B2KI: Parallel Exercises for Project B

The coding part of Project B consists of completing questions Q1 ... Q8 of UC Berkeley's Pac-Man **Project 1 (Search in Pacman)**. In parallel, you are required to write a lab-report addressing the answers to the exercises below. The exercises correspond to the questions Q1 ... Q8 and can only be answered upon implementation of those questions. Some exercises cover multiple questions, so make sure to read all of them before proceeding with the first one!

Lab-report

Write a report with answers to the 10 exercises below. Be sure to state your answers clearly and to explain and/or motivate all your answers. You can obtain a maximum of 30 points for the lab-report.

Do not forget to include your names and studentnumbers in the report!

Exercise 1

Describe and motivate the generic structure that you have used for questions Q1 ... Q4.

Points: 2

Exercise 2

For Q1:

    a. Argue why your solution is complete.

    b. Argue whether or not your solution is a least cost solution.

    c. Does Pacman go to all the explored squares on his way to the goal? Explain why or why not.

Points: 2 for each

Exercise 3

For Q2: does your pacman code work for the eightpuzzel as well? Explain why or why not.

Points: 1

Exercise 4

For Q3:

    a. Report the path costs you find for the three UCS agents.

    b. What are the different cost functions employed by these agents?

    c. Motivate the differences in path costs by comparing the cost functions.

Points: a. 0 (−1 if unanswered); b. and c. 2 each

Exercise 5

Compare DFS, BFS, UCS and A* with Manhatten-distance on `OpenMaze`. Explain your observations.

Points: 2

Exercise 6

Describe and motivate the abstract state representation you used for Q5.

Points: 2

Exercise 7

    a. Describe and motivate the (non-trivial) heuristic you used for Q6.

    b. Argue/prove the admissibility and consistency of your heuristic.

    c. Give the number of nodes expanded by your heuristic (this will be tested!).

Points: a. and b. 2 each; c. 0 (-1 if unanswered)

Exercise 8

    a. Describe and motivate the heuristic you used for Q7.

    b. Argue/prove the admissibility and consistency of your heuristic.

    c. Give the number of nodes expanded by your heuristic **(this will be tested!)**.

Points: a. and b. 2 each; c. 0 (-1 if unanswered)

Exercise 9

    a. Describe and motivate your design for `findPathToClosestDot` in Q8.

    b. Give a small example that illustrates that a greedy search for the closest dot does not necessarily result in finding a shortest path through all dots.

    c. Explain the general problem underlying your example in b.

Points: a. and b. 2 each; c. 1

Exercise 10

List the *autograder* scores for all the project questions:

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Total
x/3	x/3	x/3	x/3	x/3	x/3	x/4	x/3	$\sum_{Qi}$ x / 25 = ...

Note that we will run the autograder on your code to verify these scores!

Points: 0 (-1 if unanswered)