บทที่ 11 การเขียนโปรแกรมแบบ Java Applet

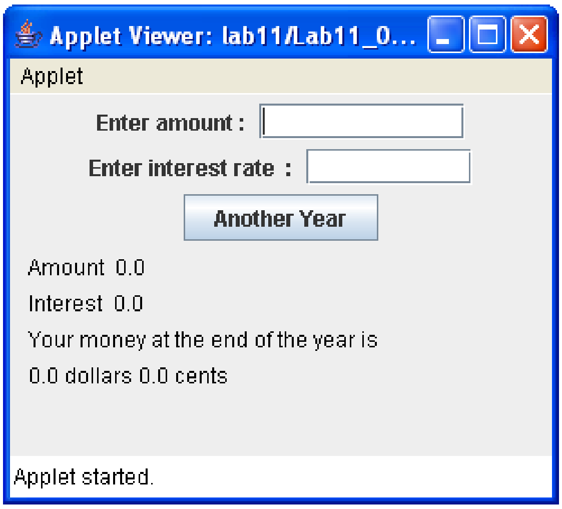
การออกแบบ Class แบบ ADT ใช้งานกับ Java Applet

การทดลองที่ 11-1

```
// File Name : Invest.java

import java.awt.*;
public class Invest {
   private float interestRate;
   private float oldAmount, newAmount;
   private float dollars, cents;

   public Invest() {
   }

   public void setAmount(float amount) {
      oldAmount = amount;
   }

   public void setRate(float rate) {
      interestRate = rate;
   }

   public void anotherYear() {
      newAmount = oldAmount + (oldAmount * interestRate / 100.0f);
      dollars = (int) newAmount;
      cents = Math.round(100.0f * (newAmount - dollars));
      oldAmount = newAmount;
   }

   public void displayInterest(Graphics g) {
      g.drawString("Amount  " + oldAmount, 10, 100 );
      g.drawString("Interest  " + interestRate, 10, 120 );
      g.drawString("Your money at the end of the year is ",
                   10, 140 );
      g.drawString(dollars + " dollars " + cents + " cents",
                   10, 160);
   }
}
```

```
// File Name : Lab11_01.java
import java.awt.*;
import java.awt.event.*;
import javax.swing.*;

public class Lab11_01 extends JApplet implements ActionListener {
   private JButton year;
   private JTextField interestField, amountField;
   private Invest myMoney;

   public void init() {
      Container c = getContentPane();
      c.setLayout( new FlowLayout());

      c.add(new JLabel("Enter amount : "));
      amountField = new JTextField(10);
      amountField.addActionListener(this);
      c.add(amountField);

      c.add(new JLabel("Enter interest rate  : "));
      interestField = new JTextField(8);
      interestField.addActionListener(this);
      c.add(interestField);

      year = new JButton("Another Year");
      year.addActionListener(this);
      c.add(year);
      myMoney = new Invest();
      super.setSize(300,200);
   }

   public void paint(Graphics g) {
      super.paint(g);
      myMoney.displayInterest(g);
   }

   public void actionPerformed(ActionEvent event) {
      if (event.getSource() == amountField) {
         String s = amountField.getText();
         if (s.equals("") == false) {
            float amount = Float.parseFloat( s );
            myMoney.setAmount(amount);
         }
      }
      else if (event.getSource() == interestField) {
         String s = interestField.getText();
         if (s.equals("") == false) {
            float rate = Float.parseFloat( s );
            myMoney.setRate(rate);
         }
      }
      else {
         myMoney.anotherYear();
      }
      repaint();
   }

}
```

ผลลัพธ์



Applet Viewer: lab11/Lab11_0...

Applet

Enter amount :

Enter interest rate :

Another Year

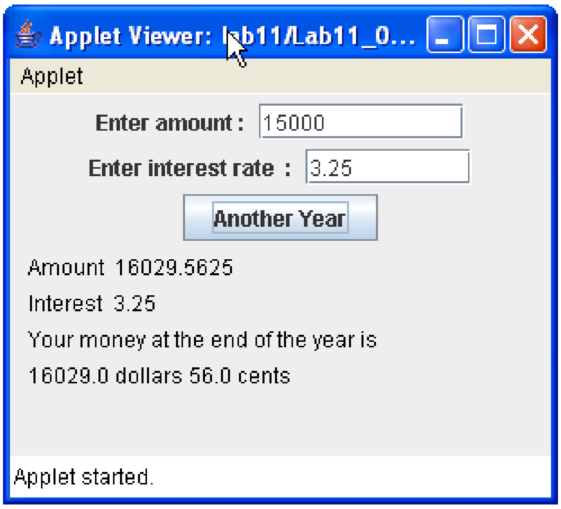
Amount 0.0

Interest 0.0

Your money at the end of the year is

0.0 dollars 0.0 cents

Applet started.



