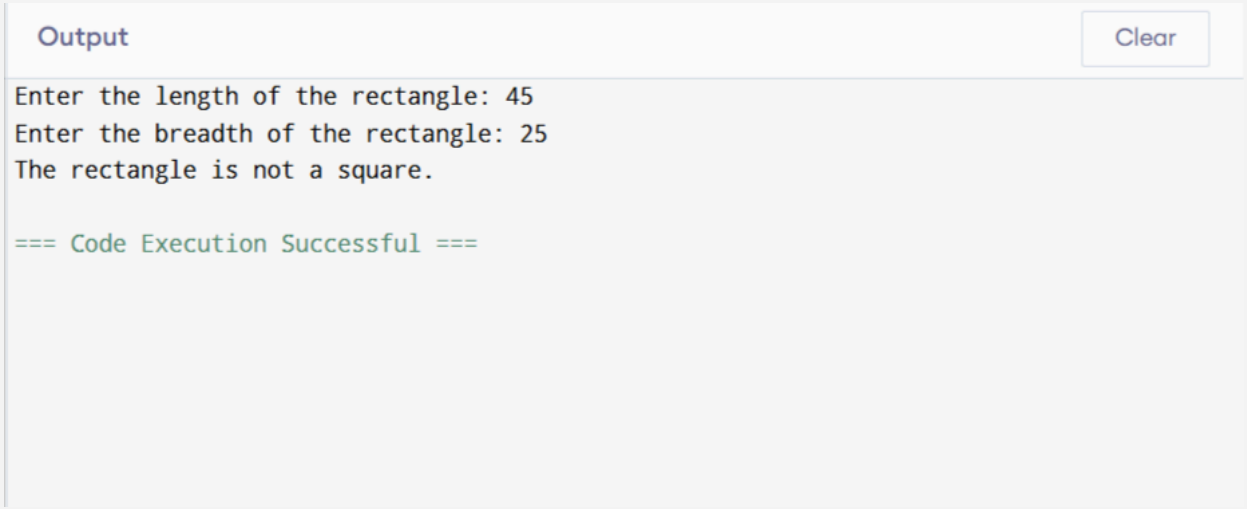
1. Taking length and breadth of a rectangle from the user and checking if it is square or not.

```java
import java.util.Scanner;

public class RectangleCheck {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        // Taking length input
        System.out.print("Enter the length of the rectangle: ");
        double length = scanner.nextDouble();

        // Taking breadth input
        System.out.print("Enter the breadth of the rectangle: ");
        double breadth = scanner.nextDouble();

        // Check if it's a square
        if (length == breadth) {
            System.out.println("The rectangle is actually a square.");
        } else {
            System.out.println("The rectangle is not a square.");
        }

        scanner.close();
    }
}
```



2. Write a program to print the multiplication table of a number using user input.

```java
import java.util.Scanner;

public class MultiplicationTable {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        // Take the number input from the user
        System.out.print("Enter a number to print its multiplication
table: ");
        int number = scanner.nextInt();

        // Print multiplication table from 1 to 10
        for (int i = 1; i <= 10; i++) {
            System.out.println(number + " x " + i + " = " + (number * i));
        }

        scanner.close();
    }
}
```

Output Clear

```
Enter a number to print its multiplication table: 8
8 x 1 = 8
8 x 2 = 16
8 x 3 = 24
8 x 4 = 32
8 x 5 = 40
8 x 6 = 48
8 x 7 = 56
8 x 8 = 64
8 x 9 = 72
8 x 10 = 80

=== Code Execution Successful ===
```

3. A college has following rules for grading system:

a. 40 to 50 - C
b. 50 to 60 - C+
c. 60 to 70 - B
d. 70 to 80 - B+
e. 80 to 90 - A
f. Above 90 - A+

