12. Design and implement C/C++ Program for N Queen's problem using Backtracking.

#include<stdio.h>

#include<stdlib.h>

void nqueens(int); int place(int[],int);

void printsolution(int,int[]);

void main()

{

int n;

printf("Enter the no.of queens: ");

scanf("%d",&n);

nqueens(n);

}

void nqueens(int n)

{

int x[10],count=0,k=1;

x[k]=0;

while(k!=0)

{

x[k]=x[k]+1;

while(x[k]<=n&&(!place(x,k)))

x[k]=x[k]+1;

if(x[k]<=n)

{

if(k==n)

{

count++;

printf("\nSolution %d\n",count);

printsolution(n,x);

}

else

{

k++;

x[k]=0;

}

}

else

{

k--; //backtracking

}

}

return;

}

int place(int x[],int k)

{

int i;

for(i=1;i<k;i++)

if(x[i]==x[k]||(abs(x[i]-x[k]))==abs(i-k)) return 0;

return 1;

}

void printsolution(int n,int x[])

{

int i,j;

char c[10][10];

for(i=1;i<=n;i++)

{

for(j=1;j<=n;j++)

c[i][j]='X';

}

for(i=1;i<=n;i++)

c[i][x[i]]='Q';

for(i=1;i<=n;i++)

{

for(j=1;j<=n;j++)

{

printf("%c\t",c[i][j]);

}

printf("\n");

}

}

OUTPUT:

Enter the no.of queens: 4

Solution 1

X Q X X

X X X Q

Q X X X

X X Q X

Solution 2

X X Q X

Q X X X

X X X Q

X Q X X