Project-Chapter 2 (100 points)

Student Name: Jared Robbins NETID: jlrob

Project Name: Calculating Future Investment Value

Problem Description:

Write a program that reads in investment amount, annual interest rate, and number of years, and displays the future investment value using the following formula:

futureInvestmentValue =
investmentAmount * (1 + monthlyInterestRate)^{numberOfYears*12}

For example, if you enter amount 1000, annual interest rate 3.25%, and number of years 1, the future investment value is 1032.98.

Hint: Use the Math.pow(a, b) method to compute a raised to the power of b.

Here is a sample run:

Sample 1:

```
Enter investment amount: 1000
Enter annual interest rate: 4.25
Enter number of years: 1
Accumulated value is 1043.34
```

Sample 2:

```
Enter investment amount: 1500
Enter annual interest rate: 3.25
Enter number of years: 1
Accumulated value is 1049.48
```

Analysis:
(Describe the problem including input and output in your own words.)

This problem will require me to write a program that will take input from the user and gather the numerical values for the following variables, to calculate a Future Investment Value:

- Investment amount
- Annual interest rate, and
- Number of years

This program will then output the Future Investment Value of the investment amount, based on the information that was provided.

Design:
(Describe the major steps for solving the problem.)

1. Program will prompt user for "Investment Amount" in dollars and cents
   a. Stored as variable: 'double investmentAmount'

2. Program will prompt user for "Annual Interest Rate" in a percent format
   a. Stored as variable: 'double annualInterestRate'

3. Program will prompt user for "Length of Investment" in number of years
   a. Stored as variable: 'int numberOfYears'

4. Calculate monthly interest rate based on value of Annual Interest Rate
   a. double monthlyInterestRate = annualInterestRate / 1200

5. Calculate Future Investment value based on formula given
   a. futureInvestmentValue = investmentAmount * (1 + monthlyInterestRate)^numberOfYears * 12

6. Display Future Investment Value of initial Investment

Coding: (Copy and Paste Source Code here. Format your code using `Courier 10pts`)

[Copy and Paste Your program here]

```
import java.util.Scanner;

public class CalculateFutureInvestmentValue {
    // Write a program that will calculate and output Future Investment Value based
       on given formula.
    /** Variables provided by user:
     * Investment amount
     * Annual interest rate, and
     * Number of years */
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        // Prompt user for Investment Amount, stored as double: investmentAmount
        System.out.print("Enter your investment amount value (ex. 100.00): ");
        double investmentAmount = input.nextDouble();
        // Prompt user for Annual Interest Rate, stored as double:
       annualInterestRate
        System.out.print("Enter the expected Annual Interest Rate (ex. 4.25): ");
        double annualInterestRate = input.nextDouble();
        // Prompt user for Length of Investment, stored as int: numberOfYears
        System.out.print("Enter your expected Length of Investment in years (ex.
       20): ");
        int numberOfYears = input.nextInt();
        // Calculate Monthly Interest Rate, stored as double: monthlyInterestRate
            // double monthlyInterestRate = annualInterestRate / 1200;
        double monthlyInterestRate = annualInterestRate / 1200;
        // Calculate Future Investment Value, stored as double:
       futureInvestmentValue
            // double futureInvestmentValue = investmentAmount * Math.pow(1 +
      monthlyInterestRate, numberOfYears * 12);
```

```
        double futureInvestmentValue = investmentAmount * Math.pow(1 +
        monthlyInterestRate, numberOfYears * 12.0);
        // Display Future Investment Value
            /* The Future Investment Value of your inital investment amount of (),
            assuming an annual interest rate of () over () years, is ().*/
        System.out.println("The Future Investment Value of your initial investment
        is $" + (int)(futureInvestmentValue * 100 + 0.5) / 100.0 + ".");
        System.out.println("This assumes an initial Investment Amount of $" +
        (int)(investmentAmount * 100 + 0.5) / 100.0 + ",");
        System.out.println("and an Annual Interest Rate of " + annualInterestRate +
        "% over " + numberOfYears + " years.");
    }
}
```

Testing: (Describe how you test this program)

This program was tested by inputting a variety of sample data into the variables to ensure that all of the statements work correctly, and the information is output in the correct format.

Through testing the code, I found I had forgot to cast futureInvestmentValue and investmentAmount as integers to round them to 2 decimal places, as would be standard when programming a financial program like this. This was easily found and resolved through testing.

There were other minor bugs, such as formatting issues when it came to outputting the information in the format I wanted to. I had to re-structure the System.out.println() methods a couple times to have it display in a way that I felt was the easiest to read and understand.

Submit the following items:

1. Submit this word file to Canvas before the due day

2. Submit the source code file (,java) to Canvas before the due day