

## **Basic Programming Practicum Job Sheet 7 Meeting 9**



**From:**

AL AZHAR RIZQI RIFA'I FIRDAUS

**Class:**

11

**Absence:**

01

**Major:**

Information Technology

**Study Program:**

Informatic Engineering

## Experiment 1: Loop Review

1. Experiment 1 was aimed at reviewing the loop that had been studied in the previous week. In experiment 1, a program will be made to make a view \* N times sideways.
2. Create a new class, name it Star

```
● ● ●  
1 public class star {  
2  
3 }
```

3. Write the basic structure of the Java programming language which contains the main() function

```
● ● ●  
1 public static void main(String[] args) {  
2  
3 }
```

4. Add the Scanner library

```
● ● ●  
1 import java.util.Scanner;
```

5. Make a Scanner declaration with the name sc



```
1 Scanner sc = new Scanner(System.in);
```

6. Add the following code to receive input from keyboard as the value to be stored in the variable N



```
1 System.out.print("Enter the value of N : ");
2         int N = sc.nextInt();
```

7. Add a for loop structure to display the \* symbol according to the number specified via input



```
1 for (int i = 1; i <= N; i++) {
2             System.out.print("*");
3 }
```

8. Compile and run the program. Observe the results!

Code :

```
● ● ●
1 import java.util.Scanner;
2
3 public class star {
4     public static void main(String[] args) {
5
6         Scanner sc = new Scanner(System.in);
7
8         System.out.print("Enter the value of N : ");
9         int N = sc.nextInt();
10
11        for (int i = 1; i <= N; i++) {
12            System.out.print("*");
13        }
14        sc.close();
15    }
16 }
```

Result :

```
└─(zharsuke@LAPTOP-FCSRQQ00)-[~/Documents/College/Basic Programming Practicum/Meet 9/coding]
$ javac star.java && java star.java
Enter the value of N : 5
*****
└─(zharsuke@LAPTOP-FCSRQQ00)-[~/Documents/College/Basic Programming Practicum/Meet 9/coding]
$
```

9. Match the results of the running programs that you have created according to the following display

```
Enter the value of N: 5
*****

```

```
└─(zharsuke@LAPTOP-FCSRQQ00)-[~/Documents/College/Basic Programming Practicum/Meet 9/coding]
$ javac star.java && java star.java
Enter the value of N : 5
*****
└─(zharsuke@LAPTOP-FCSRQQ00)-[~/Documents/College/Basic Programming Practicum/Meet 9/coding]
$
```

## Questions!

1. If in for loop, the initialization  $i = 1$  is changed to  $i = 0$ , what is the result? How can it be like that?
2. If in for loop, condition  $i \leq N$  is changed to  $i > N$ , what is the result? How can it be like that?
3. If in for loop, the condition for step  $i++$  is changed to  $i--$  what is the result? How can it be like that?

## Answer

1. Code :

```
● ● ●
1 import java.util.Scanner;
2
3 public class star {
4     public static void main(String[] args) {
5
6         Scanner sc = new Scanner(System.in);
7
8         System.out.print("Enter the value of N : ");
9         int N = sc.nextInt();
10
11        for (int i = 0; i <= N; i++) {
12            System.out.print("*");
13        }
14        sc.close();
15    }
16 }
```

Result :

```
[zharsuke@LAPTOP-FCSRQQ00] -[~/Documents/College/Basic Programming Practicum/Meet 9/coding]
$ javac star.java && java star.java Result:
Enter the value of N : 5
*****
[zharsuke@LAPTOP-FCSRQQ00] -[~/Documents/College/Basic Programming Practicum/Meet 9/coding]
$
```

The result is 1 more star than before, because i is now counted from 0, not from 1.

2. Code :

```
● ● ●
1 import java.util.Scanner;
2
3 public class star {
4     public static void main(String[] args) {
5
6         Scanner sc = new Scanner(System.in);
7
8         System.out.print("Enter the value of N : ");
9         int N = sc.nextInt();
10
11        for (int i = 0; i > N; i++) {
12            System.out.print("*");
13        }
14        sc.close();
15    }
16 }
```

Result :

```
└─(zharsuke@LAPTOP-FCSRQQ00)─[~/Documents/College/Basic Programming Practicum/Meet 9/coding]
$ javac star.java && java star.java
Enter the value of N : 5          Experiment 2: Square Star
└─(zharsuke@LAPTOP-FCSRQQ00)─[~/Documents/College/Basic Programming Practicum/Meet 9/coding]
$
```

The result star is not displayed, because in the initialization  $i = 0$  and the  $N$  inputted is 5. if  $i$  is more than  $N$  then the result will be false because  $i$  is less than  $N$  which results in the program not running.

