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

```java
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) {
```

```
        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);
}
}
```

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.
```