ARTIFICIAL INTELLIGENCE

LAB 3

AIM: To learn simple input and output predicates in prolog and to build rule-based consultation program.

1. Medical Diagnosis

```
domains
    disease,indication = symbol
    Patient,name = string
predicates
    hypothesis(string,disease)
    symptom(name,indication)
    response(char)
    go
clauses
    go :-
        write("What is the patient's name? "),
        readln(Patient),
        hypothesis(Patient,Disease),
        write(Patient,"probably has ",Disease,"."),nl.
    go :-
        write("Sorry, I don't seem to be able to"),nl,
        write("diagnose the disease."),nl.
    symptom(Patient,fever) :-
        write("Does ",Patient," have a fever (y/n) ?"),
        response(Reply),
        Reply='y'.
    symptom(Patient,rash) :-
        write("Does ",Patient," have a rash (y/n) ?"),
        response(Reply),
        Reply='y'.
    symptom(Patient,headache) :-
        write("Does ",Patient," have a headache (y/n) ?"),
        response(Reply),
        Reply='y'.
    symptom(Patient,runny_nose) :-
        write("Does ",Patient," have a runny_nose (y/n) ?"),
        response(Reply),
        Reply='y'.
    symptom(Patient,conjunctivitis) :-
        write("Does ",Patient," have a conjunctivitis (y/n) ?"),
        response(Reply),
        Reply='y'.
```

```
symptom(Patient,cough) :-
    write("Does ",Patient," have a cough (y/n) ?"),
    response(Reply),
    Reply='y'.
symptom(Patient,body_ache) :-
    write("Does ",Patient," have a body_ache (y/n) ?"),
    response(Reply),
    Reply='y'.
symptom(Patient,chills) :-
    write("Does ",Patient," have a chills (y/n) ?"),
    response(Reply),
    Reply='y'.
symptom(Patient,sore_throat) :-
    write("Does ",Patient," have a sore_throat (y/n) ?"),
    response(Reply),
    Reply='y'.
symptom(Patient,sneezing) :-
    write("Does ",Patient," have a sneezing (y/n) ?"),
    response(Reply),
    Reply='y'.
symptom(Patient,swollen_glands) :-
    write("Does ",Patient," have a swollen_glands (y/n) ?"),
    response(Reply),
    Reply='y'.
```

```
symptom(Patient,swollen_glands) :-
    write("Does ",Patient," have a swollen_glands (y/n) ?"),
    response(Reply),
    Reply='y'.
hypothesis(Patient,measles) :-
    symptom(Patient,fever),
    symptom(Patient,cough),
    symptom(Patient,conjunctivitis),
    symptom(Patient,runny_nose),
    symptom(Patient,rash).
hypothesis(Patient,german_measles) :-
    symptom(Patient,fever),
    symptom(Patient,headache),
    symptom(Patient,runny_nose),
    symptom(Patient,rash).
hypothesis(Patient,flu) :-
    symptom(Patient,fever),
    symptom(Patient,headache),
    symptom(Patient,body_ache),
    symptom(Patient,conjunctivitis),
    symptom(Patient,chills),
    symptom(Patient,sore_throat),
    symptom(Patient,runny_nose),
    symptom(Patient,cough).
hypothesis(Patient,common_cold) :-
    symptom(Patient,headache),
    symptom(Patient,sneezing),
    symptom(Patient,sore_throat),
    symptom(Patient,runny_nose),
    symptom(Patient,chills).
```

```
hypothesis(Patient,mumps) :-
    symptom(Patient,fever),
    symptom(Patient,swollen_glands).
hypothesis(Patient,chicken_pox) :-
    symptom(Patient,fever),
    symptom(Patient,chills),
    symptom(Patient,body_ache),
    symptom(Patient,rash).
hypothesis(Patient,measles) :-
    symptom(Patient,cough),
    symptom(Patient,sneezing),
    symptom(Patient,runny_nose).
response(Reply) :-
    readchar(Reply),
    write(Reply),nl.
```

Output:

