

The design started by creating a JFrame in eclipse to produce a design for the GUI that allows for user input and calculations. The GUI consists of 5 JLabels that provide the labels for each of the areas the textfields are located. The calculate button was created by adding a button component and then adding event handler for action performed. The method action performed then takes the three inputted values by the user and calculates the monthly payment and total payment. In order to get these calculations we first get the periodic interest by taking the annual interest and converting the percent into decimals and then dividing it by 12. Then we get the number of compounding periods which is the variable n and that is calculated by taking the number of years multiplied by the amount of months in a year. Once these two values are calculated I plugged them into the equation to get the monthly payments which is  $i * A / (1 - (1 + i)^{-n})$ . In order to get the total payments this method then takes the monthly payments that were calculated and multiplies it by the number of compounding periods.

```
/* this program allows user to input there annual interest rate, number of years on loan,  
*and the amount. Once user inputs these three values *calculates it.
```

```
*/
```

```
import java.awt.BorderLayout;
```

```
import java.awt.EventQueue;
```

```
import javax.swing.JFrame;
```

```
import javax.swing.JPanel;
```

```
import javax.swing.border.EmptyBorder;
```

```
import javax.swing.JTextField;
```

```
import javax.swing.JLabel;
```

```
import java.awt.Font;
```

```
import java.awt.Window.Type;
```

```
import javax.swing.JButton;
```

```
import java.awt.event.ActionListener;
```

```
import java.awt.event.ActionEvent;
```

```
public class Loan extends JFrame {
```

```
    private JPanel contentPane;
```

```
    private JLabel txtAnnualInterasetRate;
```

```
    private JTextField Rate;
```

```
    private JTextField Loan;
```

```
    private JTextField MP;
```

```
    private JTextField TP;
```

```
    private JTextField NoY;
```

```
/**
```

```
 * Launch the application.
```

```
*/
```

```
public static void main(String[] args) {
```

```
    EventQueue.invokeLater(new Runnable() {
```

```
        public void run() {
```

```
            try {
```

```
                Loan frame = new Loan();
```

```
                frame.setVisible(true);
```

```
            } catch (Exception e) {
```

```

        e.printStackTrace();
    }
}
});
}

/**
 * Create the frame.
 */
public Loan() {
    setTitle("Loan Calculator");
    setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
    setBounds(100, 100, 397, 253);
    contentPane = new JPanel();
    contentPane.setToolTipText("");
    contentPane.setBorder(new EmptyBorder(5, 5, 5, 5));
    setContentPane(contentPane);
    contentPane.setLayout(null);

    txtAnnualInterstRate = new JLabel();
    txtAnnualInterstRate.setFont(new Font("Tahoma", Font.PLAIN, 17));
    txtAnnualInterstRate.setText("Annual Interst Rate:");
    txtAnnualInterstRate.setBounds(10, 20, 161, 23);
    contentPane.add(txtAnnualInterstRate);

    JLabel lblNumberOfYears = new JLabel("Number of Years:");
    lblNumberOfYears.setFont(new Font("Tahoma", Font.PLAIN, 17));
    lblNumberOfYears.setBounds(10, 55, 138, 23);
    contentPane.add(lblNumberOfYears);

    JLabel lblLoanAmount = new JLabel("Loan Amount:");
    lblLoanAmount.setFont(new Font("Tahoma", Font.PLAIN, 17));
    lblLoanAmount.setBounds(10, 89, 104, 14);
    contentPane.add(lblLoanAmount);

    JLabel lblMonthlyPayment = new JLabel("Monthly Payment:");
    lblMonthlyPayment.setFont(new Font("Tahoma", Font.PLAIN, 17));
    lblMonthlyPayment.setBounds(10, 121, 133, 14);
    contentPane.add(lblMonthlyPayment);

    JLabel lblTotalPayment = new JLabel("Total Payment:");
    lblTotalPayment.setFont(new Font("Tahoma", Font.PLAIN, 17));
    lblTotalPayment.setBounds(10, 152, 114, 14);
    contentPane.add(lblTotalPayment);

    Rate = new JTextField();
    Rate.setBounds(181, 23, 122, 20);
    contentPane.add(Rate);
    Rate.setColumns(10);

    Loan = new JTextField();

