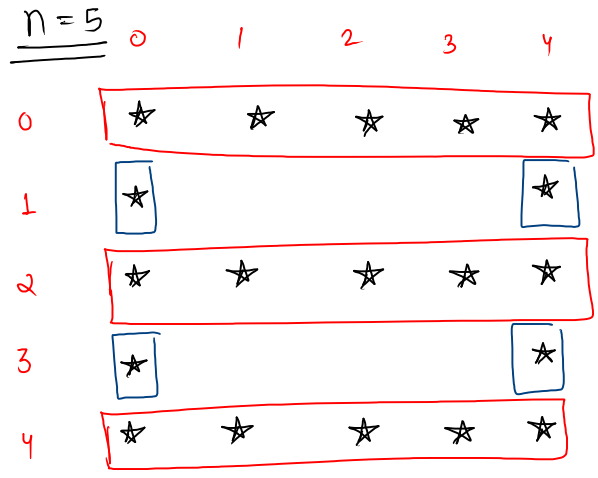
Pattern 9 - Square Ladder with top and bottom



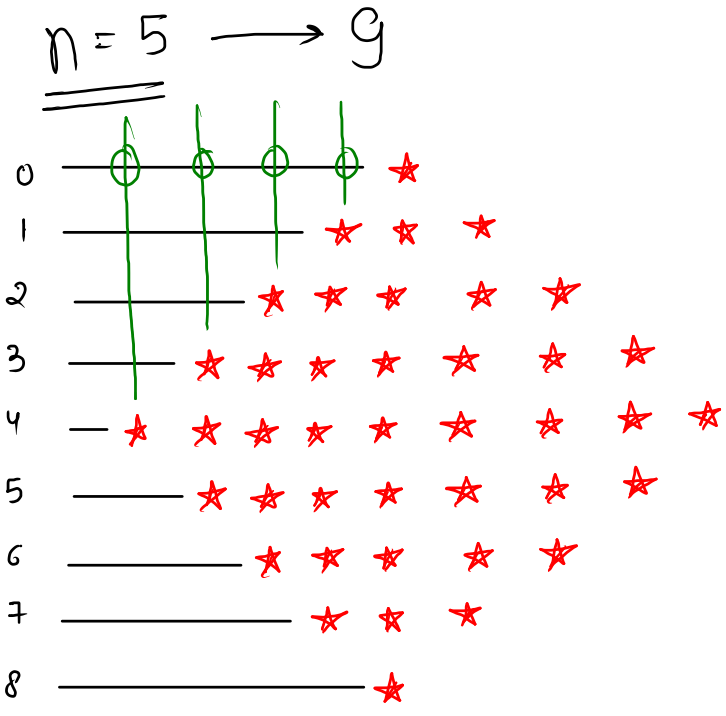
Code

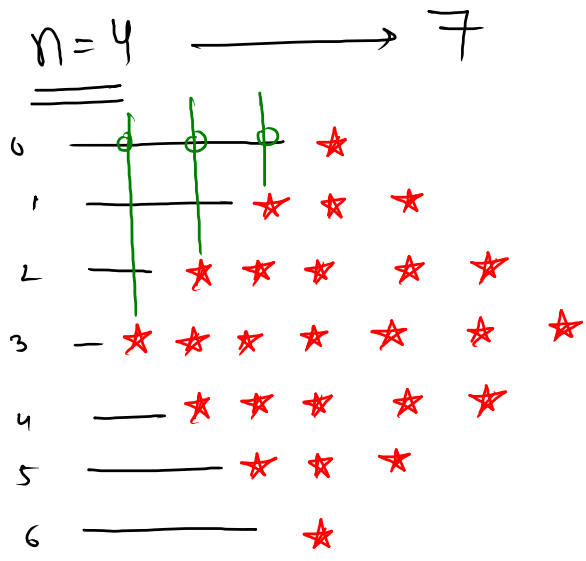
```java
public static void main(String[] args) {
    Scanner scn = new Scanner(System.in);
    int n = scn.nextInt();

    for (int i = 0; i < n; i++) {
        for (int j = 0; j < n; j++) {
            if ( i % 2 == 0 ) {
                System.out.print("*\t");
            } else {
                if ( j == 0 || j == n - 1 ) {
                    System.out.print("*\t");
                } else {
                    System.out.print("\t");
                }
            }
        }
        System.out.println();
    }
}
```

even

odd

GKSTR29_Pattern_12_Diamond





Relation

rows

n = 5 → 9 (10)