Ask users to enter marks and print the corresponding grade using if-else-if statements.

```java
import java.util.Scanner;

public class GradeCalculator {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        // Input marks from user
        System.out.print("Enter marks (0-100): ");
        int marks = scanner.nextInt();

        // Determine grade based on marks
        if (marks >= 40 && marks < 50) {
```

```
            System.out.println("Grade: C");
        } else if (marks >= 50 && marks < 60) {
            System.out.println("Grade: C+");
        } else if (marks >= 60 && marks < 70) {
            System.out.println("Grade: B");
        } else if (marks >= 70 && marks < 80) {
            System.out.println("Grade: B+");
        } else if (marks >= 80 && marks < 90) {
            System.out.println("Grade: A");
        } else if (marks >= 90 && marks <= 100) {
            System.out.println("Grade: A+");
        } else {
            System.out.println("Invalid marks entered. Please enter marks
between 0 and 100.");
        }

        scanner.close();
    }
}
```

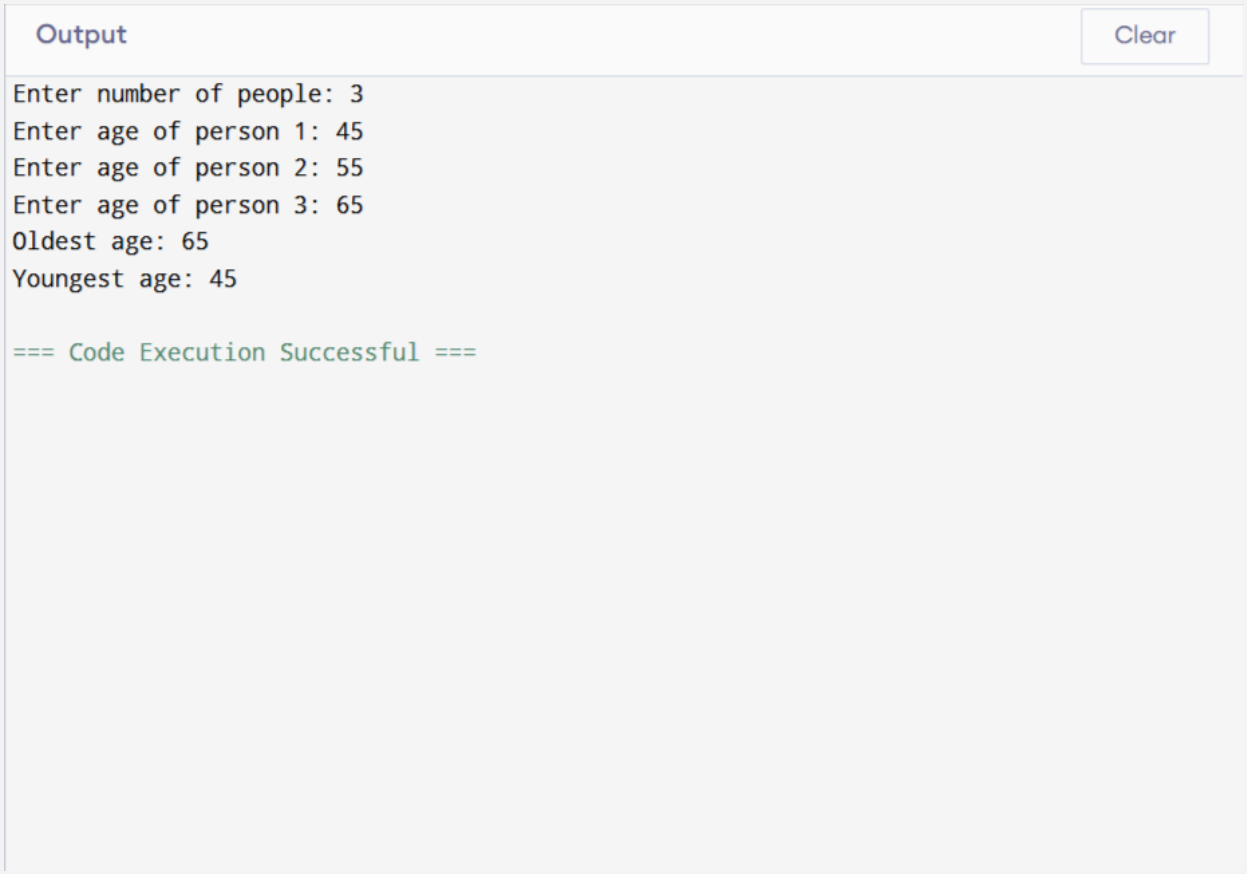
Output Clear

```
Enter marks (0-100): 80
Grade: A

=== Code Execution Successful ===
```

