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CSE DS D1

DAA EXP 7

Aim: Backtracking (To implement N Queens problem using backtracking.)

Algorithm:

```
1.  Place (k, i)
2.    {
3.      For j ← 1 to k - 1
4.       do if (x [j] = i)
5.        or (Abs x [jj]) - i) = (Abs (j - k))
6.     then return false;
7.      return true;
8.  }
```

```
1.  N - Queens (k, n)
2.  {
3.    For i ← 1 to n
4.        do if Place (k, i) then
5.    {
6.      x [k] ← i;
7.      if (k ==n) then
8.        write (x [1....n));
9.      else
10.     N - Queens (k + 1, n);
11.   }
12. }
```

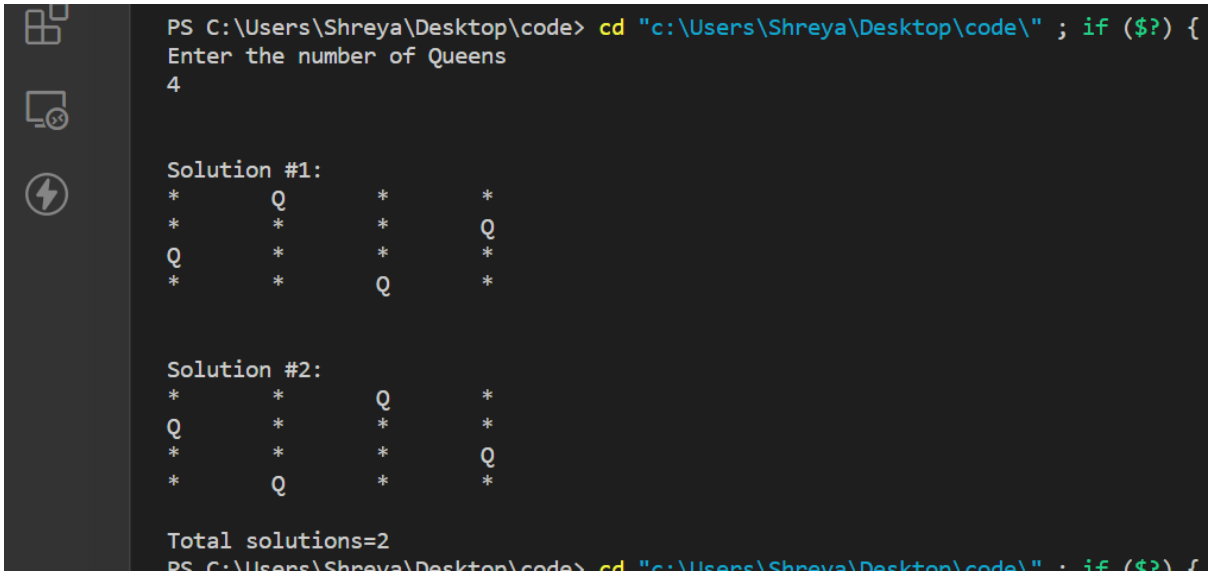
Code :

#include<stdio.h>

```
// #include<conio.h>
#include<math.h>
int a[30],count=0;
int place(int pos) {
        int i;
        for (i=1;i<pos;i++) {
                if((a[i]==a[pos])||((abs(a[i]-a[pos])==abs(i-pos))))
                  return 0;
        }
        return 1;
}
void print_sol(int n) {
        int i,j;
        count++;
        printf("\n\nSolution #%d:\n",count);
        for (i=1;i<=n;i++) {
                for (j=1;j<=n;j++) {
                        if(a[i]==j)
                           printf("Q\t"); else
                           printf("*\t");
                }
                printf("\n");
        }
}
void queen(int n) {
        int k=1;
```

```
        a[k]=0;
        while(k!=0) {
                a[k]=a[k]+1;
                while((a[k]<=n)&&!place(k))
                  a[k]++;
                if(a[k]<=n) {
                        if(k==n)
                           print_sol(n); else {
                                k++;
                                a[k]=0;
                        }
                } else
                  k--;
        }
}
void main() {
        int i,n;
//      clrscr();
        printf("Enter the number of Queens\n");
        scanf("%d",&n);
        queen(n);
        printf("\nTotal solutions=%d",count);
//      getch();
}
```

Output:



Conclusion: In this experiment , I understood how to implement concept of backtracking in n queens problem.