Applet Viewer: lab11/Lab11_0...

Applet

Enter amount : 15000

Enter interest rate : 3.25

Another Year

Amount 16029.5625

Interest 3.25

Your money at the end of the year is

16029.0 dollars 56.0 cents

Applet started.

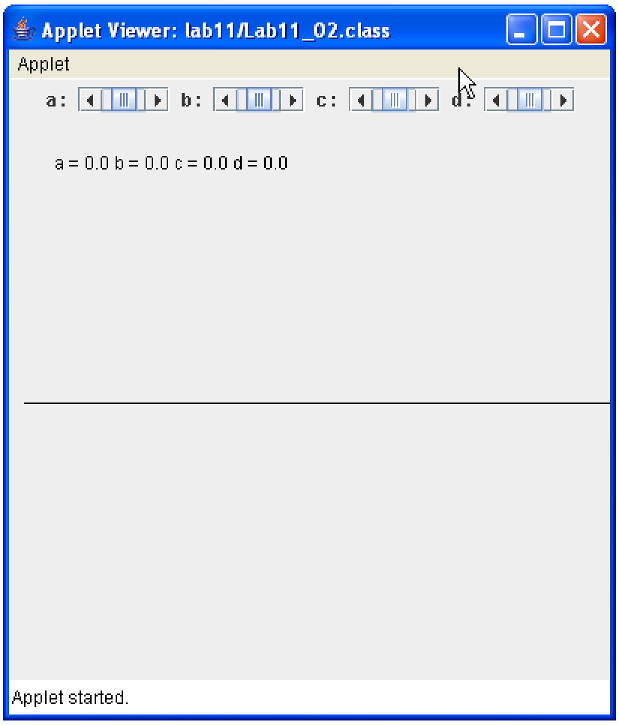
สร้างคลาสเก็บข้อมูลทางคณิตศาสตร์ เพื่อวาดกราฟ ที่มีสมการคณิตสาศตร์ดังนี้ $y = ax^3 + bx^2 + cx + d$ โดยใช้เมธอด drawLine ในการวาดเส้นโค้ง

การทดลองที่ 11-2

```
// File Name : Graph.java

import java.awt.*;

public class Graph {
   private final int xPixelStart = 10, xPixelEnd = 410,
                       xOrigin = 215;
   private final int yPixelStart = 10, yPixelEnd = 410,
                       yOrigin = 215;
   private final float xStart = -5.0f, xEnd = 5.0f;
   private final float yStart = -5.0f, yEnd = 5.0f;
   private final float scale = (xPixelEnd - xPixelStart) /
                                 (xEnd - xStart);
   private float a, b, c, d;

   public float theFunction(float x, float a, float b, float c,
                              float d) {
      return( a*x*x*x + b*x*x + c*x +d);
   }
   public float scaleX(int xPixel) {
      float value = (xPixel - xOrigin)/ scale;
      return (value);
   }

   public float scaleY(float y) {
      int pixelCoord;
      pixelCoord = Math.round( -y * scale) + yOrigin;
      return (pixelCoord);
   }

   public void setParameters(int aValue, int bValue, int cValue,
              int dValue) {
      a = scale( aValue );
      b = scale( bValue );
      c = scale( cValue );
      d = scale( dValue );
   }

   private float scale(int coefficient) {
      return((coefficient - 50)/10.0f);
   }

   public void draw(Graphics g) {
      float x, y, nextX, nextY;
      int xPixel, yPixel, nextXPixel, nextYPixel;

      g.drawString("a = " + a + " b = " + b + " c = " + c +
                   " d = " + d, 30,60);
      for (xPixel = xPixelStart; xPixel < xPixelEnd; xPixel++) {
         x = scaleX(xPixel);
         y = theFunction( x, a, b, c, d);
         yPixel = (int) scaleY(y);
         nextXPixel = xPixel + 1;
         nextX = scaleX(nextXPixel);
         nextY = theFunction( nextX, a, b, c, d);
         nextYPixel =  (int) scaleY( nextY );
         g.drawLine( xPixel, yPixel, nextXPixel, nextYPixel);
      }
   }

}
```

