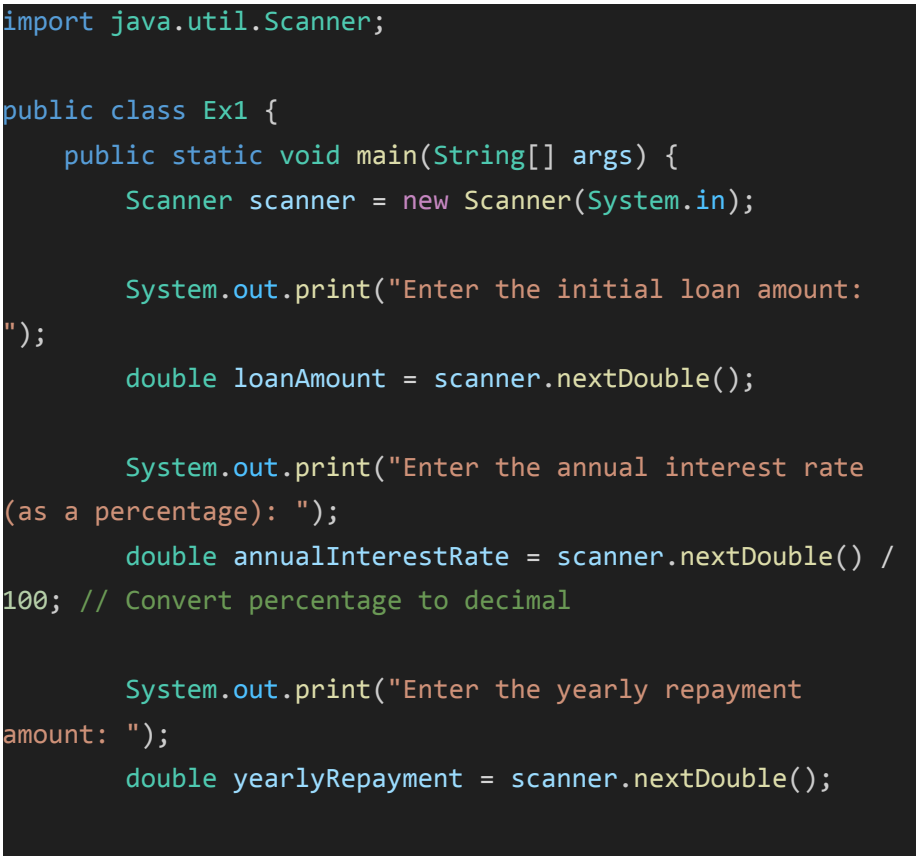
Java module 1

Exercises Day 4

1 - Do while	Loan balance year after year
Instructions	Write a program that calculates the remaining balance of a loan after each year until the loan is fully repaid. The user inputs the initial loan amount, the annual interest rate, and the yearly repayment amount. The program should use a do-while loop to subtract the yearly repayment from the loan balance, add the annual interest to the balance, and then print the remaining balance after each year. The loop continues until the loan is fully repaid or for a maximum of 10 years, whichever comes first. Assume simple interest for this calculation, not compound interest.
Expected output	Enter the initial loan amount: >>>3000 Enter the annual interest rate (as a percentage): >>>5 Enter the yearly repayment amount: >>>1200 Remaining balance after year 1: 1950.0 Remaining balance after year 2: 847.5 Remaining balance after year 3: 0.0 The loan is fully repaid.
Solution	

```java
import java.util.Scanner;

public class Ex1 {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.print("Enter the initial loan amount: ");
        double loanAmount = scanner.nextDouble();

        System.out.print("Enter the annual interest rate (as a percentage): ");
        double annualInterestRate = scanner.nextDouble() / 100; // Convert percentage to decimal

        System.out.print("Enter the yearly repayment amount: ");
        double yearlyRepayment = scanner.nextDouble();
```

	`` int year = 0; do { double interest = loanAmount * annualInterestRate; // Calculate the interest loanAmount += interest; // Add interest to the loan amount loanAmount -= yearlyRepayment; // Subtract the yearly repayment if (loanAmount < 0) { loanAmount = 0; // Ensure the balance doesn't go negative } year++; // Increment the year counter System.out.println("Remaining balance after year " + year + ": " + loanAmount); } while (loanAmount > 0 && year < 10); if (loanAmount == 0) { System.out.println("The loan is fully repaid."); } else { System.out.println("The loan has not been fully repaid after 10 years."); } scanner.close(); } } ```

2.1 - For	Multiplication table
Instructions	Print the multiplication table for a number entered by the user up to 10.
Expected output	Enter a number between 1 and 10: >>>4 4 x 1 = 4 4 x 2 = 8 4 x 3 = 12 4 x 4 = 16

	4 x 5 = 20 4 x 6 = 24 4 x 7 = 28 4 x 8 = 32 4 x 9 = 36 4 x 10 = 40
Solution	`import java.util.Scanner;` `public class Ex21 {` `  public static void main(String[] args) {` `  Scanner scanner = new Scanner(System.in);` `  System.out.print("Enter a number between 1 and 10: ");` `  int number = scanner.nextInt();` `  for (int i = 1; i <= 10; i++) {` `  System.out.println(number + " x " + i + " = " + (number*i));` `  }` `  scanner.close();` `  }` `}`

2.2 - For	Count vowels
Instructions	Determine and print the number of vowels that appear in the input entered by the user.
Expected output	Enter a sentence: >>>Hello, my name is Ana. The sentence has 7 vowels.
Solution	`import java.util.Scanner;` `public class Ex22 {` `  public static void main(String[] args) {` `  Scanner scanner = new Scanner(System.in);` `  System.out.print("Enter a sentence: ");` `  String sentence = scanner.nextLine();` `  sentence = sentence.toLowerCase();`

```
        int vowels = 0;
        for (int i = 0; i < sentence.length(); i++) {
            char c = sentence.charAt(i);
            if (c == 'a' || c == 'e' || c == 'i' || c == 'o' || c == 'u') {
                vowels++;
            }
        }
        System.out.println("The sentence has " + vowels + " vowels.");
        scanner.close();
    }
}
```

2.3 - For	Factorial
Instructions	Write a program that can calculate the factorial of a number https://en.wikipedia.org/wiki/Factorial Example: The factorial of 5 is 5*4*3*2*1=120
Expected output	Enter a positive number: >>>5 The factorial of 5 is 120
Solution	

```
import java.util.Scanner;

public class Ex23 {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

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

        int factorial = number;
        for (int i = number - 1; i > 0; i--) {
            factorial = factorial * i;
        }

        System.out.println("The factorial of " + number + " is " + factorial);
        scanner.close();
```

	`    }` `}`

2.4 - For	Fibonacci
Instructions	Write a program that can generate the Fibonacci sequence up to a certain number of terms. https://en.wikipedia.org/wiki/Fibonacci_sequence
Expected output	Enter the number of terms: >>>8 The Fibonacci sequence of 8 terms is 0 1 1 2 3 5 8 13
Solution	`import java.util.Scanner;` `public class Ex24 {` `    public static void main(String[] args) {` `        Scanner scanner = new Scanner(System.in);` `        System.out.print("Enter the number of terms: ");` `        int terms = scanner.nextInt();` `        String fibonacci = "";` `        int a = 0;` `        int b = 1;` `        for (int i = 0; i < terms; i++) {` `            fibonacci = fibonacci + a + " ";` `            int temp = a;` `            a = b;` `            b = temp + b;` `        }` `        System.out.println("The Fibonacci sequence of " +` `terms + " is: " + fibonacci);` `        scanner.close();` `    }` `}`