Lab 4

Aim :- To learn arithmetic operations and recursion in Prolog.

* Exercise :-

1. write a prolog program to find roots (real roots only) of quadratic equation.

```
predicates
    cal(integer, integer, integer)
    start
clauses
    start :-
    write("Enter A :-"),
     readint(A),
     write("Enter B :-"),
     readint(B),
     write("Enter C :-"),
      readint(C),
      cal(A,B,C),
    cal(A,B,C) :-
        D = sqrt(B*B - 4*A*C),
        R1 = (-B + D)/(2*A),
        R2 = (-B - D)/(2*A),
        write("Square root1 :-"),
        write(R1), nl,
        write("Square root2 :-"),
        write(R2), nl.
```

2. Write a prolog program to implement a logen routine. This routine must asks Username and password and verify with pair of username and password available as facts. On successful match system displays "welcome message" and on an unsuccessfull attempt user is allowed 3 times to reenter valid credentials. If user enters incorrect credential continuously 3 times then system exits with "unsuccessful attempt message".

```
predicates
        login.
        go(integer)
        welcome(symbol)
        reject
        verify(symbol, symbol)
clauses
        verify(john, john)
        login:-
                go(3).
        go(0):-
        reject.

        go(_):-
        write("Enter your username: "),
        readln(username),
```

3.

```
write("Enter your Password: "),
readln(Password),
verify(username,Password),
welcome(Username).

go(X):-
        NewX = X-1,
        go(NewX).

welcome(username) :-
write("welcome ", username), nl.

reject :-
write("3 unsuccessful attempts"), nl.
```

3. Write a prolog program to find factorial of a given number.

```
predicates
    fact(integer, integer)
    start
clauses
    start :-
        write("Enter number :- "),
        readint(A)
        Fact(A, Result),
```

```
write("Factorial of A is ",Result,".")
nl.
Fact(0,1).
Fact(A,Result):-
A>0,
A1 = A-1,
Fact(A1,Res),
Result = A*Res.
```

4. Write a prolog program to find sum of first n numbers.

```
predicates
    start
clauses
    start:-
    write("Enter one number:-"),
    readint(A),
    Result = (A*(A+1))/2,
    write("Sum of first ",A,"number is",
          Result,"."),
    nl.
```

5. write a prolog program to print nth term of Fibonacci series.

```
predicates
    start
    fib(integer,integer).
clauses
    start:-
    write("Enter a number:-"),
    readint(A),
    fib(A,Result),
    nl,
    write(A,"th term of fibonacci series is:",
          Result,"."),
    nl.
    fib(1,1).
    fib(2,1).
    fib(A,Result):-
      A>2,
      A1=A-1,
      A2=A-2,
      fib(A1,Res1),
      fib(A2,Res2),
      Result:=Res1+Res2.
```

6. write a prolog program to print Fibonacci series up-to n^{th} term.

```
predicates
    fibo(integer)
    fibb(integer, integer, integer, integer)
clauses
    fibo(1):-
        write(1).
    fibo(2):-
        write(1).
    fibo(x):-
        M=1, N=1, Curr=1,
        write(1, " "),
        fibb(x, Curr, M, N).

fibb(x, x, _, _).

fibb(x, Curr, M, N):-
    write(N, " "),
    Next = Curr+1,
    Nextm = N,
    Nextn = M+N,
    fibb(x, Next, Nextm, Nextn).
```