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DAA Assignment 5

* Aim: Write a recursive program to find the solution of placing n queens of chess so that no queens attack each other using backtracking.

* Theory

- The n-queen is the problem of placing N queens on N×N chessboard so that no two queens attack each other.

- Mathematically, it can be represented by: If two queens are placed at position (i,j) & (k,ℓ) where i & k are row indices & j & ℓ are column indices.

$i \neq k$ (no same row)
$j \neq \ell$ (no same column)
$|i-k| \neq |j-\ell|$ (no same diagonal)
where $i,j,\ell,k \in \{1,2,\ldots 8\}$ for 8-queen problem.

- One of the solutions to 8 queen problem is $X = \{3,6,2,7,1,4,8,5\}$

* Algorithm
{

```
k = l
for(i = l, i ≤ n ; i++)
{
    if placeQ( k,i) then
    {
        x[k] = i
        if( k = n) then write (x[l:n])
        else NQueens (k+l : n)
    }
}
}
```

* Input : N is no of queens placed on N × N chessboard. K is the queen no to be placed on board.

* Output: A solution x[l:n] representing valid column position of n-queens.

* Conclusion: This we solved n-queen problem using backtracking & branch & bound function.