4. Determine oldest and youngest among the people taking the user input.

```java
import java.util.Scanner;

public class AgeChecker {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.print("Enter number of people: ");
        int n = scanner.nextInt();

        if (n <= 0) {
            System.out.println("Please enter a positive number.");
            scanner.close();
            return;
        }

        int oldest = Integer.MIN_VALUE;
        int youngest = Integer.MAX_VALUE;

        for (int i = 1; i <= n; i++) {
            System.out.print("Enter age of person " + i + ": ");
            int age = scanner.nextInt();

            if (age < 0) {
                System.out.println("Age cannot be negative. Try again.");
                i--; // redo this iteration
                continue;
            }

            if (age > oldest) {
                oldest = age;
            }
            if (age < youngest) {
                youngest = age;
            }
        }

        System.out.println("Oldest age: " + oldest);
        System.out.println("Youngest age: " + youngest);
```

```
        scanner.close();
    }
}
```



5. Ask a student if he/she has a medical cause or not ('y or 'n'). if (‘y’) print you are not allowed to sit in the exam and if(‘n’’) print you can sit in the exam.

```
import java.util.Scanner;

public class ExamEligibility {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.print("Do you have a medical cause? (y/n): ");
        char response = scanner.next().charAt(0);

        if (response == 'y' || response == 'Y') {
```

```
            System.out.println("You are not allowed to sit in the exam.");
        } else if (response == 'n' || response == 'N') {
            System.out.println("You can sit in the exam.");
        } else {
            System.out.println("Invalid input. Please enter 'y' or 'n'.");
        }

        scanner.close();
    }
}
```

6. Write a program to check the odd and even numbers using user input.

```
import java.util.Scanner;

public class OddEvenChecker {
    public static void main(String[] args) {
```

```
        Scanner scanner = new Scanner(System.in);

        // Take number input from user
        System.out.print("Enter a number: ");
        int number = scanner.nextInt();

        // Check if the number is even or odd
        if (number % 2 == 0) {
            System.out.println(number + " is an even number.");
        } else {
            System.out.println(number + " is an odd number.");
        }

        scanner.close();
    }
}
```

```
Output                                                    Clear
Enter a number: 2012
2012 is an even number.

=== Code Execution Successful ===
```

7. Write a program to check if the number is odd or even, if the number is even, check whether it is divisible by 4, and if the number is odd,check whether it is divisible by 7 or not using user input.

```
import java.util.Scanner;

public class OddEvenDivisibility {
```

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

        System.out.print("Enter a number: ");
        int number = scanner.nextInt();

        if (number % 2 == 0) { // even
            System.out.println(number + " is even.");
            if (number % 4 == 0) {
                System.out.println(number + " is divisible by 4.");
            } else {
                System.out.println(number + " is not divisible by 4.");
            }
        } else { // odd
            System.out.println(number + " is odd.");
            if (number % 7 == 0) {
                System.out.println(number + " is divisible by 7.");
            } else {
                System.out.println(number + " is not divisible by 7.");
            }
        }

        scanner.close();
    }
}
```

8. Write a program to input marks of five subjects Physics, Chemistry, Biology, Mathematics and Computer. Calculate percentage and grade according to following:

- Percentage >= 90% : Grade A
- Percentage >= 80% : Grade B
- Percentage >= 70% : Grade C
- Percentage >= 60% : Grade D
- Percentage >= 40% : Grade E
- Percentage < 40% : Grade F

```java
import java.util.Scanner;

public class GradeCalculatorpart2 {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        // Input marks for five subjects
        System.out.print("Enter marks for Physics: ");
        double physics = scanner.nextDouble();