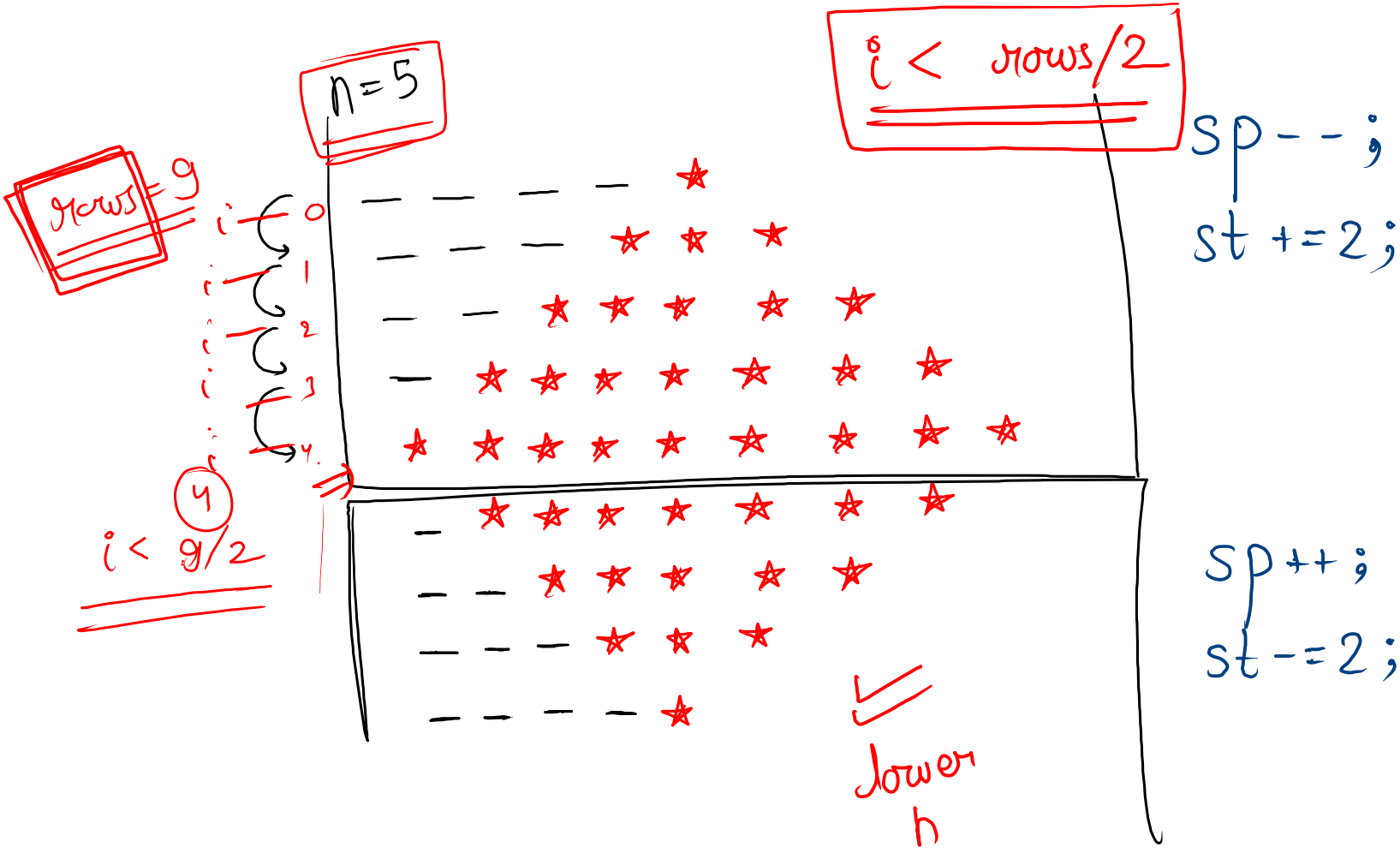
n = 4 → 7 (8)

n = 3 → 5 (6)

n = 2 → 3 (4)

n = 1 → 1 (2)

rows = 2n - 1


n=5
i < rows/2
sp--;
st+=2;
rows=9
i
0
1
2
3
4
4
i < 9/2
sp++;
st-=2;
lower
h

Code

```java
public static void main(String[] args) {
    Scanner scn = new Scanner(System.in);
    int n = scn.nextInt();

    int st = 1;
    int sp = n - 1;
    int rows = 2 * n - 1;
    for (int i = 0; i < rows; i++) {
        for (int j = 0; j < sp; j++) {
            System.out.print(" ");
        }
        for (int j = 0; j < st; j++) {
            System.out.print("*");
        }

        if (i < rows / 2) {
            // upper half
            sp--;
            st += 2;
        } else {
            // lower half
            sp++;
            st -= 2;
        }

        System.out.println();
    }
}
```

⇒ Functions

↳ saperate piece of code which can be reused as many times as we want

1) Function declaration :- where we write that piece of code

2) Function calling :- where we want to use that piece of code.

Note :- main function will always be called first

advantage of functions :- reusability & readability

code

```
public class Main {
    public static void main(String[] args) {
        System.out.println("Hi1");
        kunal(); // function calling
        System.out.println("Hi2");
    }

    public static void kunal() {    // function declaration
        System.out.println("Hi");
    }
}
```

```
Hi1
Hi
Hi2
```

Syntex

function declaration :-

```
public static void fun_name ( ) {
        // statement
}
```

function calling :-

```
fun_name();
```

```java
public class Solution {

    public static void main(String[] args) {
        Scanner scn = new Scanner(System.in);
        int t = scn.nextInt();

        for (int i = 0; i < t; i++) {
            int x = scn.nextInt();
            int y = scn.nextInt();

            sum(x, y);
        }
    }

    public static void sum(int x, int y) {
        int ans = x + y;
        System.out.println(ans);
    }
}
```