Task 1 : Make five structure objects in prolog.

Structure 1 :

movie(Name, date(Day, Month, Year), Rating);

From this structure, we can create a movie object as,

Cube = movie(“Cube”, date(11, “July”, 1998), 7.2);

Structure 2 :

book(Title, Author, NumberOfPages, Publisher);

From this structure, we can create a book object as,

The\_Great\_Gatsby = book(“The Great Gatsby”, “F. Scott Fitzgerald”, 218,”Scribner”);

Structure 3 :

Mouse(Brand, Model, Weight, DPI, Price);

From this structure, we can create a mouse object as,

Havit\_HV\_MS\_1001 = mouse(“Havit”, “Gamenote-HV-MS-1001”, 150, 850);

Structure 4 :

student(Name, Id, Dept., Year);

we can create a student object from this structure,

Hasib = student(“modon”, “CSE0000”, “CSE”, “4th”);

Structure 5 :

epidemic(Event, Date, Location, Disease, DeathToll);

From this structure, we can create a epidemic object as,

Covid19 = epidemic(“Covid-19 pandemic”, “2019-present”, “Worldwide”, “Covid-19”, “1.2million+”);

Task 2 :

triangle(point(-l,0),P2, P3): triangle(Pl, point(l,0), point(0,Y))

The resulting instantiation defines a family of triangles. How would

you describe this family?

The instantiations will be,

P1 = point(-1,0)

P2 = point(1,0)

P3 = point(0,Y)

For P1 and P2 points are fixed and defined. But for P3, point could be anywhere on the y axis as x = 0.line(point(X1, Y1), point(X2, Y2)). vertical(point(X, Y1), point(X, Y2)) :- Y1 =\= Y2. horizontal(point(X1, Y), point(X2, Y)) :- X1 =\= X2. rectangle(point(X1, Y1), point(X2, Y2), point(X3, Y3), point(X4, Y4)). regular(rectangle(A,B,C,D)) :- vertical(A,B), horizontal(B,C), vertical(C,D), horizontal(D,A); horizontal(A,B), vertical(B,C), horizontal(C,D), vertical(D,A).

**Problem Statement**

**Problem 1:** make 5 structures

Prolog Code:

cat(has(hair),classtype(mamal)).

date(1,may,2000).

computer(cpu(intel),display(samsung),iodevice(2)).

class(student,teacher).

car(wheel(4),color(red),brand(toyota)).

Query:

?- car (wheel(X), color (red), brand(Toyota)).

X = 4

**Problem 2:** triangle (point (-l,0), P2, P3) = triangle(Pl, point(l,0), point(0,Y)) The resulting instantiation defines a family of triangles. How would you describe this family?

After comparing these two triangles the following variables gets instantiated.

P2=point(l,0), P3=point(0,Y), Pl = point(-l, 0)

Now as we can see the distance between P1 and P2 is same. So, the family of triangle depends on P3. When value of Y is Y=1 or Y=-1 triangle is called equilateral triangle and if Y is Y>1 or Y<-1 then it is called isosceles triangle.

**Ex-2.9:? - big( X), dark( X).**

EXECUTION TRACE:

(1) Initial list big(X), dark( X).

(2) Scan the program from top to bottom looking for a clause whose head matches the first goal big (X). Clause 1 found. This clause has no body, so the goal list, properly instantiated, shrinks to:

dark (bear).

(3) Scan the program to find a match with dark(bear). Clause 7 found:

dark( Z) :- black(Z).

Replace the goal by the instantiated body of clause 7, giving a new goal

black(bear)

(4) Scan the program for the goal black(bear). No clause found. Therefore backtrack to step(3).Now the goal is again

dark(bear).

Continue scanning the program below clause 7. Clause 8 is found:

dark( Z) :- brown( Z).

Replace the goal in the goal list by brown(X), giving:

brown(bear).

(5)Scan the program and find clause brown( bear).So now the goal list is empty. This indicates successful termination, and the corresponding variable instantiation is:

X = bear

So find the answer of? - big(X), dark( X). Problem we need 5 steps and to answer of?- dark( X) ,big(X) problem we need 6 steps. So prolog need more work to solve?- dark( X) ,big(X) problem than ?- big(X), dark( X). Problem.

**Ex -2.5 :-** Assume that a rectangle is represented by the term rectangle( Pl, P2, P3, P4) where the P's are the vertices of the rectangle positively ordered. Define the relation regular( R) which is true if R is a rectangle whose sides are vertical and horizontal.

Prolog Code.

vertical(point(X, Y1), point(X, Y2)) :-

Y1 =\= Y2.

horizontal(point(X1, Y), point(X2, Y)) :-

X1 =\= X2.

regular(point(X1, Y1), point(X2, Y2), point(X3, Y3), point(X4, Y4)) :-

vertical(point(X1, Y1),point(X2, Y2)),

horizontal(point(X2, Y2),point(X3, Y3)),

vertical(point(X3, Y3),point(X4, Y4)),

horizontal(point(X4, Y4),point(X1, Y1));

horizontal(point(X1, Y1),point(X2, Y2)),

vertical(point(X2, Y2),point(X3, Y3)),

horizontal(point(X3, Y3),point(X4, Y4)),

vertical(point(X4, Y4),point(X1, Y1)).

Query:-

?- regular(point(1,1),point(10,1),point(10,5),point(1,5)).

-true

?- regular(point(1,2),point(3,14),point(5,7),point(10,15)).

-false