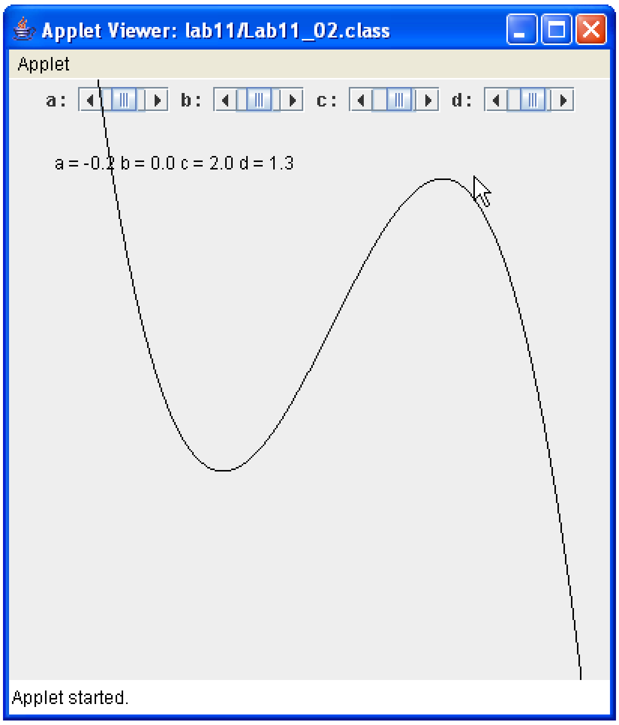
```
// File Name : Lab11_02.java

import java.awt.*;
import java.awt.event.*;
import javax.swing.*;
public class Lab11_02 extends JApplet implements
AdjustmentListener {
   private Graph myGraph;
   private JScrollBar aScrollbar, bScrollbar, cScrollbar,
dScrollbar;

   public void init() {
      Container c = getContentPane();
      c.setLayout( new FlowLayout() );

      c.add( new JLabel(" a : ") );
      aScrollbar = new JScrollBar( JScrollBar.HORIZONTAL, 50, 10,
                                   0 , 100);
      c.add( aScrollbar );
      aScrollbar.addAdjustmentListener( this );

      c.add( new JLabel(" b : ") );
      bScrollbar = new JScrollBar( JScrollBar.HORIZONTAL, 50, 10,
                                   0 , 100);
      c.add( bScrollbar );
      bScrollbar.addAdjustmentListener( this );

      c.add( new JLabel(" c : ") );
      cScrollbar = new JScrollBar( JScrollBar.HORIZONTAL, 50, 10,
                                   0 , 100);
      c.add( cScrollbar );
      cScrollbar.addAdjustmentListener( this );

      c.add( new JLabel(" d : ") );
      dScrollbar = new JScrollBar( JScrollBar.HORIZONTAL, 50, 10,
                                    0 , 100);
      c.add( dScrollbar );
      dScrollbar.addAdjustmentListener( this );

      setSize( 400, 400);
      myGraph = new Graph();

   }

   public void paint(Graphics g) {
      super.paint( g );
      myGraph.draw( g );
   }

   public void adjustmentValueChanged(AdjustmentEvent event) {
      int aValue = aScrollbar.getValue() ;
      int bValue = bScrollbar.getValue() ;
      int cValue = cScrollbar.getValue() ;
      int dValue = dScrollbar.getValue() ;

      myGraph.setParameters(aValue, bValue, cValue, dValue);
      repaint();
   }

}
```

ผลลัพธ์



a = 0.0 b = 0.0 c = 0.0 d = 0.0

Applet started.



a = -0.2 b = 0.0 c = 2.0 d = 1.3

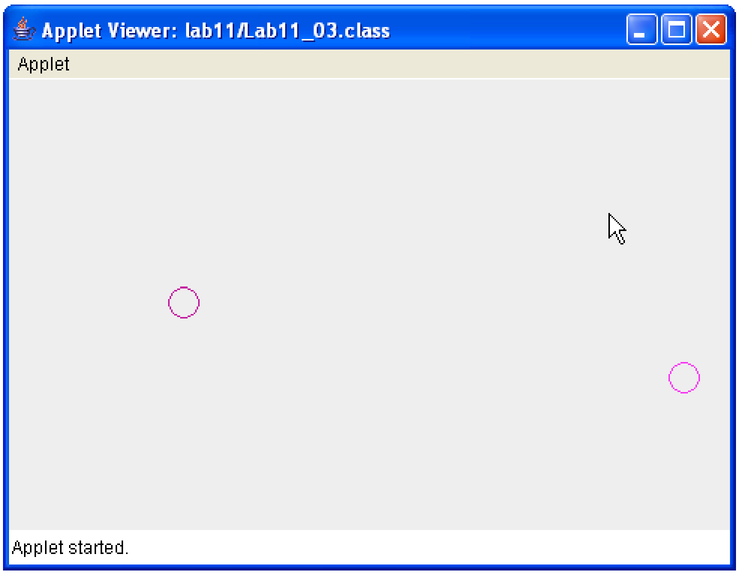
Applet started.

