**PROG10082 Object Oriented Programming 1 – JAVA**

**Assignment 1**

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**Instructor: Muhammad Shafique**

**Date: October 7, 2022**

**Problem** (Future Value of Investment)

Future value of an investment refers to how much an investment today would grow to over a period if put in an investment plan that pays compound interest. The formula for calculating future value is:

FV = PV (1 + r/m) ^ mt

Where

FV ---- is the future value

PV ---- is the present value, the money invested today

r ------ is the annual interest rate

t ------ is the number of years (i.e., duration of investment plan)

m ---- is the number of times the money invested in the plan

**Solution:**

**Solution**

1. **Analysis**

Inputs: inputs are Amount of money for investment, Annual interest rate, The duration of investment in years, The number of times the money invested in the plan. All of them are double values. None of them can be negative. And The number of times the money invested cannot be zero as well because it will be used in division in the formula.

Output: The output is the result of the calculation of the formula for the investment.

The input asked from the user all in double. I also checked if the input entered in negative. I put the checking in “while” because I want to check until user input a value greater than or equal to zero. Note that for number of investment time per year, I checked it to be greater than zero. It cannot be zero as well.

For the calculation I used pow in java.

At the end I print the result.

1. **Algorithm**
2. Get the amount of the present value as double from user. Get the annual interest as double from user. Get the duration of investment plan as double from user. Get the number of times the money invested in the plan as double from user.
3. All the values should be check not to be negative and for the number of times the money invested in the plan can not be zero because of division. For every negative input, I ask the alert the user and ask for entering a new one.

C) computing the Future value of an investment by putting the values that we get from user in Future value formula futureValue = presentValue \* (double)Math.pow( 1 + annualRate / moneyInvestedTimes , moneyInvestedTimes \* timeDuration );

D) Output the result of Future value.

1. **Source code**

package assignment;

import java.util.Scanner;

/\*

\* Assignment 2 (Future Value of Investment)

\* instructor: Muhammad Shafique

\* Author: Amir Hosein Khanmohammadi

\* student number: 991646689

\* Date: october 7 , 2022

\* This application Computing the Future value of an investment,

\* which refers to how much an investment today would grow over

\* a period if put in an investment plan that pays compound interest.

\*/

public class Assignment02futureValue {

public static void main(String[] args) {

double futureValue; // is the future value

double presentValue; // is the present value, the money invested today

double annualRate; // is the annual interest rate

double timeDuration; // is the number of years (i.e., duration of investment plan)

double moneyInvestedTimes; // is the number of times the money invested in the plan

Scanner sc = new Scanner(System.***in***);

System.***out***.print("Please enter the amount of the present value, the money that you invested today: ");

presentValue = sc.nextDouble();

//checking if user entered a negative number

while (presentValue<0) {

System.***out***.println("Amount of money cannot be negetive.");

System.***out***.print("Please enter the amount of the present value, the money that you invested today: ");

presentValue = sc.nextDouble();

}

System.***out***.print("Please enter the annual interest rate: ");

annualRate = sc.nextDouble();

//checking if user entered a negative number

while (annualRate <0) {

System.***out***.println("Annuaml interest rate cannot be negetive.");

System.***out***.print("Please enter the annual interest rate: ");

annualRate = sc.nextDouble();

}

System.***out***.print("Please enter the duration of investment plan (years): ");

timeDuration = sc.nextDouble();

//checking if user entered a negative number

while (timeDuration <0) {

System.***out***.println("Investemt duration cannot be negetive.");

System.***out***.print("Please enter the duration of investment plan (years): ");

timeDuration = sc.nextDouble();

}

System.***out***.print("Please enter the number of times the money invested in the plan: ");

moneyInvestedTimes = sc.nextDouble();

//checking if user entered a negative number or zero

while(moneyInvestedTimes <=0){

System.***out***.println("Number of times should be greater than 0.");

System.***out***.print("Please enter the number of times the money invested in the plan: ");

moneyInvestedTimes = sc.nextDouble();

}

futureValue = presentValue \* (double)Math.*pow*( 1 + annualRate / moneyInvestedTimes , moneyInvestedTimes \* timeDuration );

System.***out***.println("Your Future value of an investment is: " + futureValue);

}

}

Sample run for test case 1

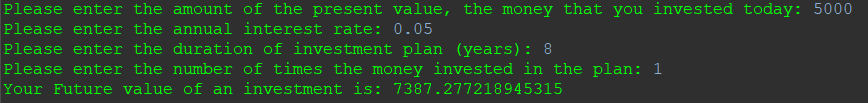
Please enter the amount of the present value, the money that you invested today: 5000

Please enter the annual interest rate: 0.05

Please enter the duration of investment plan (years): 8

Please enter the number of times the money invested in the plan: 1

Your Future value of an investment is: 7387.277218945315



Sample run for test case 1

Please enter the amount of the present value, the money that you invested today: 2000

Please enter the annual interest rate: 0.23

Please enter the duration of investment plan (years): 10

Please enter the number of times the money invested in the plan: 2

Your Future value of an investment is: 17641.16830453963

