CS 461
Program 3 – logic programming
Due Friday, March 24 (Friday before spring break).

In this project, we will use logic programming to solve a particular puzzle. The Prolog language is designed for this (its name is based on PROgramming LOGic). *Programs must be written in Prolog to receive credit.* Prolog is installed on Flarsheim lab computers and available as a free download for all major operating systems. See http://www.swi-prolog.org/versions.txt for more details.

We are given a series of facts. Translate these into first-order logic, and from there into a Prolog knowledge base. "Each X has a distinct Y" means that each X has exactly one Y and no two X's have the same Y.

- There are 5 houses, numbered consecutively from left to right. Valid numbers are 1, 2, 3, 4, 5.
- Each house has a distinct color. Valid colors are: red, white, yellow, blue, green.
- Each house's resident has a distinct nationality. Nationalities are: English, Spanish, Norwegian, Ukrainian, Japanese.
- Each resident prefers a distinct beverage. Beverages are: juice, tea, coffee, milk, water.
- Each resident prefers a distinct candy. Candies are: Hershey bars, Kit Kats, Smarties, Snickers, Milky Way.
- Each resident has a distinct pet. Pets are: dog, fox, snails, horse, zebra.
- The Englishman lives in the red house.
- The Spaniard owns the dog.
- The Norwegian lives in the first (leftmost) house.
- The Smarties eater owns snails.
- The green house is immediately to the right of the white house.
- The Hershey bar eater lives next to the man with the fox.
- Kit Kats are eaten in the yellow house.
- The Norwegian lives next to the blue house.
- The Snickers eater drinks juice.
- The Japanese resident eats Milky Ways.
- The Ukrainian drinks tea.
- Kit Kats are eaten in a house next to the house where the horse is kept.
- Coffee is drunk in the green house.
- Milk is drunk in the middle house.

Using this knowledge base, your program must answer: Where does the zebra live, and in which house do they drink water?

Your program should list what is definitely known (number, color, nationality, beverage, pet, candy) for each house.

For each question: If there is a single answer (i.e. the question can be answered definitely), your program should have Prolog list the reasoning behind the conclusion.

Submit your knowledge base and a transcript of your Prolog console session.