**DAA – CSE2012**

**Lab-07**

**N QUEEN PROBLEM**

**(PPS N Queen Back-tracking)**

Name: Preyash Registration Number: 20BPS1022

**Algorithm:**

1. Start
2. First we are checking the row match
3. Then we are checking for the left diagonal match
4. Then we are checking for the right diagonal match
5. Stop

**Code:**

#include <iostream>

using namespace std;

void boardPlacement(int board[][20], int n)

{

    for (int i = 0; i < n; i++)

    {

        for (int j = 0; j < n; j++)

        {

            cout << board[i][j] << " ";

        }

        cout << endl;

    }

}

bool checkPlace(int board[][20], int n, int i, int j)

{

    // row check

    for (int k = 0; k < j; k++)

    {

        if (board[i][k] == 1)

            return false;

    }

    // left diagonal

    int l = i;

    int m = j;

    while (l >= 0 && m >= 0)

    {

        if (board[l][m] == 1)

            return false;

        l--, m--;

    }

    // right diagonal

    l = i;

    m = j;

    while (m < n && l >= 0)

    {

        if (board[l][m] == 1)

            return false;

        l--, m++;

    }

    return true;

}

bool attackingNQueen(int board[][20], int n, int x)

{

    // base case

    if (x == n)

    {

        boardPlacement(board, n);

        return true;

    }

for (int i = 0; i < n; i++)

    {

        if (checkPlace(board, n, i, x))

        {

            board[i][x] = 1;

            bool success = attackingNQueen(board, n, x + 1);

            if (success)

                return true;

            // backtracking

            board[i][x] = 0;

        }

    }

    return false;

}

int main()

{

    int n;

    cout << "Enter the size of the chess board: " << endl;

    cin >> n;

    int board[20][20] = {0};

    for (int i = 0; i < n; i++)

    {

        attackingNQueen(board, n, i);

    }

    return 0;

}

**Output:**

