Assignment 3: Planning

Due Sunday, 20 December 2020, 11pm

Action (or task) planning Consider the Fox, Goose, and Bag of Beans puzzle:

> Once upon a time a farmer went to market and purchased a fox, a goose, and a bag of beans. On his way home, the farmer came to the bank of a river and hired a boat. But in crossing the river by boat, the farmer could carry only himself and a single one of his purchases—the fox, the goose, or the bag of beans. If left alone, the fox would eat the goose, and the goose would eat the beans.
>
> The farmer's challenge was to carry himself and his purchases to the far bank of the river, leaving each purchase intact. How did he do it?

Formalize the domain above in STRIPS or ADL, and use the planner FASTDOWNWARD[1] to solve the puzzle.

In your formalization, use the following fluents and actions only:

- *onLeft*(x) describes that x is on the left bank of the river; whereas $\neg$*onLeft*(x) describes that x is on the right bank.
- *cross*(x) describes the action of x crossing the river.

Submit the STRIPS/ADL description of the domain (i.e., operators) presented to the planner, the planning problem, and the input and output of the planner.

Motion planning Listen to Lydia Kavraki's talk at

`https://ieeetv.ieee.org/planning-in-robotics-and-beyond-icra-2020`

and submit a pdf copy of your answers to the following questions:

a) What is motion planning?

b) How is motion planning different from task planning?

c) Describe three sample real-world applications of motion planning mentioned in the talks.

[1] `http://www.fast-downward.org/`