3. Code :

```
● ● ●
1 import java.util.Scanner;
2
3 public class star {
4     public static void main(String[] args) {
5
6         Scanner sc = new Scanner(System.in);
7
8         System.out.print("Enter the value of N : ");
9         int N = sc.nextInt();
10
11        for (int i = 0; i <= N; i--) {
12            System.out.print("*");
13        }
14        sc.close();
15    }
16 }
```

Result :



The screenshot shows a terminal window with a black background and white text. At the top, there's a menu bar with 'File', 'Actions', 'Edit', 'View', 'Help'. Below the menu, the terminal prompt is '(zharsuke@LAPTOP-FCSRQQ00) [~/Documents/College/Basic Programming Practicum/Meet 9/coding]'. The user has typed a command that results in an infinite loop of asterisks (\*). The loop starts with a single asterisk on the first line, followed by two on the second, three on the third, and so on, increasing by one each line. The loop continues indefinitely, filling the screen.

The result is that the star repeats infinitely, because the condition  $i \leq N$  and if every looping  $i$  decreases by 1, then the looping will continue to be true.

## Experiment 2: Square Star

1. Experiment 2 is used to create a display \* in the form of a square, with sides of a number of N. When observed further, this problem is actually similar to Experiment 1. In Experiment 1, for example the input of N is 5, then the resulting output is \*\*\*\* (we can think of it as an

inner loop showing 5 stars \*\*\*\*\*). For Experiment 2, doesn't the result of Experiment 1 just need to be repeated N times? (by adding an outer loop to repeat the inner loop process N times)

2. Create a new class, name it Square

```
● ● ●  
1 public class square {  
2  
3 }
```

3. Write the basic structure of the Java programming language which contains the main() function

```
● ● ●  
1 public static void main(String[] args) {  
2  
3 }
```

4. Add the same program code as the contents of the main() function in Experiment 1

```
● ● ●  
1 Scanner sc = new Scanner(System.in);  
2 System.out.print("Enter the value of N : ");  
3 int N = sc.nextInt();  
4  
5 for (int i = 1; i <= N; i++) {  
6     System.out.print("*");  
7 }
```

5. Run the program. Make sure the results given are the same as in Experiment 1

```
● ● ●
1 import java.util.Scanner;
2
3 public class square {
4     public static void main(String[] args) {
5
6         Scanner sc = new Scanner(System.in);
7         System.out.print("Enter the value of N : ");
8         int N = sc.nextInt();
9
10        for (int i = 1; i <= N; i++) {
11            System.out.print("*");
12        }
13        sc.close();
14    }
15 }
```

Result :

```
[zharsuke@LAPTOP-FCSRQQ00] -[~/Documents/College/Basic Programming Practicum/Meet 9/coding]
$ javac square.java && java square.java
Enter the value of N : 5
*****
[zharsuke@LAPTOP-FCSRQQ00] -[~/Documents/College/Basic Programming Practicum/Meet 9/coding]
```

6. Pay attention to the iterative syntax used to print \* N times sideways. In step 4, we make for loop structure (red box) as an inner loop

7. Furthermore, the inner loop needs to be repeated N times in order to display the \* symbol to form a square. Thus, it is necessary to add an outer loop

```
● ● ●
1 for (int iOuter = 1; iOuter <= N; iOuter++) {
2     for (int i = 1; i <= N; i++) {
3         System.out.print("*");
4     }
5     System.out.println();
6 }
```

8. Compile and run the program. Observe the results!

Code :

```
● ● ●
1 import java.util.Scanner;
2
3 public class square {
4     public static void main(String[] args) {
5
6         Scanner sc = new Scanner(System.in);
7         System.out.print("Enter the value of N : ");
8         int N = sc.nextInt();
9
10        for (int iOuter = 1; iOuter <= N; iOuter++) {
11            for (int i = 1; i <= N; i++) {
12                System.out.print("*");
13            }
14            System.out.println();
15        }
16        sc.close();
17    }
18 }
```