1. Unsuccessful to identify the disease.
   Goal: go

```
What is patient's name? Drashti
Does Drashti have a fever (y/n)? y
Does Drashti have a cough (y/n)? n
Does Drashti have a headache (y/n)? n
Does Drashti have a body_ache (y/n)? y
Does Drashti have a conjunctivitis (y/n)? n
Does Drashti have a runny_nose (y/n)? y
Does Drashti have a chills (y/n)? n
Does Drashti have a sneezing (y/n)? n
Sorry, I don't seem to be able to
diagnose the disease.
Yes
```

2. Successfully able to identify the disease.
   Goal: go

```
What is patient's name? Drashti
Does Drashti have a fever (y/n)? y
Does Drashti have a swollen_glands (y/n)? y
Drashti probably has mumps.
```

2. Predict user's nature based on color user likes.

Solution:

Code:

```
predicates
    personNature(string)
    likes(string,string)
    go
clauses
    go :-
        write("Please Enter Person Name :- "),
        readln(Person),
        personNature(Person),nl.
    go :-
        write("It seems difficult for me to predict"),nl,
        write("nature based on the color person likes."),nl.
    personNature(Person) :-
        likes(Person,"Red"),
        write(Person," is AGGRESSIVE in nature."),nl.
    personNature(Person) :-
        likes(Person,"Orange"),
        write(Person," is LOYAL in nature."),nl.
    personNature(Person) :-
        likes(Person,"Yellow"),
        write(Person," is IMAGINATIVE & CO-OPERATIVE in
        nature."),nl.
    personNature(Person) :-
        likes(Person,"Green"),
        write(Person," is AFFECTIONATE in nature."),nl.
    personNature(Person) :-
        likes(Person,"Blue"),
        write(Person," is INTROSPECTIVE & ENTHUSIASTIC in
        nature."),nl.
    personNature(Person) :-
        likes(Person,"Purple"),
        write(Person," is CREATIVE & ANGRY in nature."),nl.
    personNature(Person) :-
        likes(Person,"Brown"),
        write(Person," is IMPULSIVE in nature."),nl.
    personNature(Person) :-
        likes(Person,"Black"),
        write(Person," is POLITE in nature."),nl.
```

```
    likes(Person,Color):-
        write("Does ",Person," likes ",Color," color ? (y/n)"),
        readchar(Reply),
        write(" ",Reply),nl,
        Reply='y'.
```

Output:

1. A person who doesn't like any color.

```
Please Enter Person Name:- Drashti
Does Drashti likes Orange color?(y/n) n
Does Drashti likes Red color?(y/n) n
Does Drashti likes Brown color?(y/n) n
Does Drashti likes Blue color?(y/n) n
Does Drashti likes Black color?(y/n) n
Does Drashti likes Green color?(y/n) n
Does Drashti likes Yellow color?(y/n) n
It seems difficult for me to predict
nature based on the color person likes.
```

2. A person who likes Red color.

```
Please Enter Person Name:- Drashti
Does Drashti likes Orange color?(y/n) n
Does Drashti likes Red color?(y/n) y
Does Drashti likes Brown color?(y/n) n
Does Drashti likes Blue color?(y/n) n
Drashti is AGGRESSIVE in nature
```

3. Predict user's health based on habits user practices.

Solution:

Code:

```
domains
    habit=symbol
predicates
    hashabit(string,habit)
    personHealth(string,string)
    go
clauses
    go :-
        write("Please Enter Person Name :- "),
        readln(Person),personHealth(Person,Status),
        write(Person,"'s health is ",Status,"."),nl.
    go :-
        write("Sorry..!!!"),nl,
        write("I am not able to predict person habit"),nl,
        write("based on his/her regular habits."),nl.
    personHealth(Person,"Bad"):-
        hasHabit(Person,regular_smoking).
    personHealth(Person,"Bad"):-
        hasHabit(Person,excessive_drinking).
    personHealth(Person,"Bad"):-
        hasHabit(Person,taking_drugs).
    personHealth(Person,"Bad"):-
        hasHabit(Person,oily_food),
        hasHabit(Person,sweet_food).
    personHealth(Person,"Bad"):-
        hasHabit(Person,less_sleep).
    personHealth(Person,"Good"):-
        hasHabit(Person,drinking_milk),
        hasHabit(Person,eating_green_veges_or_egg),
        hasHabit(Person,drinking_water).
    personHealth(Person,"Good"):-
        hasHabit(Person,regular_exe),
        hasHabit(Person,suff_sleep),
        hasHabit(Person,regular_walk).
    personHealth(Person,"Good"):-
        hasHabit(Person,brush_teeth),
        hasHabit(Person,wash_hair),
        hasHabit(Person,regular_shower).
```

```
    personHealth(Person,"Good"):-
        hasHabit(Person,brush_teeth),
        hasHabit(Person,wash_hair),
        hasHabit(Person,regular_shower).
    personHealth(Person,"Moderate"):-
        hasHabit(Person,oily_food),
        hasHabit(Person,regular_walk).
```

```
personHealth(Person,"Moderate"):-
    hasHabit(Person,oily_food),
    hasHabit(Person,regular_exe).
```

```
hasHabit(Person,regular_smoking) :-
    write("Does ",Person," have habit of regular smoking?(y/n)"),
    readchar(Reply),write(Reply),nl,Reply='y'.
hasHabit(Person,excessive_drinking) :-
    write("Does ",Person," have habit of excessive drinking regularly?(y/n) "),
    readchar(Reply),write(Reply),nl,Reply='y'.
hasHabit(Person,taking_drugs) :-
    write("Does ",Person," have habit of taking drugs?(y/n) "),
    readchar(Reply),write(Reply),nl,Reply='y'.
hasHabit(Person,oily_food) :-
    write("Does ",Person," have habit of eating oily food?(y/n)"),
    readchar(Reply),write(Reply),nl,Reply='y'.
hasHabit(Person,sweet_food) :-
    write("Does ",Person," have habit of taking too much suger
    with food?(y/n) "),
    readchar(Reply),write(Reply),nl,Reply='y'.
hasHabit(Person,less_sleep) :-
    write("Are sleep hours of ",Person," less?(y/n) "),
    readchar(Reply),write(Reply),nl,Reply='y'.
hasHabit(Person,drinking_milk) :-
    write("Does ",Person," have habit of drinking milk regularly?(y/n) "),
    readchar(Reply),write(Reply),nl,Reply='y'.
hasHabit(Person,eating_green_veges_or_egg) :-
    write("Does ",Person," have habit of eating green vegetables in meal?(y/n) "),
    readchar(Reply),write(Reply),nl,Reply='y'.
hasHabit(Person,eating_green_veges_or_egg) :-
    write("Does ",Person," have habit of eating eggs in meal?(y/n) "),
    readchar(Reply),write(Reply),nl,Reply='y'.
hasHabit(Person,drinking_water) :-
    write("Does ",Person," have habit of drinking enough water during day?(y/n) "),
    readchar(Reply),write(Reply),nl,Reply='y'.
hasHabit(Person,regular_exe) :-
    write("Does ",Person," have habit of regular exercise?(y/n)"),
    readchar(Reply),write(Reply),nl,Reply='y'.
```

```
hasHabit(Person,suff_sleep) :-
    write("Does ",Person," have habit of regular sufficient sleep hours?(y/n) "),
    readchar(Reply),write(Reply),nl,Reply='y'.
hasHabit(Person,regular_walk) :-
    write("Does ",Person," have habit of regular walk?(y/n) "),
    readchar(Reply),write(Reply),nl,Reply='y'.
hasHabit(Person,brush_teeth) :-
    write("Does ",Person," have habit of brushing teeth?(y/n)"),
    readchar(Reply),write(Reply),nl,Reply='y'.
hasHabit(Person,wash_hair) :-
    write("Does ",Person," have habit of washing hair?(y/n) "),
    readchar(Reply),write(Reply),nl,Reply='y'.
hasHabit(Person,regular_shower) :-
    write("Does ",Person," have habit of using shower
    regularly?(y/n) "),
    readchar(Reply),write(Reply),nl,Reply='y'.
```

Output:

```
Please Enter Person Name:- Drashti
Does Drashti have habit of regular smocking?(y/n) n
Does Drashti have habit of excessive drinking regularly?(y/n) n
Does Drashti have habit of taking drugs?(y/n) n
Does Drashti have habit of eating oily food?(y/n) y
Does Drashti have habit of taking too much sugar with food?(y/n) y
Drashti's health is Bad.
Yes
```