

**21BCE7371**

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**AI LAB ASSIGNMENT-3**

**4 QUEENS PROBLEM**

**INPUT**

```
import java.io.*;
import java.util.*;

class Main
{

static int a[] = new int[30], cnt;
static int place(int pos)
{
    int i;
    for (i = 1; i < pos; i++) {
        if ((a[i] == a[pos])
            || ((Math.abs(a[i] - a[pos]) == Math.abs(i - pos))))
            return 0;
    }
    return 1;
}

static void print_sol(int N)
{
    int i, j;
    cnt++;

    System.out.println("Solution #" + cnt + ":");
    for (i = 1; i <= N; i++) {
```

```

        for (j = 1; j <= N; j++) {
            if (a[i] == j)
                System.out.print("Q ");
            else
                System.out.print("* ");
        }
        System.out.println("\n");
    }
}

static void queen(int n)
{
    cnt = 0;
    int k = 1;
    a[k] = 0;
    while (k != 0) {
        a[k] = a[k] + 1;
        while ((a[k] <= n) && place(k) == 0)
            a[k]++;
        if (a[k] <= n) {
            if (k == n)
                print_sol(n);
            else {
                k++;
                a[k] = 0;
            }
        }
        else
            k--;
    }
}

```

```

public static void main(String[] args)

```

```

{

    int N = 4;

    // Function call

    queen(N);

    System.out.println("Total solutions=" + cnt);

}

}

```

```

Main.java
1 import java.io.*;
2 import java.util.*;
3
4 class Main
5 {
6
7     static int a[] = new int[30], cnt;
8     static int place(int pos)
9     {
10         int i;
11         for (i = 1; i < pos; i++) {
12             if ((a[i] == a[pos])
13                 || ((Math.abs(a[i] - a[pos]) == Math.abs(i - pos))))
14                 return 0;
15         }
16         return 1;
17     }
18     static void print_sol(int N)
19     {
20         int i, j;
21         cnt++;
22         System.out.println("Solution #" + cnt + ":");
23         for (i = 1; i <= N; i++) {
24             for (j = 1; j <= N; j++) {
25                 if (a[i] == j)
26                     System.out.print("Q ");
27                 else
28                     System.out.print("* ");
29             }
30             System.out.println("\n");
31         }
32     }
33     static void queen(int n)
34     {
35         cnt = 0;
36         int k = 1;
37         a[k] = 0;
38         while (k != 0) {

```

```

28         System.out.print(" ");
29     }
30     System.out.println("\n");
31 }
32 }
33 static void queen(int n)
34 {
35     cnt = 0;
36     int k = 1;
37     a[k] = 0;
38     while (k != 0) {
39         a[k] = a[k] + 1;
40         while ((a[k] <= n) && place(k) == 0)
41             a[k]++;
42         if (a[k] <= n) {
43             if (k == n)
44                 print_sol(n);
45             else {
46                 k++;
47                 a[k] = 0;
48             }
49         }
50         else
51             k--;
52     }
53 }
54
55 public static void main(String[] args)
56 {
57     int N = 4;
58
59     // Function call
60     queen(N);
61     System.out.println("Total solutions=" + cnt);
62 }
63 }
64

```

## OUTPUT

```

Solution #1:
* Q * *
* * * Q
Q * * *
* * Q *

Solution #2:
* * Q *
Q * * *
* * * Q
* Q * *

Total solutions=2

...Program finished with exit code 0
Press ENTER to exit console.

```