



# Artificial Intelligence

## Assignment 3: Pacman Informed Search

Deadline: October 29, 2023

### General Remarks

- You are free to consult with other students. The assignment is, however, individual, meaning that each submitted assignment has to be sufficiently unique.
- Always motivate your answers. Detail the steps needed to come to your conclusions.
- You are free to provide answers in either English or Dutch.
- If anything is unclear or if you experience technical problems with the assignment, contact me at [joey.depauw@uantwerpen.be](mailto:joey.depauw@uantwerpen.be).

### Assignment (15 points)

For this assignment, you will implement **informed** search algorithms in the context of Pacman. The code and background information can be found at: <https://inst.eecs.berkeley.edu/~cs188/fa23/projects/proj1/>. Solutions should work with Python version 3.8.

Solve the following questions:

**Question 4 (2 points):** A\* Search

**Question 6 (3 points):** Corners Problem: Heuristic

**Question 7 (5 points):** Eating All The Dots

**Question 8 (2 points):** Suboptimal Search

**Report (3 points):** Discuss Heuristics

- Document your heuristics for questions 6 and 7 and discuss their *consistency* and *admissibility*. You do not need to give a formal proof, but rather try to use intuitive arguments.
- Is your heuristic for Q7 able to solve `mediumSearch` in a short time? If your answer is yes, either we'll be very impressed, or your heuristic may be inconsistent.
- Discuss the use of suboptimal search for question 8. Give an example where `ClosestDotSearchAgent` goes horribly wrong.

Grading of questions 6 and 7 depend on the strenght of your heuristic. Remark that the number of expanded nodes for questions 6 and 7 is counted whenever you call the `problem.getSuccessors()` function. If you bypass this function this constitutes as cheating.

Your heuristic must be a non-trivial, non-negative, consistent heuristic to receive any points. Note that, even if the autograder does not detect a situation where your heuristic is inconsistent, this does not prove consistency.

Upload a **zip** file containing **only** the files `report.pdf`, `search.py` and `searchAgents.py` via Blackboard. These files should contain your solution to all the questions. Do not change the names of these files. Good Luck!

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