Timothy Astacio

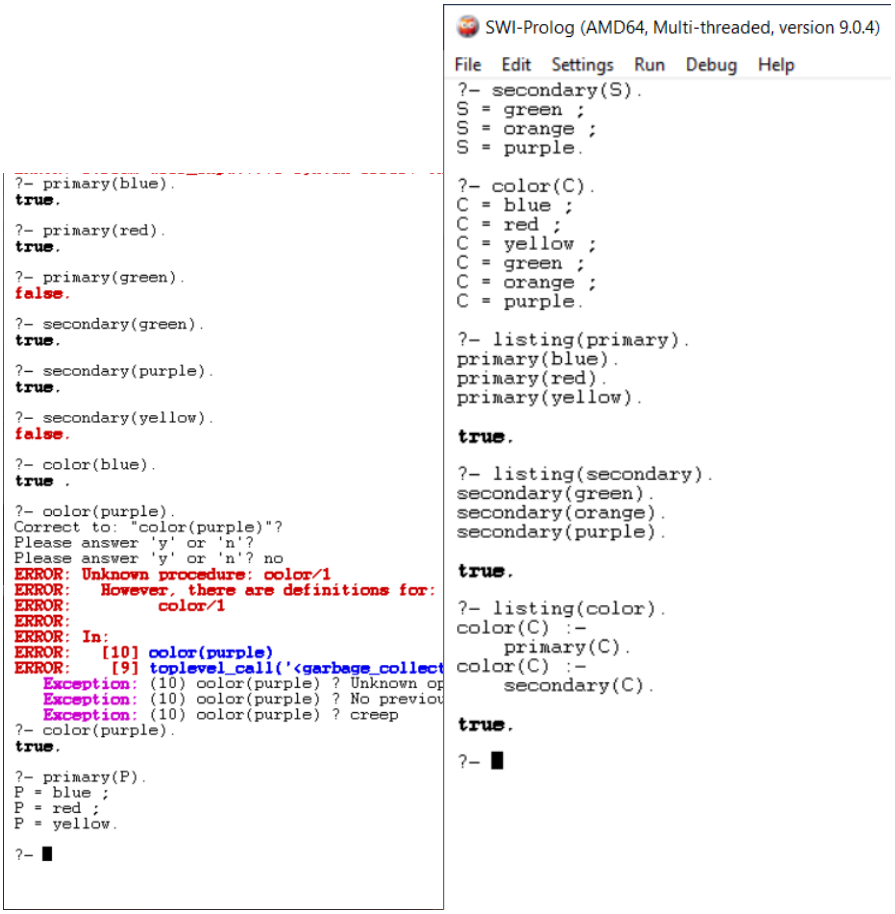
CSC 344 Programming Languages

Prolog Assignment 1: Various Computations

Abstract: This assignment introduces us to the programming language Prolog. Through this assignment I was able to gain a better understanding of Prologs syntax as well as further my skills in problem solving.

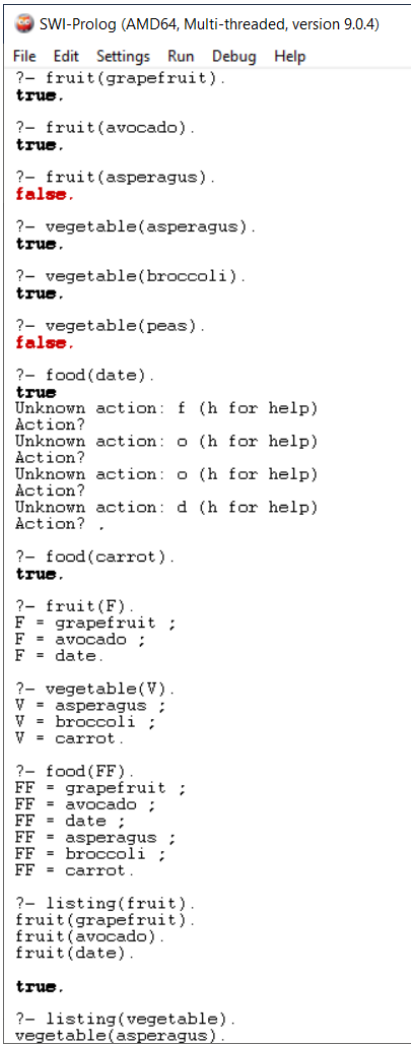
Task 1 Colors KB Code and Demo:

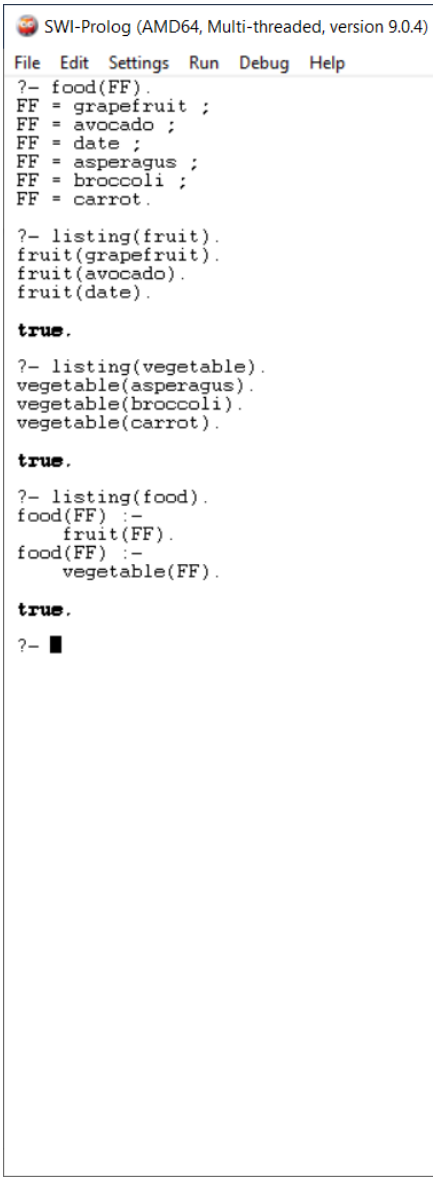
```
%-----------------------------------------------------------
% primary(P) :: P is a primary color

primary(blue).
primary(red).
primary(yellow).

%-----------------------------------------------------------
% second(S) :: S is a secondary color

secondary(green).
secondary(orange).
secondary(purple).

%-----------------------------------------------------------
% color(C) :: C is a color

color(C) :- primary(C).
color(C) :- secondary(C).
```



Task 2 Food KB Code and Demo:

```
%-----------------------------------------------------
% fruit(F) :: F is fruit

fruit(grapefruit).
fruit(avocado).
fruit(date).

%-----------------------------------------------------
% vegetable(V) :: V is a vegetable

vegetable(asperagus).
vegetable(broccoli).
vegetable(carrot).

%-----------------------------------------------------
% food(FF) :: FF is a food

food(FF) :- fruit(FF).
food(FF) :- vegetable(FF).
```





Task 3 Map Coloring:

Code:

mapColoring.pro - Notepad

File Edit Format View Help

```
%-----------------------------------------------------------------------------
% File: mapColoring.pro
% Line: Program to find a 4 color map rendering for south american countries.
% More: The colors used will be red, blue, green, orange.
% More: The standard abbrieviation are used to stand for the countries.

%-----------------------------------------------------------------------------
% different(X,Y) :: X is not equal to Y

different(red,blue).
different(red,green).
different(red,orange).
different(green,blue).
different(green,orange).
different(green,red).
different(blue,green).
different(blue,orange).
different(blue,red).
different(orange,blue).
different(orange,green).
different(orange,red).

%-----------------------------------------------------------------------------
% coloring(A,B,C,D,E,F,G,H,I,J,K,L,M,N,O,P,Q,R,S,T,U,V,W,X,Y,Z,AA,AB) ::
%The individual shapes that form the squares are represented by letters

coloring(A,B,C,D,E,F,G,H,I,J,K,L,M,N,O,P,Q,R,S,T,U,V,W,X,Y,Z,AA,AB) :-
different(A,B),
different(A,D)
```

Ln 49, Col 14 | 100% | Windows (CRLF) | UTF-8

```
coloring(A,B,C,D,E,F,G,H,I,J,K,L,M,N,O,P,Q,R,S,T,U,V,W,X,Y,Z,AA,AB) :-
different(A,B),
diferent(A,D),
different(A,H),
different(A,G),
different(A,F),
different(A,E),
different(C,B),
different(C,D),
different(C,K),
different(C,L),
different(C,M),
different(C,N),
different(B,H),
different(B,I),
different(B,J),
different(B,K),
different(D,E),
different(D,P),
different(D,O),
different(D,N),
different(H,I),
different(H,G),
different(H,S),
different(E,F),
different(E,Q),
different(E,P),
different(K,J),
```

