

Experiment 7

Prolog Programing

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N Queen Problem

```
queens(N, Queens) :-  
    length(Queens, N),  
    board(Queens, Board, 0, N, _, _),  
    queens(Board, 0, Queens).  
  
board([], [], N, N, _, _).  
board([_|Queens], [Col-Vars|Board], Col0, N, [_|VR], VC) :-  
    Col is Col0+1,  
    functor(Vars, f, N),  
    constraints(N, Vars, VR, VC),  
    board(Queens, Board, Col, N, VR, [_|VC]).  
  
constraints(0, _, _, _) :- !.  
constraints(N, Row, [R|Rs], [C|Cs]) :-  
    arg(N, Row, R-C),  
    M is N-1,  
    constraints(M, Row, Rs, Cs).  
  
queens([], _, []).  
queens([C|Cs], Row0, [Col|Solution]) :-  
    Row is Row0+1,  
    select(Col-Vars, [C|Cs], Board),  
    arg(Row, Vars, Row-Row),  
    queens(Board, Row, Solution).
```

Output:

```
| ?- queens(8,Queens).  
Queens = [1,5,8,6,3,7,2,4]
```