Experiment No: 6

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Title: Prolog Programming Set 1

Objective: To get acquainted with logical programming

Implement

1. Hello, World!" program

```
main :- write('Hello World'),

| ?- main.
Hello World
```

2. Program to check if an element is a member of a list

```
list_member(X,[X|_]).
list_member(X,[_|TAIL]) :- list_member(X,TAIL).

| ?- list_member(2,[1,2,3]).
true
```

3. Program to append two lists

```
conc([],L,L).
conc([X|M],N,[X|Q]):-conc(M,N,Q).

| ?- conc([1,2],[a,b,c],L).
L = [1,2,a,b,c]
```

4. Program to reverse a list

```
list_rev([],[]).
list_rev([Head|Tail],Reversed) :-
  list_rev(Tail, RevTail),conc(RevTail, [Head],Reversed).

| ?- list_rev([1,2,3,4,5],L).
L = [5,4,3,2,1]
```

5. Program to find the length of a list

```
list_length([],0).
list_length([_|TAIL],N) :- list_length(TAIL,N1), N is N1 + 1.

| ?- list_length([a,b,c,d,e,f,g],L).
L = 7
```

6. Program to find the maximum of two numbers

```
find_max(X, Y, X) :- X >= Y, !.
find_max(X, Y, Y) :- X < Y.

| ?- find_max(100,200,Max).
Max = 200
```

7. Program to find the minimum of two numbers

```
find_min(X, Y, X) :- X =< Y, !.
find_min(X, Y, Y) :- X > Y.

| ?- find_min(100,200,Min).
Min = 100
```

8. Program to find the factorial of a number

```
n_factorial(0, 1).
n_factorial(N, F) :-
      N #> 0,
      N1 #= N - 1,
      n_factorial(N1, F1),
      F #= N * F1.

| ?- n_factorial(5,F).
F = 120
```

9. Program to find the nth Fibonacci number

```
fib(0, 1) :- !.
fib(1, 1) :- !.
fib(N, F) :-
      N > 1,
      N1 is N-1,
      N2 is N-2,
      fib(N1, F1),
      fib(N2, F2),
      F is F1+F2.

| ?- fib(5,F).
F = 8
```

10. Program to find the sum of a list of numbers

```
list_sum([],0).

list_sum([Head|Tail], TotalSum):-
list_sum(Tail, Sum1),
TotalSum is Head+Sum1.

| ?- list_sum([1,2,3,4], Sum).
Sum = 10
```

11. Program to find the smallest element in a list.

```
min_of_two(X,Y,X) :- X =< Y, !.
min_of_two(X,Y,Y) :- X > Y.
list_min_elem([X],X).
list_min_elem([X,Y|Rest],Min) :-
  list_min_elem([Y|Rest],MinRest),
  min_of_two(X,MinRest,Min).

| ?- list_min_elem([4,8,2,5,3],Min).
Min = 2
```