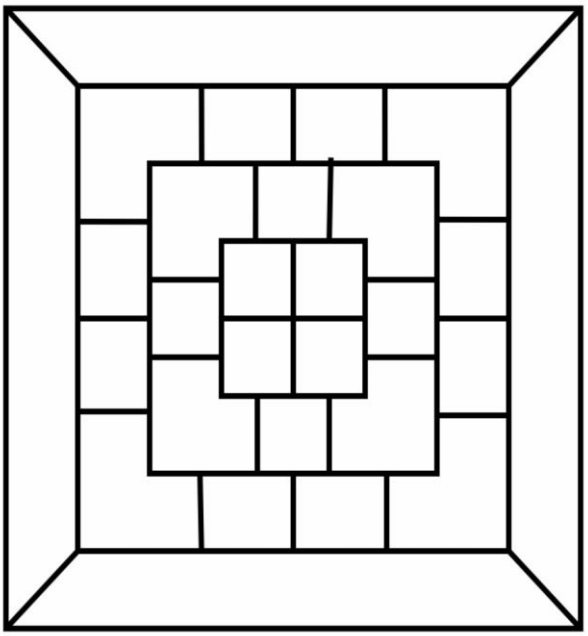
mapColoring.pro - Notepad

File Edit Format View Help

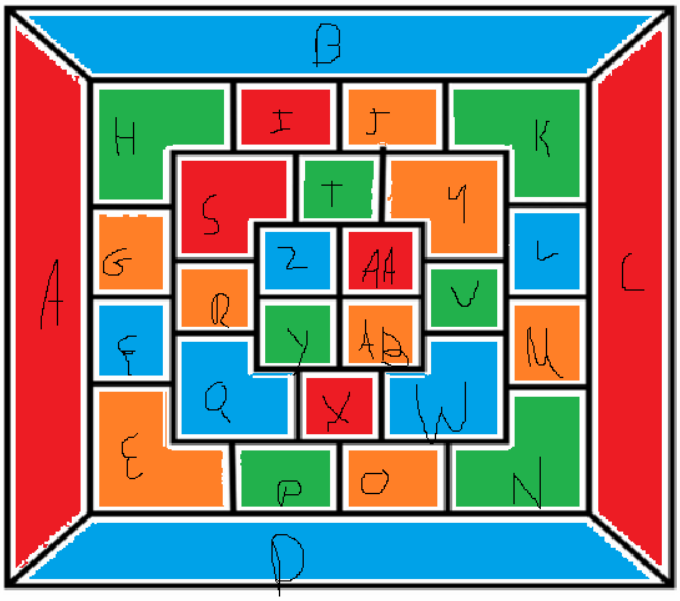
```
different(K,U),
different(K,L),
different(N,O),
different(N,W),
different(N,M),
different(I,S),
different(I,T),
different(I,J),
different(J,T),
different(J,U),
different(G,S),
different(G,R),
different(F,R),
different(F,Q),
different(F,G),
different(P,Q),
different(P,X),
different(P,O),
different(O,X),
different(O,W),
different(M,W),
different(M,V),
different(M,L),
different(L,V),
different(L,U),
different(T,S),
```

```
File  Edit  Format  View  Help
different(L,V),
different(L,U),
different(T,S),
different(T,Z),
different(T,AA),
different(T,U),
different(R,S),
different(R,Z),
different(R,Y),
different(R,Q),
different(X,Q),
different(X,Y),
different(X,AB),
different(X,W),
different(V,W),
different(V,AB),
different(V,AA),
different(V,U),
different(U,AA),
different(Y,Q),
different(Z,Y),
different(Z,AA),
different(Z,AB),
different(Z,S),
different(AB,Y),
different(AB,AA),
different(AA,Y).
```

The Given Map



The labelled and Colored in Map.