สร้างโปรแกรมทำงานตามช่วงเวลาที่กำหยด โดยใช้คลาส Timer ในชุดของ Swing

การทดลองที่ 11-3

```
// File Name : Lab11_03.java

import java.awt.*;
import java.awt.event.*;
import javax.swing.*;
import javax.swing.Timer;

public class Lab11_03 extends JApplet implements ActionListener {
    Timer swTimer;
    public void init () {
        swTimer = new Timer(1000, this);
        swTimer.start();
        setSize(480, 300);
    }
    public void paint(Graphics g) {
        super.paint(g);
        int x = 20 + (int) (Math.random() * 450);
        int y = 20 + (int) (Math.random() * 270);
        int Red = (int) (Math.random() * 256);
        int Green = (int) (Math.random() * 256);
        int Blue = (int) (Math.random() * 256);
        g.setColor(new Color(Red, Green, Blue) );
        g.drawOval( x, y, 20, 20);
    }

    public void actionPerformed(ActionEvent event) {
        repaint();
    }
}
```

ผลลัพธ์

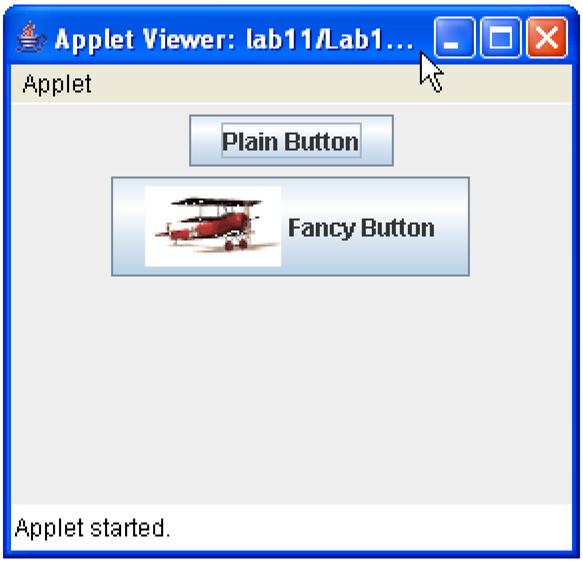


Applet started.

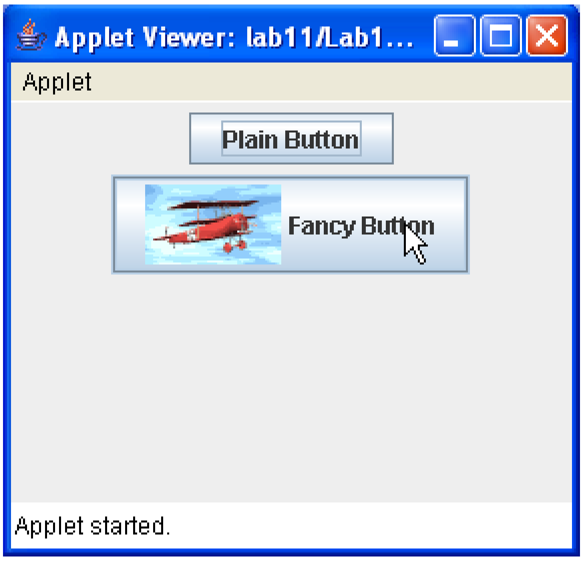
การทดลองที่ 11-4

```
// File Name : Lab11_04.java

import java.awt.*;
import java.awt.event.*;
import javax.swing.*;

public class Lab11_04 extends JApplet {
    private JButton plainBtn, fancyBtn;
    public void init () {
        Container c = getContentPane();
        c.setLayout( new FlowLayout() );
        plainBtn = new JButton("Plain Button");
        c.add( plainBtn );
        ImageIcon plane1 = new ImageIcon("airplan201.gif");
        ImageIcon plane2 = new ImageIcon("airplan202.gif");
    //  ImageIcon plane1 = new ImageIcon(
    //            getClass().getResource("airplan201.gif") );
    //  ImageIcon plane2 = new ImageIcon(
    //            getClass().getResource("airplan202.gif") );
        fancyBtn = new JButton("Fancy Button", plane1);
        fancyBtn.setRolloverIcon(plane2);
        c.add( fancyBtn );
        ButtonHandler handler = new ButtonHandler();
        fancyBtn.addActionListener( handler );
        plainBtn.addActionListener( handler );
        setSize(280, 200);
    }

    private class ButtonHandler implements ActionListener {
        public void actionPerformed(ActionEvent event) {
            JOptionPane.showMessageDialog( Lab11_04.this ,
                  "You pressed :  " + event.getActionCommand() );
        }
    }
}
```

ผลลัพธ์



Applet started.



Applet started.