Prolog Programming Assignment #1: Various Computations

What's It All About?

Programming exercises that focus on the basics of knowledge representation and search in Prolog.

Overall Charge

Generate a solution template document that is consistent with the accompanying solution template. Then, please do each of the Prolog tasks, adding source code, demos, and other materials (maps) to your template in the appropriate manner.

Task 1: Colors KB

Please mindfully type the Prolog code for the colors KB presented in Prolog Lesson 1 into a file called `colors.pro`. Then, load the file into a Prolog process and carefully interact with the colors KB to mimic the demo that is provided in the lesson.

Presentational Notes for Task 1

Add the following items to your solution document.

1. The knowledge base pertaining to colors stored in `colors.pro` that you typed into your system.
2. Your re-creation of the demo provided in Prolog Lesson 1.

Task 2: Foods KB

Working by close analogy with the colors KB and interaction (previous task), please:

1. Craft a food oriented KB, placing it within a file called `foods.pro`, containing the following three relations:
   - Relation `fruit` containing three facts, one indicating that a `grapefruit` is a fruit, one indicating that an `avocado` is a fruit, and one indicating that a `date` is a fruit.
   - Relation `vegetable` containing three facts, one indicating that `asperagus` is a vegetable, one indicating that `broccoli` is a vegetable, and one indicating that a `carrot` is a vegetable.
   - Relation `food` that contains two rules, one implying that a fruit is a food, and the other implying that a vegetable is a food.
2. Create a demo that is, under analogical interpretation, just like the colors demo.

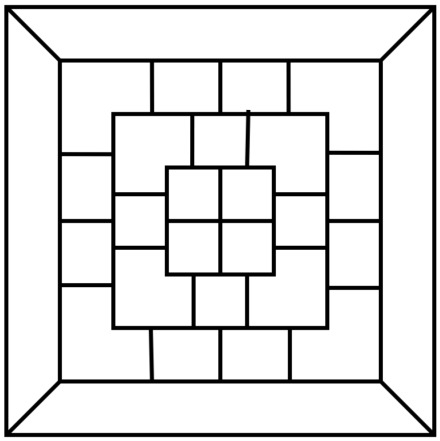
Presentational Notes for Task 2

Add the following items to your solution document.

1. The knowledge base pertaining to food stored in `food.pro` that you typed into your system.
2. Your demo, by direct analogy with the colors KB interaction, that queries the food KB.

Task 3: Map Coloring

Working by analogy with the map coloring program provided in class, which you can find in Lesson 3, write a map coloring program to solve the problem of coloring the following map in four colors.



Then, color the map according to the solution produced by your program, either by hand or with the help of a computational tool, for inclusion in your presentation document.

Presentational Notes for Task 1

Add the following items to your solution document.

1. An image of the given map.
2. An image of the given map, with the regions labelled.
3. Your source program.
4. The demo of your program.
5. An image of the map colored according to the output of your program.

Task 4: The Floating Shapes World

Please mindfully type the Prolog code for the floating shapes world KB, which appears in Lesson 4, into a file called `shapes_world.pro`. Then, load the shapes world KB, and carefully interact with it to mimic the demo that is provided in the lesson.

Presentational Notes for Task 4

Add the following items to your solution document.

1. The floating shapes world image presented in the lesson.
2. The Prolog KB
3. The demo that you generate (corresponding to that presented the lesson).

Due Date

Please complete your work on this assignment, and post your work to your web work site, no later than Friday, April 6th, 2023.