Date: 16/09/2021

Assignment 7

Aim: Write a PROLOG program for Farmer-Goat-Wolf-Cabbage Problem. A farmer and his goat, wolf, and cabbage come to the West bank of a river that they wish to cross. There is a boat, but it has only room for two, and the farmer is the only one that can row. If the goat and the cabbage get in the boat at the same time, the goat will eat the cabbage. Similarly, if the wolf and the goat are together without the farmer, the goat will be eaten. Devise a series of crossings of the river so that all concerned make it across safely to the East bank.

Code:

```
change(e,w).
change(w,e).

move([X,X,G,C],wolf,[Y,Y,G,C]):-change(X,Y).
move([X,W,X,C],goat,[Y,W,Y,C]):-change(X,Y).
move([X,W,G,X],cabbage,[Y,W,G,Y]):-change(X,Y).
move([X,W,G,C],nothing,[Y,W,G,C]):-change(X,Y).

eq(X,X,_).
eq(X,_,X).

safe([M,W,G,C]):- eq(M,G,W),eq(M,G,C).

solution([e,e,e,e],[]).
solution(Config,[Move|Rest]):-
move(Config,Move,NextConfig),safe(NextConfig),solution(NextConfig,Rest).
```

Output:

```
?- length(X,7),solution([w,w,w,w],X).
X = [goat, nothing, wolf, goat, cabbage, nothing, goat]
```