The Monthly Loan Repayment Scheduler

# Files:

# Assumptions:

* The user would only enter numerical data in the double data type for the interest, and loan amount
* the user would only enter integers for the period

# Purpose:

A program that would calculate the interest payments and print out a schedule of interest and total payment.

# Specification:

The Monthly Loan Repayment Scheduler is a command line application that would allow users to input their amount of the loan, the interest and the length of the loan and outputting the loan schedule. This application helps people to look at loans at a variety of interest rates, their monthly payments and the total payments.

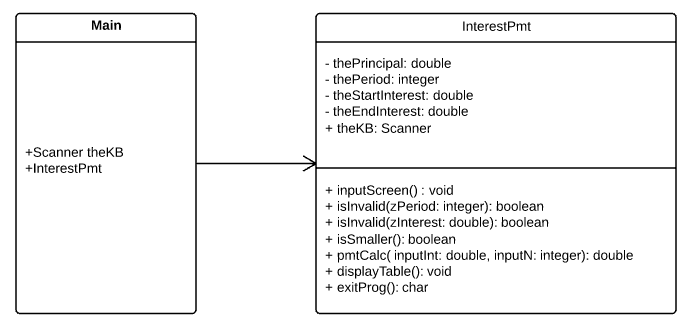
# User Guide:

Provided is a executable jar file.

Open up the command line. Enter the below command

java -jar Assignment1Q1\_Bankloan.jar

# Structure:



# Design

The project consists of a client and a class where the functionality of the application resides. The application will be a command line based and the user will have to interface with the application through text based inputs, hence the program is similarly apportioned into input, process and output methods.

# Algorithm

/\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Authors: Rebecca Lim

Date: 27/08/2017

Purpose: The bank loan application

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*/

Begin

Class InterestPmt

declare private double thePrincipal

declare private integer thePeriod

declare private double theStartInterest

declare private double theEndInterest

public function double getThePrincipal

return thePrincipal

end function

public function void setThePrincipal(double thePrincipal)

this.thePrincipal = thePrincipal

end function

public function integer getThePeriod

return thePeriod

end function

public function void setThePeriod(integer thePeriod)

this.thePeriod = thePeriod

end function

public function double getTheStartInterest

return theStartInterest

end function

public function void setTheStartInterest(double theStartInterest)

this.theStartInterest = theStartInterest

end function

public function double getTheEndInterest

return theEndInterest

end function

public function void setTheEndInterest

return theEndInterest

end function

public function void studentInfo

print "Name: Rebecca Lim"

print "Student Number: 33111264"

print "Enrolment: Internal"

print "Tutor: Mark Abernethy"

print "Tutorial: Thursday, 10.30am"

end function

public function void inputScreen

declare boolean theFlag = false

do

print "Please enter the principal amount: "

read thePrincipal

if(isInvalid(thePrincipal))

print "Please enter a number greater than 0"

end if

while (isInvalid(thePrincipal))

do

print "Please enter the rate of the starting interest:"

read theStartInterest

if(isInvalid(theStartInterest))

print "Please enter a number greater than 0"

end if

while (isInvalid(theStartInterest))

do

print "Please enter the rate of the ending interest"

read theEndInterest

if(this.isSmaller())

print "Please enter an interest greater than the starting interest"

theFlag = true

else

theFlag = false

end if

if(this.isInvalid(theEndInterest))

print "Please enter a number greater than 0"

theFlag = true

else

theFlag = false

end if

if(theEndInterest >= 100.00)

print “Please enter an interest that is less than 100%”

theFlag = true

end if

while(theFlag)

do

print "Please enter the number of years"

read thePeriod

if(isInvalid(thePeriod))

print "Please enter a number greater than 0"

end if

while (isInvalid(thePeriod))

end function

public function boolean isInvalid(int zPeriod)

declare boolean theFlag = false

if(zPeriod <= 0)

theFlag = true

end if

return theFlag

end function

public function boolean isInvalid(double zAmount)

declare boolean theFlag = false

if(zAmount <= 0)

theFlag = true

end if

return theFlag

end function

public function boolean isSmaller

declare boolean theFlag = false

if(theStartInterest > theEndInterest)

theFlag = true

end if

return theFlag

end function

public function double pmtCalc(double inputInt, double inputN)