Result :

```
[zharsuke@LAPTOP-FCSRQQ00] -[~/Documents/College/Basic Programming Practicum/Meet 9/coding]
$ javac square.java && java square.java
Enter the value of N : 5
*****
*****
*****
*****
*****
```

9. Match the results of the running programs that you have created according to the following display

```
Enter the value of N: 5
*****
*****
*****
*****
*****
```

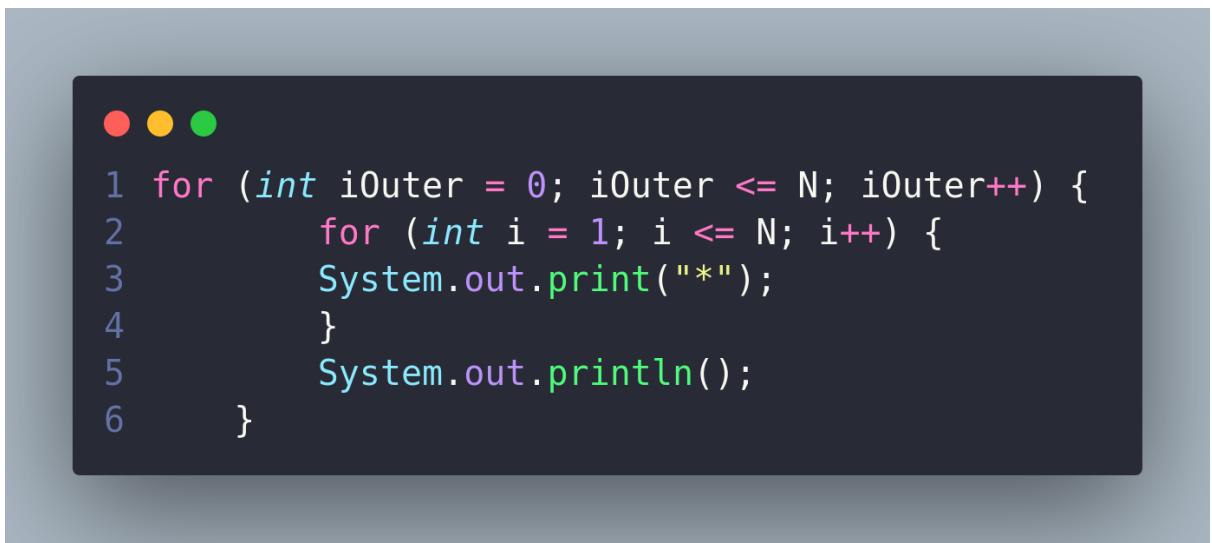
```
(zharsuke@LAPTOP-FCSRQQ00) [~/Documents/College/Basic Programming Practicum/Meet 9/coding]
$ javac square.java && java square.java
Enter the value of N : 5
*****
*****
*****
*****
*****
( zharsuke@LAPTOP-FCSRQQ00) [~/Documents/College/Basic Programming Practicum/Meet 9/coding]
$
```

## Questions!

- Pay attention to outer loop. If in for syntax, the initialization `iOuter = 1` is changed to `iOuter = 0`, what is the result? How can it be like that?
- Return the program to normal with initialization `iOuter = 1`. Then pay attention to the inner loop. If in for syntax, the initialization `i = 1` is changed to `i = 0`, what is the result? How can it be like that?
- What is the difference between outer loop and inner loop?
- Why is it necessary to add the syntax `System.out.println();` under inner loop? What will happen if the syntax is omitted?

## Answer

- Code :



```
● ● ●
1 for (int iOuter = 0; iOuter <= N; iOuter++) {
2     for (int i = 1; i <= N; i++) {
3         System.out.print("*");
4     }
5     System.out.println();
6 }
```

Result :

```
G will happen if the syntax is omitted?
(zharsuke@LAPTOP-FCSRQQ00) [~/Documents/College/Basic Programming Practicum/Meet 9/coding]
$ javac square.java && java square.java
Enter the value of N : 5
*****
*****
*****
*****
*****
( zharsuke@LAPTOP-FCSRQQ00) [~/Documents/College/Basic Programming Practicum/Meet 9/coding]
$
```

2.3 Experiment 3: Triangle Star

- 1. Experiment 3 is used to create a display \* in the form of a right triangle of N
- 2. Create a new class, name it Triangle

Politeknik Negeri Malang

The result is that the star line is incremented by 1 because `iOuter` is initialized equal to 0, which results in `iOuter` being counted from 0 instead of 1.

