CCM Programming Challenge: Extending the Programming Languages KB

This assignment asks you to do a number of tasks pertaining to an extention of the programming languages KB that you established in the first Prolog assignment.

Specific Tasks

1. Work within the location that you estblished for doing what needed to be done for your first Prolog programming assignment.

2. Copy the `proglang_v1.pro` file to a `proglang_v2.pro` file. Change the name of the file in the comment appropriately. Work from the version 2 file which will appear just like that shown in **Part A** below.

3. Recreate the demo provided in **Part B** (modulo technical variations due to Prolog version and the specific operating system used), being sure to skip over the upper case English sentences that I threw in for purposes of "enrichment." Save it to a file called `proglang_v2_before_demo.text`.

4. Add knowledge of two more programming languages, SNOBOL and APL, to the programming language knowledge base in `proglang_v2.pro` according to the brief descriptions of the languages presented in **Part C**.

5. Create another demo, this one in the context of the augmented KB, this one dedicated to answering the questions posed in English in **Part D**. Save it to a file called `proglang_v2_after_demo.text`

Due Date

Wednesday, September 16, 2020

Part A

```
% file:  proglang_v2.pro
% line:  some knowledge about programming languages

% language(L) means L is a programming language

language(smalltalk).
language(lisp).
language(prolog).

% essense(L,DT,CF) means language L features datatype DT
% and computational formalism CF

essence(smalltalk,object,'message passing').
essence(lisp,list,'recursive functions').
essence(prolog,relation,'logical inferencing').

% history(L,invertor(I),date(D)) means language L was invented by I in year D

history(smalltalk,inventor('Alan Kay'),date(1980)).
history(lisp,inventor('John McCarthy'),date(1959)).
```

```
history(prolog,inventor('Alan Colmeraur'),date(1971)).
```

Part B

```
bash-3.2$ swipl
Welcome to SWI-Prolog (Version 2.7.16)
Copyright (c) 1993-1996 University of Amsterdam.
All rights reserved.
For help, use ?- help(Topic). or ?- apropos(Word).

LOAD THE KNOWLEDGE BASE FILE.
1 ?- consult('proglang.pro').
proglang.pro compiled, 0.00 sec, 1,916 bytes.
Yes

IS PASCAL A PROGRAMMING LANGUAGE?
2 ?- language(pascal).
No

IS PROLOG A PROGRAMMING LANGUAGE?
3 ?- language(prolog).
Yes

IS THERE A PROGRAMMING LANGUAGE?
4 ?- language(X).
X = smalltalk
Yes

IS THERE A PROGRAMMING LANGUAGE? (ASK PROLOG TO LIST THEM ALL!)
5 ?- language(L).
L = smalltalk;
L = lisp;
L = prolog;
No

LIST ALL THE PROGRAMMING LANGUAGES.
6 ?- language(Language),write(Language),nl,fail.
smalltalk
lisp
prolog
No

WHAT IS THE ESSENTIAL DATA TYPE AND COMPUTATIONAL FORMALISM OF LISP?
7 ?- essence(lisp,DT,CF).
DT = list
CF = 'recursive functions'
Yes

WHAT IS THE ESSENTIAL DATA TYPE OF PROLOG?
8 ?- essence(prolog,DT,_).
DT = relation
Yes
```

```
WHAT IS THE ESSENTIAL COMPUTATIONAL FORMALISM OF PROLOG?
9 ?- essence(prolog,_,CF).
CF = 'logical inferencing'
Yes

WHAT LANGUAGE HAS OBJECTS AS THE ESSENTIAL DATA TYPE?
10 ?- essence(L,objects,_).
L = smalltalk
Yes

WHO INVENTED LISP?
11 ?- history(lisp,I,_).
I = inventor('John McCarthy')
Yes

WHO INVENTED LISP?
12 ?- history(lisp,inventor(Name),_).
Name = 'John McCarthy'
Yes

LIST ALL OF THE PROGRAMMING LANGUAGE INVENTORS.
13 ?- history(_,inventor(N),_),write(N),nl,fail.
Alan Kay
John McCarthy
Alan Colmeraur
No

STOP PROLOG
14 ?- halt.
bash-3.2$
```

Part C

- SNOBOL is a programming language. The featured data type in SNOBOL is the pattern. The featured mechanism of computation in SNOBOL is string processing. SNOBOL first appeared in 1962 and was invented by Ralph Griswold (among others).

- APL is a programming language. The featured data type in APL is the matrix. The featured mechanism of computation in APL is matrix operations. APL first appeared in 1964 and was invented by Kenneth Iverson.

Part D

1. Is SNOBOL a programming language?
2. Is SNOWBALL a programming language?
3. What is the featured data type in SNOBOL?
4. Is there a programming language with the matrix featured as its fundamental data type?
5. Interactively display the names of all of the programming languages.
6. Programmably display the names of all of the programming languages.

7. Who invented APL? (Grab the name and only the name.)

8. Interactively display the names of all of the inventors of the programming languages.

9. Programmably display the names of all of the inventors of the programming languages.

10. Is there a programming language invented in 1959 with the list being its featured data type? (Hint: separate the two terms in this two-term query by a comma.)