Comp 333 Project #4 (25 pts)

Due: Dec 8 (upload by 8am)

**GENERAL DIRECTIONS:** In this project you will write and compile and run four Prolog programs. Use SWI-Prolog. You must turn in the source code and the sample runs pasted onto the end of the source code. I recommend that you cut and paste your program onto a WORD document before printing it. Your name should be embedded in the source code as a comment. Your source code file must be named project4.pl.

1. Write a recursive Prolog predicate that finds the max value in a list of numbers. Your queries should look like maxList([3,5,2,1,7,4], N) where N will be instantiated to the largest number in L.

**Test Case:** maxList( [ 3,5,2,23,7,4 ,1,5 ], N).

1. Write a recursive Prolog predicate listRef(L,N,R) to find the Nth member of a the list L. The answer should be in R. If N > length of the list, the sytem shuld respond with false. ***TestCases:*** listRef([a,b,c,d,e,f], 5,R) and listRef([cat, dog, bird], 4, R).
2. Write a recursive Prolog predicate to remove duplicates from a list. Your queries should look like removeDups( [1,3,5,2,5,7,1,9], X) where X will be instantiated to [ 3,2,5,7,1,9] and where order of the elements of X does not matter. **Testcases:** removeDups( [ 1,3,2,3,2,1,4,5], X) and removeDups([q,w,e,r,ty] , X). Do NOT USE sort.
3. Write a Prolog program to solve the general Challenger puzzle below. Your predicate should be challenger(A1,A2,A3,A4,A5,A6,A7,A8,A9,A10, X1,X2,X3,X4,X5,X6,X7,X8,X9,X10,X11,X12,X13,X14,X15,X16) . To solve problem generate the Xs and check the equations in an efficient order. **Test Case:** Solve the particular Challenger puzzle. To solve the particular puzzle, your query will be

challenger(A1,A2,A3,A4,A5,A6,A7,A8,A9,A10, X1,X2,X3,X4,X5,X6,X7,X8,X9,X10,X11,X12,X13,X14,X15,X16) with values substituted for the As and the given Xs.

**Turn in:**

* 1. Hard copy: Your source code in a single .pl file. A transcript of the interpreter window that shows your test results for each program. Label everything. Turn in in class.
  2. Electronic Copy: Upload a single source file with your Prolog programs to Moodle by Dec 8 at 8am. Your source file should contain as a comment your name, date and Project 4 and the file itself should be named project4.pl.

**Challenger Problem**

Enter a number between 1 and 9 in each white square.

Rows must add to totals on the right (gray box)

Columns must add to totals on bottom (gray box).

Diagonals squares should add to totals in upper and lower right (gray box).

**Specific Challenger Problem**

**Format of the General Challenger Problem**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  |  |  | 20 |
|  |  |  | 6 | 25 |
| 1 |  |  |  | 16 |
|  |  | 6 |  | 13 |
|  | 2 |  |  | 18 |
| 8 | 17 | 33 | 14 | 17 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  |  |  | A1 |
| X1 | X2 | X3 | X4 | A2 |
| X5 | X6 | X7 | X8 | A3 |
| X9 | X10 | X11 | X12 | A4 |
| X13 | X14 | X15 | X16 | A5 |
| A10 | A9 | A8 | A7 | A6 |

Note: The diagonal equations are X1 + X6 + X11 + X16 =:= A6

and X13 + X10+ X7 +X4 =:= A1