declare double calcPmt

declare integer periodN = (integer) inputN

calcPmt = (intputInt \* thePrincipal) / (1-((1+inputInt)^(- 1\*periodN)))

return calcPmt

end function

public function void displaytable

declare double thePmt

declare double totPmt

print "Loan Amount:", thePrincipal

print "Number of years: ", thePeriod

print " %20s %20s %20s \n", "Interest Rate", "Monthly Payment", "Total Payment"

while(theStartInterest < = theEndInterest)

declare double r = (theStartInterest / 12)/100

declare integer n = (integer)thePeriod \* 12

thePmt = pmtCalc(r,n)

totPmt = thePmt\*n

print "%20.2f %20.2f %20.2f \n", theStartInterest, thePmt, totPmt

theStartInterest = theStartInterest + 0.25

end while

end function

end Class

class Assignment1Q1\_BankLoan

declare character theFlag = 'y'

new InterestPmt()

do

thePmt.inputScreen()

thePmt.displayTable()

theFlag = thePmt.exitProg()

while(theFlag == 'y')

end class

end

# Limitations

The limitation of this application is that it is unable to accept alphabetic characters on input.

# Testing:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Test | Test Description | Inputs | Expected Output | Algorithm Outputs | Program  Success/Failure |
| 1 | Testing if the program takes an expected input | 0 | “Please enter a number greater than 0” | “Please enter a number greater than 0” | Success |
| 2 | Testing if the program takes an unexpected input | a |  |  | Failure |
| 3 | Testing if the program takes an expected input | -1 | “Please enter a number greater than 0” | “Please enter a number greater than 0” | Success |
| 4 | Testing if the program takes an expected input for principal | 10000 | “Please enter the rate of the starting interest” | “Please enter the rate of the starting interest” | Success |
| 5 | Testing if the program takes an expected input for starting interest | 1 | “Please enter the rate of the ending interest” | “Please enter the rate of the ending interest” | Success |
| 6 | Testing if the program takes an expected input for starting and ending interest | Start Rate :5  End  Rate:  3 | “Please enter an interest greater than the starting interest” | “Please enter an interest greater than the starting interest” | Success |
| 7 | Testing if the program takes an expected input for starting and ending interest | Start Rate: 5  End Rate:  8 | “Please enter number of years” | “Please enter number of years” | Success |
| 8 | Testing if the program takes an expected input | End Rate  101 | “Please enter a rate less than 100%” | “Please enter a rate less than 100%” | Success |

/\*

\* To change this license header, choose License Headers in Project Properties.

\* To change this template file, choose Tools | Templates

\* and open the template in the editor.

\*/

package assignment1q1\_bankloan;

import java.util.Scanner;

/\*\*

\*

\* @author rebecca

\*/

public class InterestPmt

{

private double thePrincipal;

private int thePeriod;

private double theStartInterest;

private double theEndInterest;

Scanner theKB = new Scanner(System.in);

public double getThePrincipal()

{

return thePrincipal;

}

public void setThePrincipal(double thePrincipal)

{

this.thePrincipal = thePrincipal;

}

public double getThePeriod()

{

return thePeriod;

}

public void setThePeriod(int thePeriod)

{

this.thePeriod = thePeriod;

}

public double getTheStartInterest()

{

return theStartInterest;

}

public void setTheStartInterest(double theStartInterest)

{

this.theStartInterest = theStartInterest;

}

public double getTheEndInterest()

{

return theEndInterest;

}

public void setTheEndInterest(double theEndInterest)

{

this.theEndInterest = theEndInterest;

}

public void studentInfo()

{

System.out.println("Name: Rebecca Lim");

System.out.println("Student Number: 33111264");

System.out.println("Enrolement: Internal");

System.out.println("Tutor: Mark Abernethy");

System.out.println("Tutorial: Thursday, 10.30am");

}

/\*\*

\* The method allows the user to input the principal, the interest rates,

\* the number of years into the application.

