

CS814 AI for Autonomous Systems – Coursework 3

Guidelines

Aim of the assignment

To provide deeper understanding of Classical AI Planning.

Learning outcomes

Program in PDDL, with the goal being to implement key AI algorithms and build classical AI Planning system; Define and understand the problem of Artificial Intelligence as it relates to autonomous systems;

Submission

You will be allowed to submit one file only in .doc or .docx extension. The document should contain four different parts:

1. The first part is the coding for the domain file.
2. The second part is the coding for the problem file.
3. The third part is the plan that you have received from the planner.
4. The fourth part contains a reflection on the plan in part 3.

The file should be submitted using myPlace; no submission will be accepted in any different way. Any extension should be requested in advance of the submission deadline, with a valid reason. Assessments submitted after the Monday midday deadline without an approved extension will receive a mark of zero.

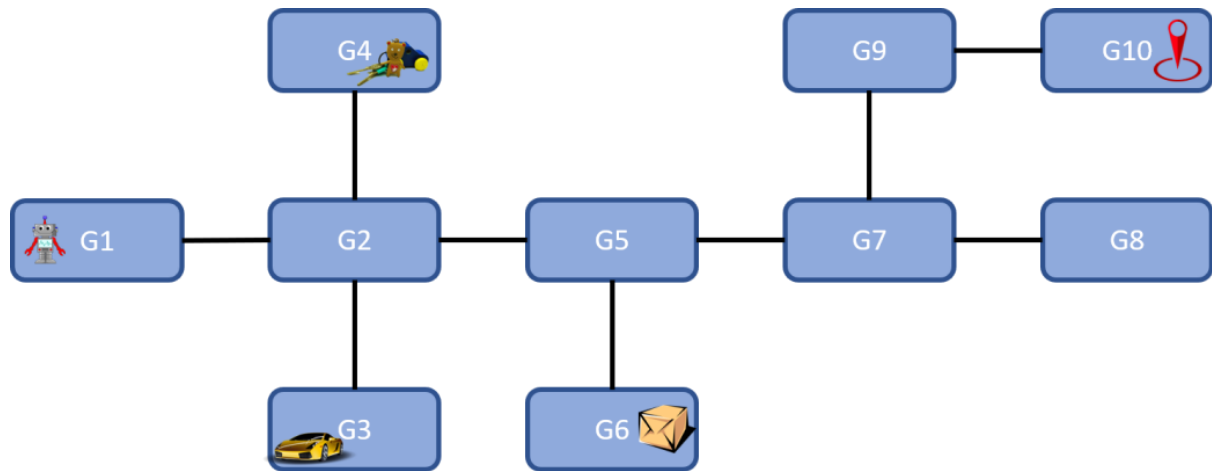
Good Luck!!

DUE: 12:00 noon, Monday December 7th, 2020

CS814 AI for Autonomous Systems – Coursework 3

Part I (100% of the grade)

Task: create a planning model for the basic logistics task in which a robot uses a car to deliver a package.



The diagram above describes a set of locations (G1 to G10) and roads between locations in both directions. In addition, we have a robot, a car, a key, a package, and a destination.

Question 1 (50%)

You must write the domain file. The domain file should include a list of predicates and actions. It can optionally include a list of types.

The actions should allow for the following activities:

- The robot can walk between connected locations.
- The robot can grab the keys, or put it down in a location.
- The robot can get into and out of the car.
- When the robot is inside the car and while the robot has the key, it can drive between connected locations.
- The robot can load the package into and out of the car. The robot must be present at the same location, but outside the car.

The list of predicates should be those sufficient to support the actions. Everything not explicitly stated is up to you.

Question 2 (30%)

You must write the problem file. The problem file will need to include a list of objects, an initial state, and a goal.

The initial state is as follows:

- The robot is in G1,
- The key is in G4,
- The car is in G2,
- The package is in G6,
- The destination is G10.

The goal state is as follows:

CS814 AI for Autonomous Systems – Coursework 3

- The robot is in G1,
- The key is in G4,
- The car is in G2,
- The package is in G10.

Question 3 (10%)

Present the received solution or the plan from the (online) planner.

Question 4 (10%)

Analyse and discuss the solution presented in Question 3. The answer for this question should be a max of one page in portrait.