

CS2104 Prolog Assignment

Instructions

1. The assignment is worth 10%. The deadline is on Monday, 7th June 2004, 2359hrs.
2. Which question to do? Add up the digits of your matric number. If the final sum is even, then do question 1. If the final sum is odd, then do question 2. For example, assuming that your matric number is U012345A, then the sum of digits is $0+1+2+3+4+5 = 15$, which is odd. Therefore you need to do question 2.
3. The main predicate (for either question) should be named 'puzzle'. Meaning that upon loading the prolog program, one just needs to key into the prolog search engine: `puzzle(X)`. and the result will be printed out.
4. Method of Submission:
 - (a) Name filename of your prolog program after your matric number, with a '.pl' extension (eg. U012345A.pl).
 - (b) Send the file as an attachment to `gohah@comp.nus.edu.sg` with the subject heading: '[cs2104] Submission: XXXXX' where XXXXX is your matric number.
5. Suggestion: Refer to Tucker and Noonan, Chapter 9 on Prolog on the example of doing allocations of people to floors of a building. The result is search through the predicate 'building(X)'. If you learn the concept behind this small example well, you can apply it to your assignment.

Question 1 (where sum of digits of matric number is even)

Suppose there are five houses, each of a different colour, inhabited by people of different nationalities, with different pets, drinking preferences, and clothing preferences. From the following information, design a Prolog program that discovers who has the zebra as a pet. How many different solutions does this puzzle have?

1. The Finn lives in the red house.
2. The Spaniard owns a dog.
3. The coffee-drinker lives in a green house, which is next to an ivory house.
4. The Ukrainian drinks tea.
5. The person who has pet snails wears a skirt.
6. The person in the yellow house wears jeans and lives next to the horse.
7. Milk is drunk in the middle house.
8. The Norwegian lives in the first house, which is next to the blue house.
9. The person who wears slacks lives next to the fox.
10. The person who wears woolies drinks orange juice.
11. The Japanese person wears a vest.
12. Someone drinks vodka.

Question 2 (where sum of digits of matric number is odd)

Five runners named Harriet, Harvey, Larry, Paula, and Steve run marathons in five different towns (Brunswick, Quincy, Northhampton, Providence, and Williamsburg), wearing five different coloured shirts (blue, green, purple, red and yellow), and have five different last names (Dickerson, Gould, Kendrig, Simms and Whitley). They have five different finishing times, ranging from 150 minutes to 170 minutes, in increments of 5 minutes. The following additional facts are known:

1. Either Harriet or Dickerson has a finishing time of 155 minutes, and the other has a finishing time of 160 minutes.
2. Dickerson does not wear a purple shirt.
3. Harvey runs in Williamsburg.
4. Simms' finishing time is either 165 or 170 minutes, and Paula has a faster finishing time than Simms.
5. The runner in Quincy wears a red shirt.
6. The runner in Northhampton has the best finishing time, and Dickerson has a better finishing time than Steve.
7. The runner wearing a blue shirt has the second-best finishing time.
8. The runner in Providence is not Kendrig and does not have a finishing time of 165 minutes.
9. Each of the runners in Brunswick and Williamsburg wears a blue or a purple shirt.
10. Larry does not run in Northhampton, nor does he wear a green shirt.
11. Neither Gould nor the person wearing the green shirt has a finishing time better than 165 minutes.
12. The runner in Quincy does not finish in 160 minutes.

What is the first and last name, town, shirt colour, and finishing time of each runner? How many solutions are there to this problem?