- Code :

```
1 import java.util.Scanner;
2
3 public class square {
4     public static void main(String[] args) {
5
6         Scanner sc = new Scanner(System.in);
7         System.out.print("Enter the value of N : ");
8         int N = sc.nextInt();
9
10        for (int iOuter = 1; iOuter <= N; iOuter++) {
11            for (int i = 0; i <= N; i++) {
12                System.out.print("*");
13            }
14            System.out.println();
15        }
16        sc.close();
17    }
18 }
```

Result :

```
└─(zharsuke@LAPTOP-FCSRQQ00)-[~/Documents/College/Basic Programming Practicum/Meet 9/coding]
$ javac square.java && java square.java
Enter the value of N : 5
*****
*****
*****
*****
*****
> OUTLINE
└─(zharsuke@LAPTOP-FCSRQQ00)-[~/Documents/College/Basic Programming Practicum/Meet 9/coding]
$ JAVA PROJECTS
```

The result is that the star column is increased by 1, because in loop i it is counted starting from 0, which results in the number of columns being 1 more than before

3. The difference is that outer will form the number of rows of the loop and inner will form the number of columns of the loop.
4. To given enter new line in a loop. if not given `System.out.println();` under the inner loop then what will happen is that the loop will run with only 1 line.

### Experiment 3: Triangle Star

1. Experiment 3 is used to create a display \* in the form of a right triangle with a height of N
2. Create a new class, name it Triangle

● ● ●

```
1 public class triangle {  
2  
3 }
```

3. Write the basic structure of the Java programming language which contains the main() function

● ● ●

```
1 public static void main(String[] args) {  
2  
3 }
```

4. Add the Scanner library

● ● ●

```
1 import java.util.Scanner;
```

5. Make a Scanner declaration with the name sc

● ● ●

```
1 Scanner sc = new Scanner(System.in);
```

6. Add the following code to receive input from keyboard as the value to be stored in the variable N



```
1 System.out.print("Enter the value of N : ");
2         int N = sc.nextInt();
```

7. Add a while loop structure to display the \* symbol according to the number specified via input



```
1 int i = 0;
2         while (i <= N) {
3             int j = 0;
4             while (j < i) {
5                 System.out.print("*");
6                 j++;
7             }
8             i++;
9         }
```

8. Compile and run the program. Observe the results!

Code :

```
● ● ●
1 import java.util.Scanner;
2
3 public class triangle {
4     public static void main(String[] args) {
5
6         Scanner sc = new Scanner(System.in);
7
8         System.out.print("Enter the value of N : ");
9         int N = sc.nextInt();
10
11        int i = 0;
12        while (i <= N) {
13            int j = 0;
14            while (j < i) {
15                System.out.print("*");
16                j++;
17            }
18            i++;
19        }
20
21        sc.close();
22    }
23 }
```

result :

```
[zharsuke@LAPTOP-FCSRQQ00] - [~/Documents/College/Basic Programming Practicum/Meet 9/coding]
$ javac triangle.java && java triangle.java
Enter the value of N : 5
*****
[zharsuke@LAPTOP-FCSRQQ00] - [~/Documents/College/Basic Programming Practicum/Meet 9/coding]
$
```

## Questions!

1. Look at the results, is the output generated with a value of N = 5 in accordance with the following display?

```
*
**
***
****
*****
```

