

Guided Exercises for Project

March 1, 2020

These questions are prepared to guide you to the completion of the term project. There is no need to submit the answer to these exercises. Rather, it will act as milestones you can report in the interim report slides.

1 Navigation with Search



1.1

Assume that your agent needs to navigate a simple environment shown above. Your objective is to guide the agent to reach the goal (fruit). Among all the algorithms, methods, ideas you learned throughout the course this semester, which one can be applied to to this problem?

1.2

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

1.3

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

1.4

Implement your navigation algorithm. You may replace `game_data.py` with the provided `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 Navigation with Planning



2.1

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

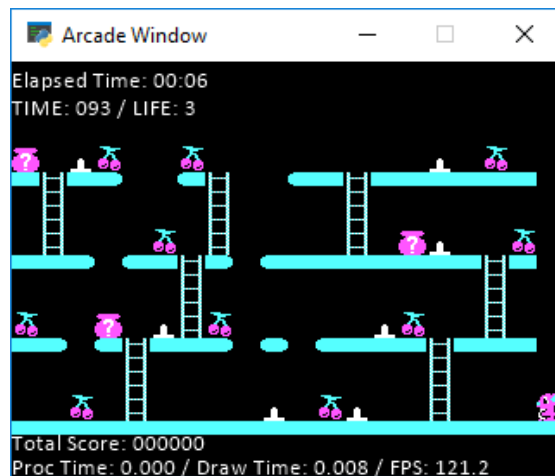
2.2

Implement your navigation algorithm. You may replace `game_data.py` with the provided `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

Assume that your agent is allowed to make only a limited number of actions. Similarly, you can consider the time limit (as in the real game). What would be the best navigation strategy in such cases? Should the agent eat only the fruits? Should the agent aim for the bonus bags? Or mixture of these? In which criteria the agent should take into account when making decisions, in what way?

3 Obstacles and Adversarial Agents



3.1

Now we have the full game stage except the adversarial 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

Implement your navigation algorithm. You may replace `game_data.py` with the provided `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

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