Introduction

The purpose of this project is to write in Prolog a program capable of learning and answering simple questions about properties of things. This project will be graded out of 100, with a possibility of earning up to 150 points when adding the features noted as extra credit and more you can come up with. This grade will replace the grade you earned in the final to calculate your final grade for the class.

You will need to make an appointment for the week of the final (from December 5 to December 9) to turn in your project. You will need to present your project in person, explain how the code works, demo it and be ready to answer questions about it.

Project Description

1) Specify the grammar for a simple language to express facts and questions about properties of things. The language should allow sentences like:

> The color of the car is blue.
> The capacity of the bottle is one liter.
> What is the length of the rod?

You do not have to infer the name of the property from its value (e.g. equate "The sky is blue" with "The color of the sky is blue", thus inferring that since blue is a color the property implied must be color) but you'll earn extra credit if you do. Your language be able to express single or multi-word properties (e.g. dark blue or 20 inches).

2) Define a knowledge base schema as Prolog dynamic predicates. Whether you use one or more predicates is up to you. You can also initialize with some built-in knowledge.

3) Write a Prolog predicate execute/2 where the first argument must be instantiated and is expected to contain a single sentence in the language you defined in part 1. The second argument would typically non-instantiated and would end up bound to the response to the sentence in the first argument. (You will need to create more than one predicate to generate the answer.) Depending on the sentence and the state of the knowledge base, the response can be:

- "OK" when the sentence is a fact that was not yet known in the knowledge base and has been added.
- "I know" when the sentence is a fact that is already part of the knowledge base
- "It's not" when the sentence contradicts a fact already in the knowledge base (alternatively, and for extra credit, the answer can be "No it's " and the value of the property
- "I don't know" when the sentence is a question whose answer is not in the knowledge base
- The value of the property if the sentence is a question and the answer is already in the knowledge base.

For example, if you start with a blank knowledge base, the following interaction could take place:

- What is the color of the car?
  - I don't know
- The color of the car is blue.
  - OK
- The color of the car is green.
  - It's not
- The color of the car is blue.
  - I know
- What is the color of the car?
  - blue