Report on : AI LAB (CS-793C)

Assignment-9

1. Write a program in prolog to find the Factorial of a given number 'N'.

Knowledge Representation

```
factorial(0,1).
factorial(N,F):-
   N>0,
   N1 is N-1,
   factorial(N1,F1),
   F is N*F1.
```

Query and Output :-

```
factorial(5,W),write(W).
120
W = 120 .
```

2. Write a program in prolog for finding Fibonacci series of nth number.

Knowledge Representation

```
fib(0, 0).
fib(X, Y):- X > 0, fib(X, Y, _).
fib(1, 1, 0).
fib(X, Y1, Y2) :- X > 1,
    X1 is X - 1,
    fib(X1, Y2, Y3),
    Y1 is Y2 + Y3.
```

Query and Output

```
?- fib(8,21).
true .
?- fib(8,Y).
Y = 21 .
Yes.
```

3. Write a program in prolog for the membership.

Knowledge Representation

```
member(X,[X|R]).
member(X,[Y|R]) :- member(X,R).
```

Query and Output :-

```
member(a,[b,a,c,d]).
true .
```

4. Write a program in prolog to find the reverse of a list.

Knowledge Representation

```
reverse([X | Y],Z,W):-reverse(Y,[X | Z],W).

reverse([],X,X).
```

Query and Output

```
?- reverse([9,8,3],A).

A = [3, 8, 9].

Yes.
```

5. Write a program in prolog to find whether a given word is palindrome or not.

Knowledge Representation

```
palindrome(L):- reverse(L,L).

                my_reverse([],[]).

                my_reverse([H|T],R):- my_reverse(T,T1),append(T1,[H],R).
```

Query and Output

```
?- palindrome([d,a,d]).

Yes.

?- palindrome([d,a,d,d,y]).

false.
```

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6. Write a program in prolog to find the sum of two numbers.

Knowledge Representation

```
sum(X,Y):-
 S is X+Y,
 write(S).
```

Query and Output

```
?- sum(5,5).
10
true.
?- sum(-3,5).
2
true.
```

7. Write a program in prolog to find the subtraction of two numbers.

Knowledge Representation

```
sub(X,Y):-
 S is X-Y,
 write(S).
```

Query and Output

```
?- sub(-3,5).
-8
true.
?- sub(-2,-2).
0
true.
```

8. Write a program in prolog to find the product of two numbers.

Knowledge Representation

```
mul(X,Y):-
 M is X*Y,
 write(M).
```

Query and Output

```
?-mul(-2,-2).
4
true.
```

9. Write a program in prolog to find the result after division of two numbers.

Knowledge Representation

```
div(X,Y):-
 D is X/Y,
 write(D).
```

Query and Output

```
?- div(5,2).
2.5
true.
```

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10. Write a program in prolog to find the summation of arithmetic progression.

Knowledge Representation

```
start:-ap.

        ap:-write('N='),read(N),
        write('A='),read(A),
        write('D='),read(D),
        S is ((N/2)*(A+((N-1)*D))),
        write('A.P. sum is '),write(S).
```

Query and Output

```
?- start.
N=4.
A=|: 2.
D=|: 2.
A.P. sum is 16
true.
```

11. Write a program in prolog to create a loop for n numbers.

Knowledge Representation

```
loop(0).
loop(N):-N>0,write(' The value is: '),write(N),nl,M is N-1,loop(M).
```

Query and Output

```
?- loop(6).
 The value is: 6
 The value is: 5
 The value is: 4
 The value is: 3
 The value is: 2
 The value is: 1
true
```

12. Write a program in prolog to find the length of a list.

Knowledge Representation

```
length([]    , 0 ).
length([_|Xs] , L ) :- list_length(Xs,N) , L is N+1 .
```

Query and Output

```
?- length([4,5,8,9,1],X).
X = 5.
```

13. Write a program in prolog to implement BLOCK AND TABLE.

Knowledge Representation

```
block(block1).
block(block2).
block(block3).
block(block4).
table(table1).
on(block1,block2).
on(block2,table1).
on(block3,block4).
on(block4,table1).
above(X,Y):-block(X),block(Y),on(X,Y).
above(X,Y):-block(X),table(Y),on(X,Y).
above(X,Y):-block(X),block(Z),on(X,Z),above(Z,Y).
```

Query and Output

1 ?- on(block1, table1).

No

2 ?- above(block1, table1).

Yes

3 ?- above(block1, block2).

Yes

4 ?- above(block2, X).

X = table1

Yes

5 ?- above(block3, X).

X = block4

Yes

6 ?- above(X, table1).

X = block2

Yes

7 ?- above(X,Y).

X = block1

Y = block2

Yes

Figure of BLOCK AND TABLE Problem