2. If not, which parts should be improved or added? Describe any parts that need to be improved or added!

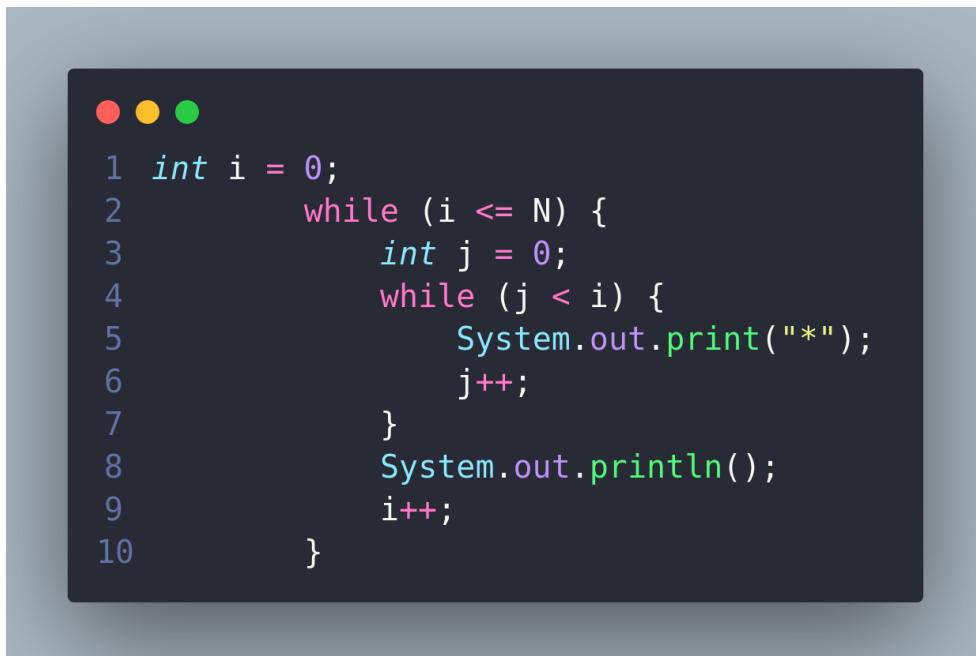
### Answer

1. Result :

```
(zharsuke@LAPTOP-FCSRQQ00) [~/Documents/College/Basic Programming Practicum/Meet 9/coding]
$ javac triangle.java && java triangle.java
Enter the value of N : 5
*****
(zharsuke@LAPTOP-FCSRQQ00) [~/Documents/College/Basic Programming Practicum/Meet 9/coding]
$
```

The result not same with picture above, because there is no System.out.println(); under the inner loop which causes the program to repeat only 1 line.

2. Code :



```
1 int i = 0;
2         while (i <= N) {
3             int j = 0;
4             while (j < i) {
5                 System.out.print("*");
6                 j++;
7             }
8             System.out.println();
9             i++;
10 }
```

add System.out.println(); under inner loop to given enter new line each looping.

### Experiment 4: Guess the Number Quiz

1. Experiment 4 is used to create a quiz to guess a random computer set number
2. Create a new class, name it Quiz

●

●

●

```
1 public class quiz {  
2  
3 }
```

3. Add Scanner and Random libraries outside the class

●

●

●

```
1 import java.util.Scanner;  
2 import java.util.Random;
```

4. Write the basic structure of the Java programming language which contains the main() function

●

●

●

```
1 public static void main(String[] args) {  
2  
3 }
```

5. Make a Scanner declaration with the name input and Random declaration with the name rand



```
1 Scanner input = new Scanner(System.in);  
2 Random rand = new Random();
```

6. Add the following code to create a do-while loop structure that is used to make a game of guessing numbers quiz. In inner loop, the loop is used to ask the user to enter a number as long as the number entered does not match the number determined by the computer randomly. While the outer loop is used to repeat the game by choosing a new random number Note: the input.nextLine() syntax in that snippet is used to ignore the new line character

```
1 char menu = 'y';  
2 do {  
3     int number = rand.nextInt(10) + 1;  
4     boolean success = false;  
5     do {  
6         System.out.print("Guess the number (1-10) : ");  
7         int answer = input.nextInt();  
8         input.nextLine();  
9         success = (answer == number);  
10    } while (!success);  
11    System.out.print("Do you want to repeat the game (Y/N) ");  
12    menu = input.next().charAt(0);  
13    input.nextLine();  
14 } while (menu == 'Y' || menu == 'y');
```

7. Compile and run the program. Observe the results!

Code :

```

● ● ●
1 import java.util.Scanner;
2 import java.util.Random;
3
4 public class quiz {
5     public static void main(String[] args) {
6
7         Scanner input = new Scanner(System.in);
8         Random rand = new Random();
9
10        char menu = 'y';
11        do {
12            int number = rand.nextInt(10) + 1;
13            boolean success = false;
14            do {
15                System.out.print("Guess the number (1-10) : ");
16                int answer = input.nextInt();
17                input.nextLine();
18                success = (answer == number);
19            } while (!success);
20            System.out.print("Do you want to repeat the game (Y/N) ");
21            menu = input.next().charAt(0);
22            input.nextLine();
23        } while (menu == 'Y' || menu == 'y');
24        input.close();
25    }
26 }

