# PROLOG LAB MANUAL

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## Aim 4 :

**WAP in turbo prolog for medical diagnosis and show the advantages and disadvantages of green and red cuts.**

**Solution :**

```
% Facts

/* Description:

In the 4 Queens problem the object is to place 4 queens on a chessboard in
such a way that no queens can capture a piece. This means that no two
queens may be placed on the same row, column, or diagonal.

*/


% Domains:


queen = q(integer, integer)

queens = queen*

freelist = integer*

board = board(queens, freelist, freelist, freelist, freelist)


% Predicates:


nondeterm placeN(integer, board, board)

nondeterm place_a_queen(integer, board, board)

nondeterm nqueens(integer)

nondeterm makelist(integer, freelist)

nondeterm findandremove(integer, freelist, freelist)

nextrow(integer, freelist, freelist)
```

% Clauses

```
nqueens(N):-
        makelist(N,L),
        Diagonal=N*2-1,
        makelist(Diagonal,LL),
        placeN(N,board([],L,L,LL,LL),Final),
        write(Final).
placeN(_,board(D,[],[],D1,D2),board(D,[],[],D1,D2)):-!.
placeN(N,Board1,Result):-
        place_a_queen(N,Board1,Board2),
        placeN(N,Board2,Result).
place_a_queen(N,
                board(Queens,Rows,Columns,Diag1,Diag2),
                board([q(R,C)|Queens],NewR,NewC,NewD1,NewD2)):-
nextrow(R,Rows,NewR),
findandremove(C,Columns,NewC),
D1=N+C-R,findandremove(D1,Diag1,NewD1),
D2=R+C-1,findandremove(D2,Diag2,NewD2).
findandremove(X,[X|Rest],Rest).
findandremove(X,[Y|Rest],[Y|Tail]):-
        findandremove(X,Rest,Tail).
makelist(1,[1]).
makelist(N,[N|Rest]) :-
        N1=N-1,makelist(N1,Rest).
```

```
nextrow(Row,[Row|Rest],Rest).
```

**Output:**

```
% Goal

nqueens(4),nl.
board([q(1,2),q(2,4),q(3,1),q(4,3),[],[],[7,4,1],[7,4,1])
yes
```