        System.out.print("Enter marks for Chemistry: ");
```

```
        double chemistry = scanner.nextDouble();

        System.out.print("Enter marks for Biology: ");
        double biology = scanner.nextDouble();

        System.out.print("Enter marks for Mathematics: ");
        double mathematics = scanner.nextDouble();

        System.out.print("Enter marks for Computer: ");
        double computer = scanner.nextDouble();

        // Calculate total and percentage
        double total = physics + chemistry + biology + mathematics +
computer;
        double percentage = (total / 500) * 100;

        System.out.printf("Percentage: %.2f%%\n", percentage);

        // Determine grade
        if (percentage >= 90) {
            System.out.println("Grade: A");
        } else if (percentage >= 80) {
            System.out.println("Grade: B");
        } else if (percentage >= 70) {
            System.out.println("Grade: C");
        } else if (percentage >= 60) {
            System.out.println("Grade: D");
        } else if (percentage >= 40) {
            System.out.println("Grade: E");
        } else {
            System.out.println("Grade: F");
        }

        scanner.close();
    }
}
```

Output

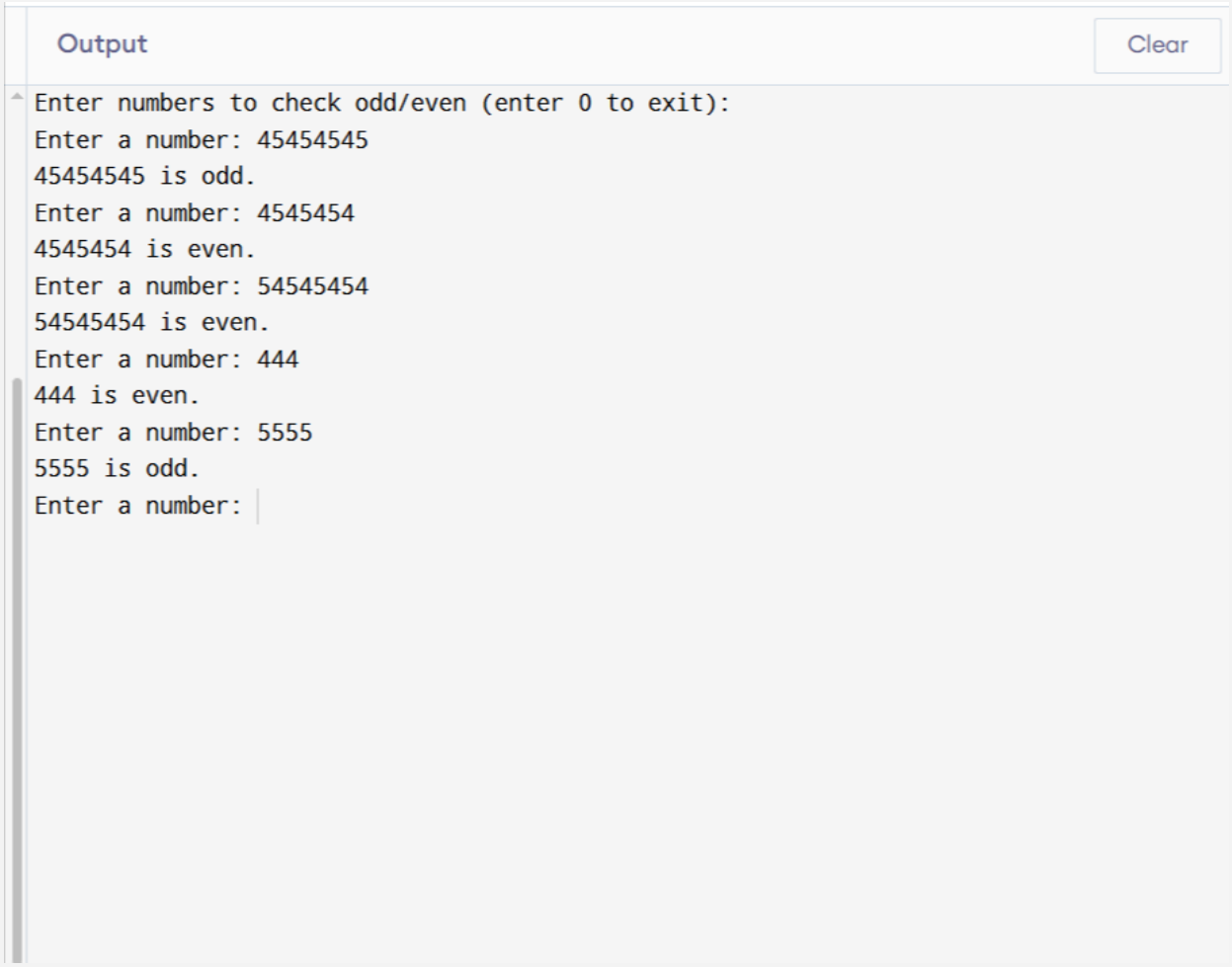
```
Enter marks for Physics: 45
Enter marks for Chemistry: 55
Enter marks for Biology: 45
Enter marks for Mathematics: 55
Enter marks for Computer: 65
Percentage: 53.00%
Grade: E

