



بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ



# Tri-Tool Java Program

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## Description:

A Java program with calculator, password generator, and currency converter functions.

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## What is Java?

**J**ava is a widely used object-oriented programming language and software platform that runs on billions of devices. From notebook computers to mobile devices, gaming consoles, medical devices, and many others, Java is used across a wide range of industries and applications. The rules and syntax of Java are based on the C and C++ languages.

One major advantage of developing software with Java is its portability. Once you have written code for a Java program on a notebook computer, it is very easy to move the code to a mobile device. Java's scalability, reliability, and cross-platform compatibility make it an ideal language for developers and businesses alike.

When the language was invented in 1991 by James Gosling of Sun Microsystems (later acquired by Oracle), the primary goal was to be able to "write once, run anywhere." This philosophy has been a driving force behind Java's popularity and longevity.

It's important to understand that Java is much different from JavaScript. While both are programming languages used for web development, JavaScript does not need to be compiled, while Java code does need to be compiled. Additionally, JavaScript only runs on web browsers, while Java can be run on a wide range of devices.

Java's versatility and popularity are evident in the many real-world examples of Java applications, including Android apps, financial software, e-commerce platforms, and more. More than two decades after its creation, Java remains the most popular language for application software development, with developers continuing to choose it over other languages such as Python, Ruby, PHP, Swift, C++, and others.

In this report, we will focus on a specific Java project that includes a **calculator**, **password generator**, and **currency converter** functions. Through this project, we will explore the unique features and functionalities of Java, and demonstrate how it can be used to create practical applications for everyday use.

You can find the source code in the last page.

Here's an explanation of every step made to create the combined Java program:

## 1. Import the necessary classes and packages:

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

## 2. Define the main method:

In this method, we prompt the user to choose an option

- calculator, password generator,

or currency converter –

by printing a menu to the console.

I then read the user's choice using

a Scanner object and perform

the corresponding function using

a switch statement

```
public static void main(String[] args) {  
    Scanner scanner = new Scanner(System.in);  
  
    System.out.println("Choose an option:");  
    System.out.println("1. Calculator");  
    System.out.println("2. Password Generator");  
    System.out.println("3. Currency Converter");  
  
    int choice = scanner.nextInt();  
  
    switch(choice) {  
        case 1:  
            performCalculator();  
            break;  
        case 2:  
            performPasswordGenerator();  
            break;  
        case 3:  
            performCurrencyConverter();  
            break;  
        default:  
            System.out.println("Invalid choice!");  
            return;  
    }  
}
```

### 3. Define the performCalculator method:

```
public static void performCalculator() {  
    // code for calculator function  
}
```

Defined a separate method

performCalculator to contain the code for the calculator function. This method will be called when the user chooses the calculator option.

### 4. Define the performPasswordGenerator method:

```
public static void performPasswordGenerator() {  
    // code for password generator function  
}
```

Defined a separate method

performPasswordGenerator to contain the code for the password generator function.

This method will be called when the user chooses the password generator option.

### 5. Define the performCurrencyConverter method:

```
public static void performCurrencyConverter() {  
    // code for currency converter function  
}
```

Defined a separate method

performCurrencyConverter to

contain the code for the currency converter function.

This method will be called when the user chooses the currency converter option.

## 6. Write the code for the calculator function:

Inside the performCalculator method, we wrote the code for the calculator function. The program prompts the user to enter two numbers and an operator, then performs the corresponding operation using a switch statement. Finally, the program prints the result to the console.

```
double num1, num2, result = 0;
char operator;

Scanner scanner = new Scanner(System.in);

System.out.print("Enter first number: ");
num1 = scanner.nextDouble();

System.out.print("Enter second number: ");
num2 = scanner.nextDouble();

System.out.print("Enter operator (+, -, *, /): ");
operator = scanner.next().charAt(0);

switch(operator) {
    case '+':
        result = num1 + num2;
        break;
    case '-':
        result = num1 - num2;
        break;
    case '*':
        result = num1 * num2;
        break;
    case '/':
        result = num1 / num2;
        break;
    default:
        System.out.println("Invalid operator!");
        return;
}

System.out.println(num1 + " " + operator + " " + num2 + " = " + result);
```

## 7. Write the code for the password generator function:

Inside the performPasswordGenerator method, we wrote the code for the password generator function. The program prompts the user to enter a password length, then generates a random password using a StringBuilder and a Random object.