```

**Result :**

```

└─(zharsuke@LAPTOP-FCSRQQ00)-[~/Documents/College/Basic Programming Practicum/Meet 9/coding]
└─$ javac quiz.java && java quiz.java
Guess the number (1-10) : 1
Guess the number (1-10) : 2
Guess the number (1-10) : 3
Guess the number (1-10) : 4      Result :
Guess the number (1-10) : 5
Guess the number (1-10) : 6
Do you want to repeat the game (Y/N) n
Questions!
└─(zharsuke@LAPTOP-FCSRQQ00)-[~/Documents/College/Basic Programming Practicum/Meet 9/coding]
└─$ 2. What must be done to discontinue (not repeat) the game?
3. Modify the program above, so that it can display information about: input the guess

```

## Questions!

1. Explain the program flow in Experiment 4!
2. What must be done to discontinue (not repeat) the game?
3. Modify the program above, so that it can display information about: input the guess value entered by the user, whether it is smaller or greater than the answer (number) randomly determined by the computer!

## Answer

1. First the program declares package random and scanner. then initiate char menu. then there is an outer do that enumerates random numbers that range from 1 - 10, there is a boolean with variable success whose value is false. then in the inner do there is input to guess the number that was generated earlier, then there is an inner while condition which contains if the input is not successful then the program will repeat until success. if the looping is successful then there will be input asking whether the program wants to be repeated or not, if the input is y or Y then the

program will be repeated from the beginning, if other than that then the program will finish.

2. Enter inputs other than y and Y during repeat questions.
3. Code :

```
● ● ●
1 import java.util.Scanner;
2 import java.util.Random;
3
4 public class quiz {
5     public static void main(String[] args) {
6
7         Scanner input = new Scanner(System.in);
8         Random rand = new Random();
9
10        char menu = 'y';
11        do {
12            int number = rand.nextInt(10) + 1;
13            boolean success = false;
14            do {
15                System.out.println(number);
16                System.out.print("Guess the number (1-10) : ");
17                int answer = input.nextInt();
18                if (answer < number) {
19                    System.out.println("Answer less than number");
20                } else if (answer > number) {
21                    System.out.println("Answer more than number");
22                }
23                input.nextLine();
24                success = (answer == number);
25            } while (!success);
26            System.out.print("Do you want to repeat the game (Y/N) ");
27            menu = input.next().charAt(0);
28            input.nextLine();
29        } while (menu == 'Y' || menu == 'y');
30        input.close();
31    }
32 }
```

Result :

```
[zarsuke@LAPTOP-FCSRQQ00]-[~/Documents/College/Basic Programming Practicum/Meet 9/coding]
└─$ javac quiz.java && java quiz.java
7
Guess the number (1-10) : 5
Answer less than number
7
Guess the number (1-10) : 8
Answer more than number
7
Guess the number (1-10) : 7
Do you want to repeat the game (Y/N) n
```

### 3. Assignments

1. Create a program to print a numeric triangle display as below based on the N input (minimum N value is 3). Example N = 5

```
1  
12  
123  
1234  
12345
```

2. Create a program to print the star triangle view shown below based on the N input (minimum N value is 5). Example N = 7

```
*****  
*****  
****  
***  
**  
*
```

3. Create a program to print a square numeric display like the one below based on N input (minimum N value is 3). Example N = 3 and N = 5

```
5 5 5 5 5  
5 5  
3 3 3 5 5  
3 3 5 5  
3 3 3 5 5 5
```

4. Create a program to print a square numeric display like the one below based on N input (minimum N value is 5). Example N = 5

```
12345  
54321  
12345  
54321  
12345
```

