment like above. You agent's goal is to guide the agent to reach the goal (fruit). Among all the algorithms, methods, ideas you learned throughout the course this semester, which topic is the most relevant one?

1.2 [10 points]

You must have learned several different methodologies to solve the above problem. In your opinion, which method/algorithm is most efficient and/or promising one? Give a reason for your answer.

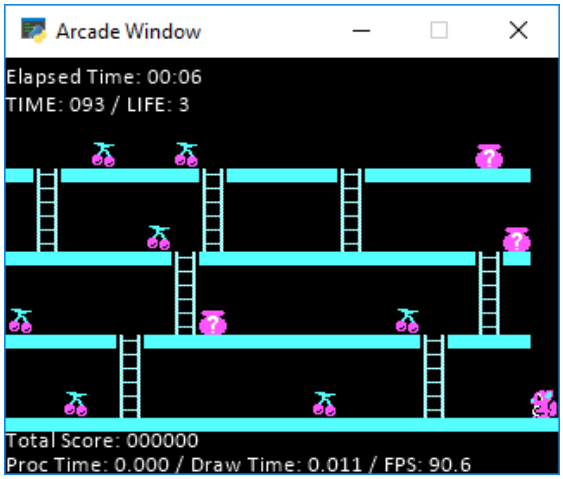
1.3 [10 points]

When implementing your suggestion above, which data structure/algorithm you would use? Why?

1.4 [25 points for Programming Assignment 3]

Implement your navigation algorithm. You may replace game_data.py with the provide game_data_mod1.py to start with. You may also need to modify the module inclusion code at the top of game_core.py and game_object.py.

2 [30 points] Navigation with Planning



2.1 [15 points]

Now we have multiple targets to eat. Note that fruits are always smallest score and the bags with question marks have higher scores (either 500 or 1000 – and you don't know which one has higher score). Your first goal here is to guide your agent to eat all targets in most efficient way. Discuss which topic we learned throughout the course is can be applied to find a solution for this problem.

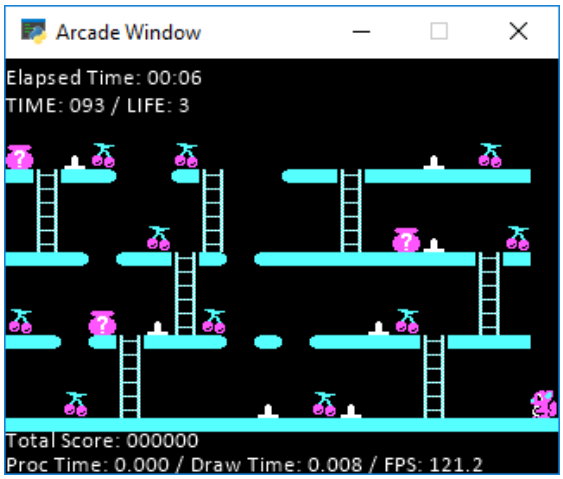
2.2 [25 points for Programming Assignment 3]

Implement your navigation algorithm. You may replace game_data.py with the provide game_data_mod2.py to start with. You may also need to modify the module inclusion code at the top of game_core.py and game_object.py.

2.3 [15 points]

Assume that your agent has only limited number of actions to take (due to battery issue, etc.). Similarly, you can consider a case with some time limit (as in the real game). In that case, what would be the best strategy here? Should the agent eat only the fruit? Should the agent aim for the bonus bags? Or mixture of them? How should our agent make the decision base on? In which criteria the agent should take into account, in what way?

3 [30 points] Navigation with Obstacles



3.1 [10 points]

Now we have the full game stage except the aversarial agents. What changes should be made from the algorithms/methods you implemented earlier? What additional factors you should consider in making those changes?

3.2 [25 points for Programming Assignment 3]

Implement your navigation algorithm. You may replace game_data.py with the provide game_data_mod3.py to start with. You may also need to modify the module inclusion code at the top of game_core.py and game_object.py.

3.3 [20 points]

Discuss how you would extend the implementation so that it can deal with adversarial agents in the wild.