=== Code Execution Successful ===
```

9. Write a program to check whether the number is odd or even using a switch statement.

```java
import java.util.Scanner;

public class OddEvenSwitch {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.print("Enter a number: ");
        int number = scanner.nextInt();

        switch (number % 2) {
            case 0:
                System.out.println(number + " is even.");
                break;
            case 1:
            case -1: // in case of negative odd numbers
```

```
                System.out.println(number + " is odd.");
                break;
            default:
                System.out.println("Unexpected case.");
        }

        scanner.close();
    }
}
```

10. Repeat ques 10. Using a while loop.



11. Write a program to sum first n even numbers using a while loop.

```java
import java.util.Scanner;

public class SumEvenNumbers {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.print("Enter the value of n: ");
        int n = scanner.nextInt();

        int count = 0;  // counts how many even numbers summed so far
        int number = 2; // first even number
        int sum = 0;

        while (count < n) {
```

```
            sum += number;
            number += 2;  // move to the next even number
            count++;
        }

        System.out.println("Sum of first " + n + " even numbers is: " +
sum);

        scanner.close();
    }
}
```

12. Write a program to find the factorial of a given number using for loops.

```
import java.util.Scanner;

public class FactorialForLoop {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.print("Enter a non-negative integer: ");
        int number = scanner.nextInt();

        if (number < 0) {
            System.out.println("Factorial is not defined for negative
numbers.");
```

```
        } else {
            long factorial = 1;
            for (int i = 1; i <= number; i++) {
                factorial *= i;
            }
            System.out.println("Factorial of " + number + " is: " +
factorial);
        }

        scanner.close();
    }
}
```

Output Clear

```
Enter a non-negative integer: 4545
Factorial of 4545 is: 0

=== Code Execution Successful ===
```

13. Write a Java program that demonstrates the use of nested loops to print a pattern, such as a pyramid of stars.

```
import java.util.Scanner;

public class StarPyramid {
    public static void main(String[] args) {
```

```
        Scanner scanner = new Scanner(System.in);

        System.out.print("Enter the number of rows for the pyramid: ");
        int rows = scanner.nextInt();

        for (int i = 1; i <= rows; i++) {
            // Print spaces
            for (int j = rows; j > i; j--) {
                System.out.print(" ");
            }
            // Print stars
            for (int k = 1; k <= (2 * i - 1); k++) {
                System.out.print("*");
            }
            // Move to next line
            System.out.println();
        }

