

NIHARIKA AGRAWAL
R177219122
500075359
AIML BATCH 4

N-QUEEN PROBLEM

CODE

```
#include <stdio.h>

#include <stdlib.h>

#include <stdbool.h>

void solveColumn(int);

bool isValidPlace(int , int);

void displayBoard();

void solveNqueen();


//Global variables

int queens;

int chessBoard[20][20];

bool hasSolution = false;


int main()

{

    //Enter value of N

    printf("Enter number of Queens \n");

    scanf("%d", &queens);

    solveNqueen();

    return 0;

}


void solveNqueen(){

    //starting from (0,0) of the board

    solveColumn(0);
```

NIHARIKA AGRAWAL

R177219122

500075359

AIML BATCH 4

```
    if(!hasSolution)

        printf("No Solution \n");
}

//Finding all solution by recursive backtracking
void solveColumn(int col){

    //Reached beyond last column
    //Means solution (configuration) found
    if(col == queens){
        hasSolution = true;
        displayBoard();
        //intentionally returning to find more possible solution
        return;
    }

    for(int i=0; i<queens; i++){
        //checking if position is safe
        if(isValidPlace(i,col)){
            //setting current value to 1 means placing a queen
            chessBoard[i][col] = 1;
            //moving to next column's 1st row
            solveColumn(col+1);
            //backtrack - reset to 0 means removing queen
            chessBoard[i][col] = 0;
        }
    }
}
```

NIHARIKA AGRAWAL
R177219122
500075359
AIML BATCH 4

//To check whether the particular position is safe or not

bool isValidPlace(int row, int col){

 //Checking horizontally

 for(int i=col; i>=0; i--){

 if(chessBoard[row][i] == 1)

 return false;

 }

 //checking left diagonal

 for(int i=row, j=col; i>=0 && j>=0; i--,j--){

 if(chessBoard[i][j] == 1)

 return false;

 }

 //checking right diagonal

 for(int i=row, j=col; i<queens && j>=0; i++,j--){

 if(chessBoard[i][j] == 1)

 return false;

 }

 return true;

}

//Display chess board with queen configuration

void displayBoard(){

 for(int i=0; i<queens; i++){

NIHARIKA AGRAWAL

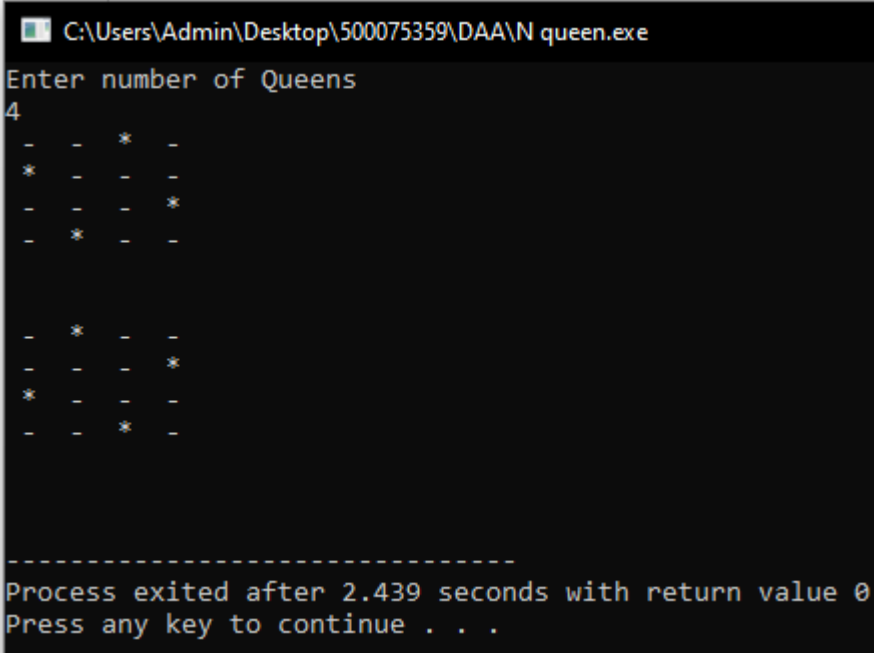
R177219122

500075359

AIML BATCH 4

```
    for(int j=0; j<queens; j++){  
        if(chessBoard[i][j] == 1)  
            printf(" * ");  
        else  
            printf(" - ");  
    }  
    printf("\n");  
}  
printf("\n\n");  
}
```

OUTPUT



```
C:\Users\Admin\Desktop\500075359\DAA\N queen.exe  
Enter number of Queens  
4  
- - * -  
* - - -  
- - - *  
- * - -  
  
- * - -  
- - - *  
* - - -  
- - * -  
  
-----  
Process exited after 2.439 seconds with return value 0  
Press any key to continue . . .
```