COSC 2P93 Prolog Assignment 3 (corrected)

Due date: 12:00 noon Monday February 25.
Lates: 12:00 noon, Thursday February 28 (-25%).
Comments: See Assignment 1 comments for program requirements.
Hand in: Printouts of your programs and adequate examples of their execution. Electronic submission of all source code and files.

Write Prolog programs that solve the following arithmetic puzzles. They should be general enough to solve the given problems (not just report the correct answer). However, they do not need to be able to solve general instances of the problems. The numeric solutions are given on the listed web sites.

1. Four digit whole number: There is one four-digit whole number n, such that the last four digits of n^2 are in fact the original number n.

source: http://www.mathsisfun.com/puzzles/four-digit-whole-number.html

2. Symbo-logical: The following 3 equations involve 4 variables, A, B, C and D. Work out the value of each variable using simple integer arithmetic functions: Each variable has a different value and is a positive integer. Note that all divisions should result in integer solutions (no truncating or rounding of fractions.).

A + (B/3) = 20
(B/5) - C = A/2 (corrected equation)
C + A = D

source: http://www.puzzlechoice.com/pc2/Symbo01x.html

3. Octa-plus: Can you work out which eight numbers correspond with the variables A through H? No two variables have the same value. Each variable is a positive integer between 1 and 34.

1. B minus C is either 5 or 6.

2. H is B minus D.

3. E is H minus D.

4. G is D plus F.

5. D is a sixth of B

6. F is a quarter of C.

7. A is 150 minus the sum of the other seven numbers.

source: http://www.puzzlechoice.com/pc2/Octaplus01x.html

Comments:

Feel free to create additional predicates if they help your solution.

Use “script” or screen dumps to show your solutions working in Prolog.

Make use of built-in Sicstus arithmetic functions (eg. mod/2). Also be aware of the difference between floating point and integer division:

```
?- X is 10/5.
X = 2.0

? X is 10//5.
X = 2

BUT...
?- X is 10//4.
X = 2
```

This little predicate might be useful. It computes integer divisions when denominator evenly divides into the numerator, or fails otherwise.

```
int_div(A,B,N) :-
 0 is mod(A, B),
 N is A//B.

?- int_div(10, 4, N).
no

?- int_div(10,2, N).
N = 5
```