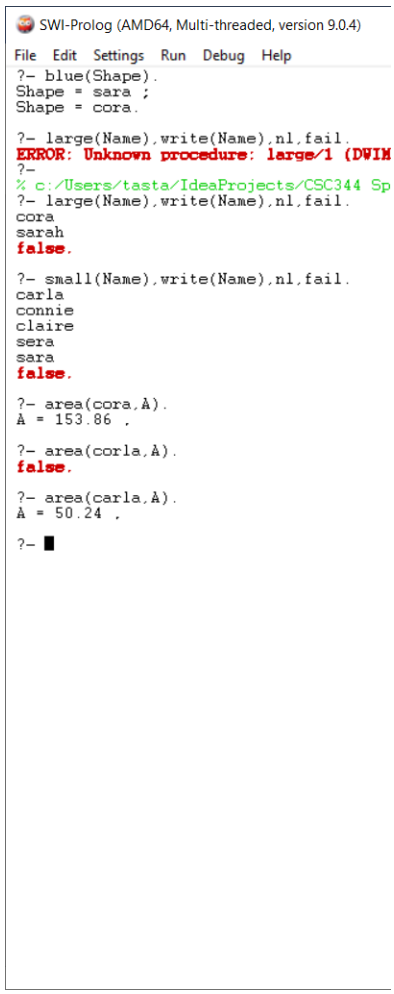


Task 4 Floating Shapes KB Code and demo:

```
%-------------------------------------------------------------
% square(N,side(L),color(C) :: N is the name of a square with side L and color C

square(sera,side(7),color(purple)).
square(sara,side(5),color(blue)).
square(sarah,side(11),color(red)).

%-------------------------------------------------------------
% circle(N, radius(R), color(C)) :: N is the name of a circle with a radius R and color C

circle(carla,radius(4),color(green)).
circle(cora,radius(7),color(blue)).
circle(connie,radius(3),color(purple)).
circle(claire,radius(5),color(green)).

%-------------------------------------------------------------
% circles :: list the names of all of the circles

circles :- circle(Name,_,_), write(Name),nl,fail.
circles.

%-------------------------------------------------------------
% squares :: list the names of all of the squares

squares :- square(Name,_,_), write(Name),nl,fail.
squares.
```

```
%-------------------------------------------------------------
% shapes:: list the names of all the shapes

shapes :- circles,squares.

%-------------------------------------------------------------
% blue(Name) :: name is a blue square

blue(Name) :- square(Name,_,color(blue)).
blue(Name) :- circle(Name,_,color(blue)).

%-------------------------------------------------------------
% large(Name) :: Name is a large shape

large(Name) :- area(Name,A), A >= 100.

%-------------------------------------------------------------
% small(Name) :: Name is a small shape

small(Name) :- area(Name,A), A < 100.

%-------------------------------------------------------------
% area(Name,A) :: A is the area of the shape with a Name

area(Name,A) :- circle(Name,radius(R),_), A is 3.14 * R * R.
area(Name,A) :- square(Name, side(S),_), A is S * S.
```


SWI-Prolog (AMD64, Multi-threaded, version 9.0.4)
File Edit Settings Run Debug Help
?- listing(squares).
squares :-
square(Name, _, _),
write(Name),
nl,
fail.
squares.
true.
?- squares.
sera
sara
sarah
true.
?- circles.
carla
cora
connie
claire
true.
?- listing(circles).
circles :-
circle(Name, _, _),
write(Name),
nl,
fail.
circles.
true.
?- listing(shapes).
shapes :-
circles,
squares.
true.
?- shapes>
|
ERROR: Syntax error: Unbalanced operator
ERROR: shapes>
ERROR: ** here **
ERROR: .
?- shapes.
carla
cora
connie
claire
sera
sara
sarah
true.
?- blue(Shape).
Shape = sara ;
Shape = cora.


SWI-Prolog (AMD64, Multi-threaded, version 9.0.4)
File Edit Settings Run Debug Help
?- blue(Shape).
Shape = sara ;
Shape = cora.
?- large(Name),write(Name),nl,fail.
ERROR: Unknown procedure: large/1 (DWIM
?-
% c:/Users/tasta/IdeaProjects/CSC344 Sp
?- large(Name),write(Name),nl,fail.
cora
sarah
false.
?- small(Name),write(Name),nl,fail.
carla
connie
claire
sera
sara
false.
?- area(cora,A).
A = 153.86 ,
?- area(corla,A).
false.
?- area(carla,A).
A = 50.24 ,
?-