\*/

public void inputScreen()

{

boolean theFlag = false;

do

{

System.out.println("Please enter the principal amount: ");

thePrincipal = theKB.nextDouble();

if(isInvalid(thePrincipal))

{

System.out.println("Please enter a number greater than 0:");

}

}while(isInvalid(thePrincipal));

do

{

System.out.println("Please enter the rate of starting interest: ");

theStartInterest = theKB.nextDouble();

if(isInvalid(theStartInterest))

{

System.out.println("Please enter a number greater than 0:");

}

}while(isInvalid(theStartInterest));

do

{

System.out.println("Please enter the rate of ending interest: ");

theEndInterest = theKB.nextDouble();

if (this.isSmaller())

{

System.out.println("Please enter an interest greater than "

+ "the starting interest");

theFlag = true;

}

else

{

theFlag = false;

}

if(this.isInvalid(theEndInterest))

{

System.out.println("Please enter a number greater than 0:");

theFlag = true;

}

else

{

theFlag = false;

}

if(this.theEndInterest >= 100.00)

{

System.out.println("Please enter a interest rate less than 100%");

theFlag = true;

}

}while(theFlag);

do

{

System.out.println("Please enter the number of years: ");

thePeriod = theKB.nextInt();

if(isInvalid(thePeriod))

{

System.out.println("Please enter a number greater than 0:");

}

}while(isInvalid(thePeriod));

}

/\*\*

\*

\* @param zPeriod is checked for whether it is less than or equal to 0.

\* @return

\*/

public boolean isInvalid(int zPeriod)

{

boolean theFlag = false;

if(zPeriod <= 0)

{

theFlag = true;

}

return theFlag;

}

/\*\*

\*

\* @param zAmount

\* @return

\*/

public boolean isInvalid(double zAmount)

{

boolean theFlag = false;

if(zAmount <= 0)

{

theFlag = true;

}

return theFlag;

}

/\*\*

\*

\* @return

\*/

public boolean isSmaller()

{

boolean theFlag = false;

if(Math.abs(this.theStartInterest) > Math.abs(this.theEndInterest))

{

theFlag = true;

}

return theFlag;

}

/\*\*

\*

\* @param inputInt

\* @param inputN

\* @return

\*/

public double pmtCalc(double inputInt, int inputN)

{

double calcPmt;

calcPmt = (inputInt \* (thePrincipal))/(1-(Math.pow((1+inputInt),

(-1\*inputN))));

return calcPmt;

}

/\*\*

\*

\*/

public void displayTable()

{

double thePmt;

double totPmt;

System.out.println("Loan Amount: "+ thePrincipal);

System.out.println("Number of years: "+ thePeriod);

System.out.printf("%20s %20s %20s\n", "Interest Rate",

"Monthly Payment", "Total Payment");

while(theStartInterest <= theEndInterest)

{

double r = (theStartInterest /12)/100;

int n = (int)thePeriod\*12;

thePmt = pmtCalc(r, n);

totPmt = thePmt\*n;

System.out.printf("%20.2f%% %20.2f %20.2f\n", theStartInterest,

thePmt, totPmt);

theStartInterest = theStartInterest + 0.25;

}

}

/\*\*

\*

\* @return

\*/

public char exitProg()

{

char theFlag = 'y';

char theInput;

do

{

System.out.println("Would you like to continue? (Y/N)");

theInput = theKB.next().charAt(0);

if((theInput == 'y') || (theInput == 'Y')|| (theInput =='n')||(theInput == 'N'))

{

if((theInput == 'n') || (theInput == 'N'))

{

theFlag = 'n';

}

else

{

break;

}

}

else

{

System.out.println("Please enter [Y/N]");

}

}while(theFlag == 'y');

return theFlag;

}

}

/\*

\* To change this license header, choose License Headers in Project Properties.

\* To change this template file, choose Tools | Templates

\* and open the template in the editor.

\*/

package assignment1q1\_bankloan;

import java.util.Scanner;

/\*\*

\*

\* @author rebecca

\*/

public class Assignment1Q1\_BankLoan {

/\*\*

\* @param args the command line arguments

\*/

public static void main(String[] args) {

// TODO code application logic here

char theFlag = 'y';

//char theInput;

Scanner theKB = new Scanner(System.in);

InterestPmt thePmt = new InterestPmt();

do

{

thePmt.inputScreen();

thePmt.displayTable();

theFlag = thePmt.exitProg();

}while (theFlag == 'y');

}

}