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

System.out.print("Enter password length: ");
int length = scanner.nextInt();

String characters = "ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz0123456789!@#$%^&*()_+<>?,./;:'\"[]{}\\|`~";

Random random = new Random();
StringBuilder password = new StringBuilder();

for (int i = 0; i < length; i++) {
    password.append(characters.charAt(random.nextInt(characters.length())));
}

System.out.println("Generated password: " + password.toString());
```

## 8. Write the code for the currencyconverter function:

Inside the `performCurrencyConverter` method, we wrote the code for the currency converter function. The program prompts the user to enter an amount in SAR and a currency to convert to, then performs the conversion using a switch statement. The conversion rates are stored as final variables.

```
final double SAR_TO_EUR = 0.25;
final double SAR_TO_USD = 0.27;

Scanner scanner = new Scanner(System.in);

System.out.print("Enter amount in SAR: ");
float sarAmount = scanner.nextFloat();

System.out.println("Choose currency to convert to:");
System.out.println("1. EUR");
System.out.println("2. USD");

int choice = scanner.nextInt();

double convertedAmount = 0;

switch(choice) {
    case 1:
        convertedAmount = sarAmount * SAR_TO_EUR;
        System.out.println(sarAmount + " SAR = " + convertedAmount + " EUR");
        break;
    case 2:
        convertedAmount = sarAmount * SAR_TO_USD;
        System.out.println(sarAmount + " SAR = " + convertedAmount + " USD");
        break;
    default:
        System.out.println("Invalid choice!");
        return;
}
```

That's it! The program combines the functionality of the three programs into one Java program, allowing the user to choose which function they want to use.

## The Source Code

```
import java.util.Random;

import java.util.Scanner;

public class CombinedProgram {

    public static void main(String[] args) {

        Scanner scanner = new Scanner(System.in);

        System.out.println("Choose an option:");

        System.out.println("1. Calculator");

        System.out.println("2. Password Generator");

        System.out.println("3. Currency Converter");

        int choice = scanner.nextInt();

        switch(choice) {

            case 1:

                performCalculator();

                break;

            case 2:

                performPasswordGenerator();

                break;

            case 3:

                performCurrencyConverter();

                break;

            default:

                System.out.println("Invalid choice!");

                return;

        }

    }

}
```



```

public static void performCalculator() {
    double num1, num2, result = 0;

    char operator;

    Scanner scanner = new Scanner(System.in);

    System.out.print("Enter first number: ");

    num1 = scanner.nextDouble();

    System.out.print("Enter second number: ");

    num2 = scanner.nextDouble();

    System.out.print("Enter operator (+, -, *, /): ");

    operator = scanner.next().charAt(0);

    switch(operator) {
        case '+':

            result = num1 + num2;

            break;

        case '-':

            result = num1 - num2;

            break;

        case '*':

            result = num1 * num2;

            break;

        case '/':

            result = num1 / num2;

            break;

        default:

            System.out.println("Invalid operator!");

    }

    return;
}

```

```

}

System.out.println(num1 + " " + operator + " " + num2 + " = " + result);

}

public static void performPasswordGenerator() {

Scanner scanner = new Scanner(System.in);

System.out.print("Enter password length: ");

int length = scanner.nextInt();

String characters =
"ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz0123456789!@#$%^&*()_+<>?,./;:'\"[]{}\\|`
~";

Random random = new Random();

StringBuilder password = new StringBuilder();

for (int i = 0; i < length; i++) {

password.append(characters.charAt(random.nextInt(characters.length())));

}

System.out.println("Generated password: " + password.toString());

}

public static void performCurrencyConverter() {

final double SAR_TO_EUR = 0.25;

final double SAR_TO_USD = 0.27;

Scanner scanner = new Scanner(System.in);

System.out.print("Enter amount in SAR: ");

float sarAmount = scanner.nextFloat();

System.out.println("Choose currency to convert to:");

System.out.println("1. EUR");

System.out.println("2. USD");

int choice = scanner.nextInt();

double convertedAmount = 0;

```

```
switch(choice) {  
  
case 1:  
  
convertedAmount = sarAmount * SAR_TO_EUR;  
  
System.out.println(sarAmount + " SAR = " + convertedAmount + " EUR");  
  
break;  
  
case 2:  
  
convertedAmount = sarAmount * SAR_TO_USD;  
  
System.out.println(sarAmount + " SAR = " + convertedAmount + " USD");  
  
break;  
  
default:  
  
System.out.println("Invalid choice!");  
  
return;  
  
}  
  
}
```

## References :

<https://www.ibm.com/topics/java>

<https://ar.wikipedia.org/wiki/java>