```
loop1(X, Y) :- X =< Y,
   write(X),nl,
   M is X + 1,
   loop1(M, Y).

#Assignment 1
loop4(X, Y) :- X =< Y,
   write('PROLOG in Artificial Intelligence'),nl,
   M is X + 1,
   loop1(M, Y).

loop2(X, Y) :- Y =< X,
   write(X),nl,
   M is X - 1,
   loop2(M, Y).

loop3(X, Y, D) :- D > 0, X =< Y,
   write(X),nl,
   M is X + D,
   loop3(M, Y, D).

loop3(X, Y, D) :- D < 0, X >= Y,
   write(X),nl,
   M is X + D,
   loop3(M, Y, D).

#Assignment 2
find_summation(N, S, I):- I > N, write(S).
find_summation(N, S, I):- I =< N, S1 is S + I, I1 is I +1, find_summation(N, S1, I1).
summation(N):- find_summation(N, 0, 1).

#Assignment 2
summation0(0, 0).
summation0(N, S):- write('N = '), write(N), write(' '), N > 0, N1 is N - 1, summation0(N1
, R), S is N + R, write(' S = '), write(S), nl.

#Assignment 5
fact(0,1).
fact(X,Y):- write(X), nl, X > 0, Z is X-1, fact(Z, R), Y is R * X.

#Assignment 3
summationAP(A, A, D, A).
summationAP(A, B, D, S):- B > A, C is A + D, summationAP(C, B, R), S is A + R.

#Assignment 4
summationGP(A, A, D, A).
summationGP(A, B, D, S):- B > A, C is A * D, summationGP(C, B, R), S is A + R.

#Assignment 6
fib(0, 1).
fib(1, 1).
fib(N, Result) :- N > 1, N1 is N - 1, N2 is N - 2,
    fib(N1, Result1), fib(N2, Result2),
    Result is Result1 + Result2.

#Assignment 7
gcd(0,B,B).
gcd(A,0,A).
gcd(A,B,X):- A>B, gcd(B, A, X).
gcd(A,B,X):- A<B, T is B mod A, gcd(A, T, X).

#Assignment 8
toh_move(1,X,Y,_) :-
   write('Move top disk from '), write(X), write(' to '), write(Y), nl.
toh_move(N,X,Y,Z) :-
   N>1,
   M is N-1,
```

```
67      toh_move(M,X,Z,Y),
68      toh_move(1,X,Y,_),
69      toh_move(M,Z,Y,X).
```