        scanner.close();
    }
}
```

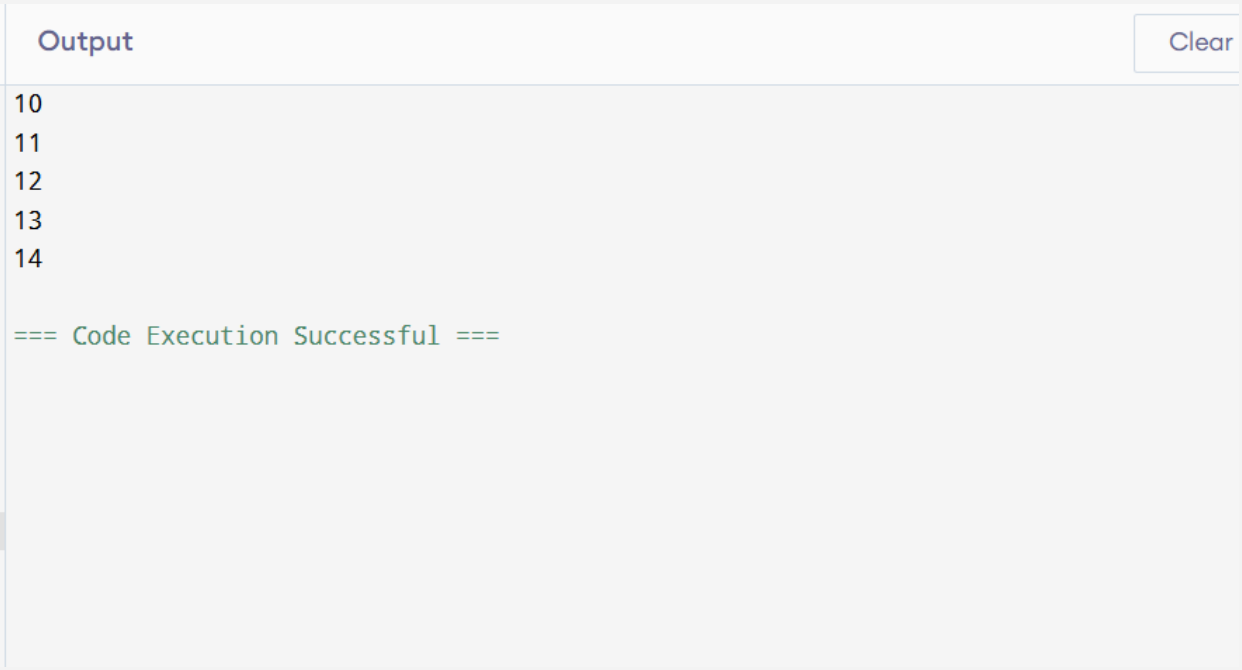
Output Clear

```
Enter the number of rows for the pyramid: 15
              *
             ***
            *****
           *******
          *********
         ***********
        *************
       ***************
      *****************
     *******************
    *********************
   ***********************
  *************************
 ***************************
*****************************

=== Code Execution Successful ===
```

14. while loop to print numbers starting from 10 to 14 which will otherwise print elements till 19. Initialized an int variable with a value of 10. Then in the while loop, we're checking x as less than 20 and within the while loop, we're printing the value of x and incrementing the value of x by 1. The loop will run until x becomes 15. Once x is 15, the break statement will break the while loop and the program exits.

```java
public class WhileLoopBreakExample {
    public static void main(String[] args) {
        int x = 10;

        while (x < 20) {
            if (x == 15) {
                break;  // Exit the loop when x reaches 15
            }
            System.out.println(x);
            x++;
        }
```

```
    }
}
```



15. while loop to print elements from 10 to 19. Here we've initialized an int variable x with a value of 10. Then in the while loop, we're checking x as less than 20 and within the while loop, we're printing the value of x and incrementing the value of x by 1. The loop will run until x becomes 15. Once x is 15, the continue statement will jump the while loop while skipping the execution of the body and loop continues.

```
public class WhileLoopContinueExample {
    public static void main(String[] args) {
        int x = 10;

        while (x < 20) {
            if (x == 15) {
                x++;       // increment before continue to avoid infinite
loop
                continue;  // skip printing 15 and jump to next iteration
            }
            System.out.println(x);
            x++;
```

```
            }
        }
}
```

Output

Clear

```
10
11
12
13
14
16
17
18
19

=== Code Execution Successful ===
```