## Answer

1. Code :

```
1 import java.util.*;
2
3 public class ass1 {
4     public static void main(String[] args) {
5
6         Scanner scanner = new Scanner(System.in);
7         int num;
8
9         System.out.print("Insert number (min 3) : ");
10        num = scanner.nextInt();
11
12        for (int i = 1; i <= num; i++) {
13            if (num < 3) {
14                break;
15            }
16            for (int j = num; j > i; j--) {
17                System.out.print(" ");
18            }
19            for (int j = 1; j <= i; j++) {
20                System.out.print(j);
21            }
22            System.out.println();
23        }
24        scanner.close();
25    }
26 }
27 }
```

## Result :

```
[zharuke@LAPTOP-FCSRQQ00] - [~/Documents/College/Basic Programming Practicum/Meet 9/coding]
$ javac ass1.java && java ass1.java
Insert number (min 3) : 5
      *
     * *
    * * *
   * * * *
  * * * * *
 * * * * * *
* * * * * * *
```

## 2. Code :

```
1 import java.util.*;
2
3 public class ass2 {
4     public static void main(String[] args) {
5
6         Scanner scanner = new Scanner(System.in);
7         int num;
8
9         System.out.print("Insert number (min 5) : ");
10        num = scanner.nextInt();
11
12        for (int i = 0; i <= num; i++) {
13            if (num < 5) {
14                break;
15            }
16            for (int j = 0; j <= num; j++) {
17                if ((i+j) > num) {
18                    break;
19                }
20                System.out.print("* ");
21            }
22            System.out.println();
23        }
24        scanner.close();
25    }
26 }
```

## Result :

```
[zharsuke@LAPTOP-FCSRQQ00] - [~/Documents/College/Basic Programming Practicum/Meet 9/coding]
$ javac ass2.java && java ass2.java
Insert number (min 5) : 7
* * * * *
* * * * *
* * * * *
* * * * *
* * * * *
* * * * *
* * * *
* *
*
3 3 3      5 5 5 5 5
3 3         5 5
3 3 3      5 5 5 5 5
3. Create a program to print a square numeric display like the one below
input (minimum N value is 3). Example N = 3 and N = 5
```

### 3. Code :

```
● ● ●
1 import java.util.*;
2
3 public class ass3 {
4     public static void main(String[] args) {
5
6         Scanner scanner = new Scanner(System.in);
7         int num;
8         System.out.print("Insert number (min 3) : ");
9         num = scanner.nextInt();
10
11        for (int i = 1; i <= num; i++) {
12            if (num < 3) {
13                break;
14            }
15            for (int j = 1; j <= num; j++) {
16                if (i == 1 && j <= num) {
17                    System.out.print(num+" ");
18                    continue;
19                } else if (i == num && j <= num) {
20                    System.out.print(num+" ");
21                    continue;
22                } else if (i <= num && j == 1) {
23                    System.out.print(num+" ");
24                    continue;
25                } else if (i <= num && j == num) {
26                    System.out.print(num+" ");
27                    continue;
28                } else {
29                    System.out.print(" ");
30                }
31            }
32            System.out.println();
33        }
34        scanner.close();
35    }
36 }
```

Result :

```
[zharsuke@LAPTOP-FCSRQQ00] - [~/Documents/College/Basic Programming Practicum/Meet 9/coding]
$ javac ass3.java && java ass3.java
Insert number (min 3) : 5
5 5 5 5
5      5
5      5
5      5
5 5 5 5 5
4. ergergergerg
```

4. Code :

```
1 import java.util.*;
2
3 public class ass4 {
4     public static void main(String[] args) {
5
6         Scanner scanner = new Scanner(System.in);
7         int num;
8         System.out.print("Insert number (min 5) : ");
9         num = scanner.nextInt();
10
11        for (int i = 1; i <= num; i++) {
12            if (num < 5) {
13                break;
14            }
15            if (i % 2 != 0) {
16                for (int j = 1; j <= num; j++) {
17                    System.out.print(j);
18                }
19            } else {
20                for (int j = num; j > 0; j--) {
21                    System.out.print(j);
22                }
23            }
24            System.out.println();
25        }
26        scanner.close();
27    }
28 }
```

Result :

```
[zharsuke@LAPTOP-FCSRQQ00] - [~/Documents/College/Basic Programming Practicum/Meet 9/coding]
$ javac ass4.java && java ass4.java
Insert number (min 5) : 5
12345
54321
12345
54321
12345
Result :
[zharsuke@LAPTOP-FCSRQQ00] - [~/Documents/College/Basic Programming Practicum/Meet 9/coding]
$
```