Modern Programming Languages (CS508)
SPRING 2012
Solution Assignment No. 3

Total Marks: 20 **Dead line: June 06, 2012**

Application:

AlstraSoft Expert System Application:

Scenario:

Suppose you are developing an expert **Environmental system** at **Alstrasoft Pvt Ltd** that strives to be the premier provider of web-based software solutions for businesses worldwide. As a web development and software company, Alstrasoft specialize mainly in web design and software programming.

Evaluation:

Now In the same Environmental systems that predict the weather, analyze water supplies, and so on. There is a need to develop an expert system in Prolog named '**Weather Modeling System'**, for National Center for Atmospheric Research .This expert system will provide relatively detailed, short term forecast of meteorological conditions. It is used particularly to model pollutant dispersion (for instance, acid rain deposition). Answer the following questions based on the scenario provided.

a) Why is **PROLOG** the language of choice for developers to develop expert system like '**Weather Modeling System'? [5]**

Solution:

-Expert Systems and Prolog:

Prolog is the language of choice for developers and a powerful tool to develop commercial applications. The technology is now in widespread use in a wide range of domains, including finance, defense, telecommunications, law, medicine, agriculture, engineering, manufacturing, and education. Prolog has some clear advantages over other programming languages and can to significant returns on investments and completive advantages.

In expert systems that have number of major system components and interface with individuals Prolog is mostly used .Prolog is successful in an environmental systems like weather modeling system as this is a sort of expert system that predict the weather, analyze water supplies, and so on. The Weather Modeling System, gives relatively detailed, short term forecast of meteorological conditions. It is used particularly to model pollutant dispersion (for instance, acid rain deposition).To develop this fully interactive system with proper GUI for users in which they can see the detail data for weather analysis prolog is the choice for programmers because it is declarative programming language and in prolog we program the logic of the program and prolog system automatically implements the control.

b**)** Write Prolog equivalent for the following statements? **[5]**

1. Weather is cloudy and rainy.
2. Dust storm is expected today.
3. Mike carries umbrella for John.
4. Is there a forecast for rain today?
5. Is the earth round.

Solution:

1. Weather is cloudy and rainy.

?- Weather(cloudy, rainy).

2. Dust storm is expected today.

?- expected(Dust storm,today)

3. Mike carries umbrella for John.

?- carries(Mike, umbrella, John).

4. Is there a forecast for rain today?

?- forecast(rain, today).

5. Is the earth round.

?- round(earth).

c) Consider a program that has following four facts and one rule. What will be the response of following queries in PROLOG also justify your answer against each query?**[10]**

Facts:

cloudy(South Carolina).

cloudy(Oslo).

cold(Oslo).

snowy(Toronto)

The rule is:

foggy(X) :- cloudy(X), cold(X).

Solution:

Queries:

?- foggy(Oslo).
Yes

?- foggy(South Carolina).
No

?- foggy(Toronto).
No

?- foggy(C).
C = X
C=Oslo

?- foggy(Sweden).
No