

/*Name - Amod Dhopavkar

Roll No - 33304

N Queens using Backtracking

*/

Code →

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#include <stdio.h>
#include <stdlib.h>
#include <math.h>
#define SIZE 20
int count = 0, backTrack = 0;

void display(int board[], int n) {
    int i,j;
    printf("\n\nSOLUTION NUMBER '%d':\n\n\n",++count);
    for (i=1; i<=n; i++)
        printf("\t%d",i);

    for (i=1; i<=n; i++) {
        printf("\n\n%d",i);
        for (j=1; j<=n; j++) {
            if (board[i] == j)
                printf("\tQ");
            else
                printf("\t-");
        }
    }
    printf("\n");
}

void displayBackTrack(int board[], int n) {
    int i,j;
    printf("\n\nBACKTRACK NUMBER '%d':\n\n\n",++backTrack);
    for (i=1; i<=n; i++)
        printf("\t%d",i);

    for (i=1; i<=n; i++) {
        printf("\n\n%d",i);
        for (j=1; j<=n; j++) {
            if (board[i] == j)
                printf("\tQ");
            else
                printf("\t-");
        }
    }
}
```

```

        }
    }
    printf("\n");
}

int place(int board[], int row, int col) {
    int i;
    for (i=1; i<=row-1; i++) {
        if ((board[i] == col) || (abs(board[i]-col) == (abs(i-row))))
            return 0;
    }
    return 1;
}

void NQueens(int board[], int row, int n) {
    int i; //flag = 0;
    for (i=1; i<=n; i++) {
        if (place(board,row,i)) {
            board[row] = i;
            if (row == n)
                display(board,n);
            else {
                NQueens(board,row+1,n);
                //flag = 1;
            }
        }
    }
    displayBackTrack(board,n);
}

int main() {
    int n, board[SIZE];
    printf("\nN QUEENS PROBLEM WITH BACKTRACKING -->\n");
    printf("\nNO. OF QUEENS: ");
    scanf("%d",&n);
    while (n < 4) {
        printf("\n\nNO. OF QUEENS CANNOT BE LESS THAN 4...\n");
        printf("\nRE-ENTER VALID NO. OF QUEENS: ");
        scanf("%d",&n);
    }
    NQueens(board,1,n);
    return 0;
}

```

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Last login: Thu Apr 23 11:22:42 on ttys000
[(base) amoddhopavkar@Amods-MacBook-Air ~ % cd Documents
[(base) amoddhopavkar@Amods-MacBook-Air Documents % cd Assignment\ 1
[(base) amoddhopavkar@Amods-MacBook-Air Assignment 1 % gcc NQueens.c -o NQueens
[(base) amoddhopavkar@Amods-MacBook-Air Assignment 1 % ./NQueens
```

N QUEENS PROBLEM WITH BACKTRACKING -->

NO. OF QUEENS: 4

BACKTRACK NUMBER '1':

	1	2	3	4
1	Q	-	-	-
2	-	-	Q	-
3	-	-	-	-
4	-	-	-	-

BACKTRACK NUMBER '2':

	1	2	3	4
1	Q	-	-	-
2	-	-	-	Q
3	-	Q	-	-
4	-	-	-	-

BACKTRACK NUMBER '3':

	1	2	3	4
1	Q	-	-	-
2	-	-	-	Q
3	-	Q	-	-
4	-	-	-	-

BACKTRACK NUMBER '4':

	1	2	3	4
1	Q	-	-	-
2	-	-	-	Q
3	-	Q	-	-
4	-	-	-	-

SOLUTION NUMBER '1':

	1	2	3	4
1	-	Q	-	-
2	-	-	-	Q
3	Q	-	-	-
4	-	-	Q	-

BACKTRACK NUMBER '5':

	1	2	3	4
1	-	Q	-	-
2	-	-	-	Q
3	Q	-	-	-
4	-	-	Q	-

BACKTRACK NUMBER '6':

	1	2	3	4
1	-	Q	-	-
2	-	-	-	Q
3	Q	-	-	-
4	-	-	Q	-

BACKTRACK NUMBER '7':

	1	2	3	4
1	-	Q	-	-
2	-	-	-	Q
3	Q	-	-	-
4	-	-	Q	-

SOLUTION NUMBER '2':

	1	2	3	4
1	-	-	Q	-
2	Q	-	-	-
3	-	-	-	Q
4	-	Q	-	-

BACKTRACK NUMBER '8':

	1	2	3	4
1	-	-	Q	-
2	Q	-	-	-
3	-	-	-	Q
4	-	Q	-	-

BACKTRACK NUMBER '9':

	1	2	3	4
1	-	-	Q	-
2	Q	-	-	-
3	-	-	-	Q
4	-	Q	-	-

BACKTRACK NUMBER '10':

	1	2	3	4
1	-	-	Q	-
2	Q	-	-	-
3	-	-	-	Q
4	-	Q	-	-

BACKTRACK NUMBER '11':

	1	2	3	4
1	-	-	-	Q
2	Q	-	-	-
3	-	-	Q	-
4	-	Q	-	-

BACKTRACK NUMBER '12':

	1	2	3	4
1	-	-	-	Q
2	Q	-	-	-
3	-	-	Q	-
4	-	Q	-	-

BACKTRACK NUMBER '13':

	1	2	3	4
1	-	-	-	Q
2	-	Q	-	-
3	-	-	Q	-
4	-	Q	-	-

BACKTRACK NUMBER '14':

	1	2	3	4
1	-	-	-	Q
2	-	Q	-	-
3	-	-	Q	-
4	-	Q	-	-

BACKTRACK NUMBER '15':

	1	2	3	4
1	-	-	-	Q
2	-	Q	-	-
3	-	-	Q	-
4	-	Q	-	-

(base) amoddhopavkar@Amods-MacBook-Air Assignment 1 %