```

```

Loan.setBounds(181, 89, 122, 20);
contentPane.add(Loan);
Loan.setColumns(10);

MP = new JTextField();
MP.setBounds(181, 121, 122, 20);
contentPane.add(MP);
MP.setColumns(10);

TP = new JTextField();
TP.setBounds(180, 152, 123, 20);
contentPane.add(TP);
TP.setColumns(10);
/*
 * Calculate button action performed
 * Calculates the monthly payment and total payments through
 * the given amounts by the user once button is clicked.
 */
JButton btnNewButton = new JButton("Calculate");
btnNewButton.addActionListener(new ActionListener() {
    public void actionPerformed(ActionEvent arg0)
    {
        double r = Double.parseDouble(Rate.getText());
        double amount = Double.parseDouble(Loan.getText());
        double year = Double.parseDouble(NoY.getText());
        double i = ((r/100)/12);
        double n = year * 12;
        String MP1 = " " +(i*amount)/(1-Math.pow((1+i), -n));
        MP.setText(MP1);
        double m2 = Double.parseDouble(MP.getText());
        String TP1 = " " +(n*m2);
        TP.setText(TP1);
    }
});
btnNewButton.setBounds(181, 180, 89, 23);
contentPane.add(btnNewButton);

NoY = new JTextField();
NoY.setBounds(181, 59, 122, 20);
contentPane.add(NoY);
NoY.setColumns(10);
}
}

```

```

63 contentPane.add(lblNumberofYears);
64
65 JLabel lblLoanAmount = new JLabel("Loan Amount:");
66 lblLoanAmount.setFont(new Font("Tahoma", Font.PLAIN, 17));
67 lblLoanAmount.setBounds(10, 89, 104, 14);
68 contentPane.add(lblLoanAmount);
69
70 JLabel lblMonthlyPayment = new JLabel("Monthly Payment:");
71 lblMonthlyPayment.setFont(new Font("Tahoma", Font.PLAIN, 17));
72 lblMonthlyPayment.setBounds(10, 121, 133, 14);
73 contentPane.add(lblMonthlyPayment);
74
75 JLabel lblTotalPayment = new JLabel("Total Payment:");
76 lblTotalPayment.setFont(new Font("Tahoma", Font.PLAIN, 17));
77 lblTotalPayment.setBounds(10, 153, 156, 14);
78 contentPane.add(lblTotalPayment);
79
80 Rate = new JTextField();
81 Rate.setBounds(10, 185, 100, 20);
82 contentPane.add(Rate);
83 Rate.setColumns(10);
84
85 Loan = new JTextField();
86 Loan.setBounds(10, 217, 100, 20);
87 contentPane.add(Loan);
88 Loan.setColumns(10);
89
90 MP = new JTextField();
91 MP.setBounds(10, 249, 100, 20);
92 contentPane.add(MP);
93 MP.setColumns(10);
94
95 TP = new JTextField();
96 TP.setBounds(10, 281, 100, 20);
97 contentPane.add(TP);
98 TP.setColumns(10);
99
100 /*
101  * calculate button action performed
102  * calculates the monthly payment and total payments through
103  * the given amounts by the user once button is clicked.
104  */
105 JButton btnNewButton = new JButton("Calculate");
106 btnNewButton.addActionListener(new ActionListener() {
107     public void actionPerformed(ActionEvent arg0) {
108         double r = Double.parseDouble(Rate.getText());
109         double amount = Double.parseDouble(Loan.getText());
110         double year = Double.parseDouble(Noy.getText());
111         double i = ((r/100)/12);
112         double n = year * 12;
113         String MP1 = " " + (i*amount)/(1-Math.pow((1+i),-n));
114         MP.setText(MP1);
115         double TP1 = Double.parseDouble(MP.getText());
116         TP.setText(TP1);
117     }
118 });

```