CPSC 583

Homework #2

Due 10/6/2016 by 5:30pm

This homework is on CLIPS. CLIPS can be downloaded from http://clipsrules.sourceforge.net/

Understanding the Basic Programming Guide, **Chapter 5** is (more than) sufficient for this assignment

You will submit three files to Titanium: cars.clp, family.clp and written answers to Problem 3. You may work in groups of two. Only one person needs to turn in these files on Titanium.

1. The attached cars.clp CLIPS program describes a list of cars (their brand, price, color). The program asks the user to enter an age and then executes a rule to recommend a car – if the person is younger than 25, then recommend a car that costs less than $30,000.

(a) Modify the rule such that the recommendation for a person younger than 25 is a car that costs less than $30,000 *and red in color*. (15 points)

(b) Add a new rule that recommendation for a person older than 25 a white car. (20 points)

Submit your modified cars.clp to Titanium

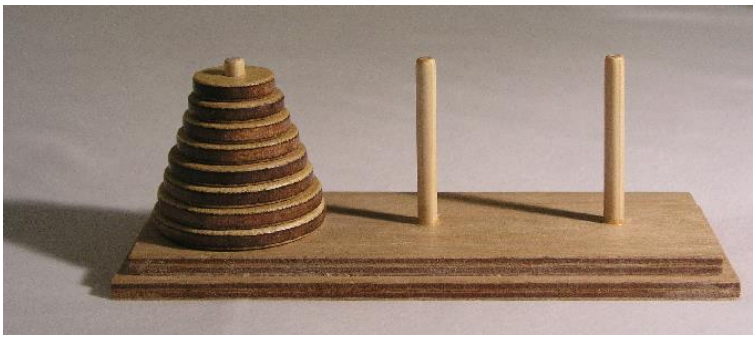
2. The attached family.clp CLIPS program describes a set of parent-child pairs and rules to identify siblings.

(a) Add rules to family.clp to print a list of all people who are parents. (15 points)

(b) Add rules to family.clp to print a list of all pairs of people who are cousins. Two people are cousins if their parents are siblings. Call this program cousins.clp (20 points)

Submit your modified family.clp to Titanium

3. Towers of Hanoi (https://en.wikipedia.org/wiki/Tower_of_Hanoi) is a puzzle where you are given a set of disks of different sizes and three pegs (called Left, Center, and Right). Initially the disks are stacked on top of each other in decreasing size on the Left peg. The objective is to move the disks to the Right peg such that that at every step only one disk is moved and a larger disk is never placed over a smaller one.



https://en.wikipedia.org/wiki/Tower_of_Hanoi

Note that the problem only has one parameter: the number of disks. There is a simple recursive solution to this puzzle. To move top N disks from peg X (initially Left) to peg Y (initially Right) while using the remaining peg (call Z, initially the Center peg) as a temporary storage, do the following steps:

1. Move N-1 disks from peg X to peg Z
2. Move a remaining disk from peg X to peg Y
3. Move N-1 disks from peg Z to peg Y

For example, for 3 disks, the complete solution is:

1. move top disk from Left to Right
2. move top disk from Left to Center
3. move top disk from Right to Center
4. move top disk from Left to Right
5. move top disk from Center to Left
6. move top disk from Center to Right
7. move top disk from Left to Right

The attached towers.clp CLIPS encodes the above approach. Answer the following questions.

(a) Why does the code list the three steps in *reverse* order in the multiple-disks rule? Answer in 1-2 sentences. (10 points)

(b) Run the program. You will notice that some steps are missing! What is the cause of this error? Answer in 1-2 sentences. (10 points)

(c) How can the above issue be fixed? Describe your approach in 2-3 sentences (there are different approaches possible). No need to write complete code. (10 points)