**台州学院**

**电子与信息工程学院课后作业**

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Chapter2 Elementary Programming

**Project: 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:

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: 1000

Enter annual interest rate: 4.25

Enter number of years: 1

Accumulated value is 1043.34

Analysis:

In this case, we calculate the future investment by reading the value from user input that reads the amount of investment, the rate of annual interest, and how many years the user want invest in the future. To calculate that, we use compound interest formula that is *A = P \* (1 + r/n)nt*, which A is the total accumulated amount, *P* is the original principal (so called money that we invest), the *r* is the interest rate, and the *n* is the number of month.

Design:

(Describe the major steps for solving the problem.)

First, we declare variables of each element before user inputting as well calculating the formula. Second, we print the statement to ask a user to input a value to the console and store in the memory that will be the value of the variable. At last, after all of needed statements printed and values are stored, we calculate them all by using the formula mentioned above by converting the annual interest rate into monthly interest rate and using Java’s method Math.pow().

Coding:

import java.util.Scanner;  
  
public class Main {  
 public static void main(String[] *args*) {  
 Scanner input = new Scanner(System.in);  
 double investmentAmount;  
 double monthlyInterestRate;  
 double annualInterestRate;  
 int numberOfYears;  
 double futureInvestmentValue;  
  
 System.out.print("Enter investment amount: ");  
 investmentAmount = input.nextDouble();  
  
 System.out.print("Enter annual interest rate: ");  
 annualInterestRate = input.nextDouble();  
  
 System.out.print("Enter number of years: ");  
 numberOfYears = input.nextInt();  
  
 // convert annual interest rate to monthly interest rate in percent  
 monthlyInterestRate = (annualInterestRate / 100) / 12;  
  
 futureInvestmentValue = investmentAmount \* Math.**pow**(1 + monthlyInterestRate, numberOfYears \* 12);  
  
 // using formatter to round the value and displays two decimal places  
 System.out.print("Accumulated value is: " + String.**format**("%.2f", futureInvestmentValue));  
 }  
}

Testing:

Run the program, once the program ran, input the needed values such as investment amount, annual interest rate, and number of years. In the example, we input investment amount is 2500, annual interest rate is 3,2 and number of years is 5, the program will execute then it will display the value that accumulates, that is 2933, 15. As shown below:

