FFTLab (1B)

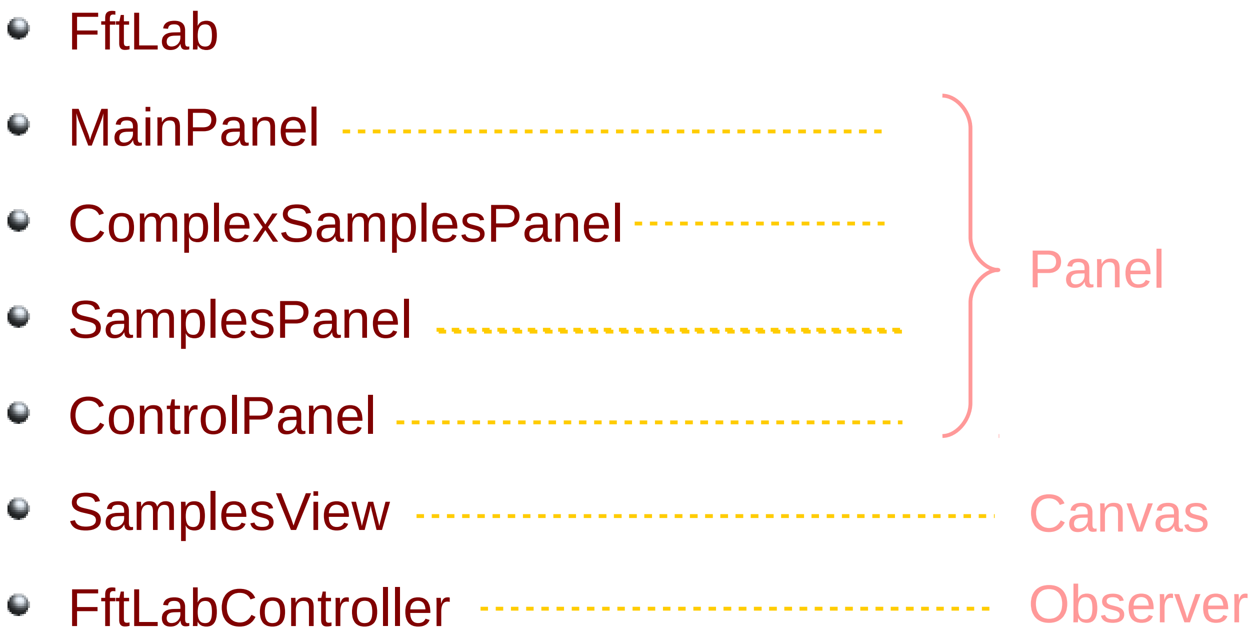
Young Won Lim
5/12/14

this document is based on
http://sepwww.stanford.edu/oldsep/hale/FftLab.html

Please send corrections (or suggestions) to youngwlim@hotmail.com.

This document was produced by using OpenOffice.

GUI Parts



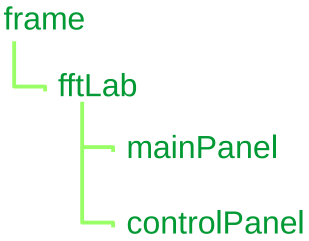
- FftLab
- MainPanel
- ComplexSamplesPanel
- SamplesPanel
- ControlPanel
- SamplesView
- FftLabController

FftLab

```
    public static void main(String args[]) {
        Frame frame = new Frame("FFT Laboratory");
        FftLab fftLab = new FftLab();

        fftLab.init();
        fftLab.start();

        frame.add("Center",fftLab);
        frame.resize(600,400);
        frame.show();
    }
}
```


frame
fftLab
mainPanel
controlPanel

```
public class FftLab extends java.applet.Applet {
    MainPanel mainPanel;
    ControlPanel controlPanel;

    public void init() {
        setLayout(new BorderLayout());
        add("Center",mainPanel);
        add("South",controlPanel);
    }

    public void start() {
            mainPanel.enable();
            controlPanel.enable();
    }

    public void stop() {
            mainPanel.disable();
            controlPanel.disable();
    }

    public boolean handleEvent(Event e) {
        if (e.id==Event.WINDOW_DESTROY) {
            System.exit(0);
        }
        return false;
    }
```

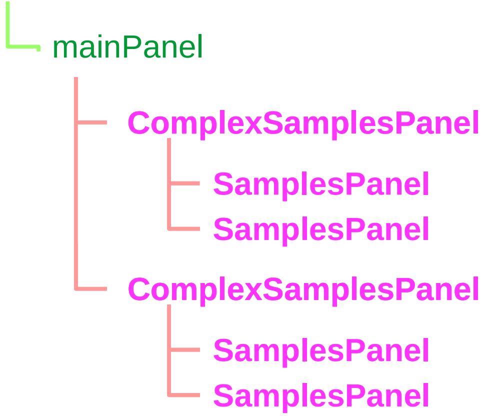
MainPanel, ComplexSamplesPanel

```
class MainPanel extends Panel {

    public MainPanel( ) {
        setLayout(new GridLayout(2,1,1,1));
        add(new ComplexSamplesPanel());
        add(new ComplexSamplesPanel());
    }

    public void paint(Graphics g) {
        Dimension d = size();
        g.setColor(Color.blue);
        g.draw3DRect(0,0,d.width-1,d.height-1,true);
    }

    public Insets insets() {
        return new Insets(1,1,1,1);
    }
}
```



mainPanel

ComplexSamplesPanel

SamplesPanel

SamplesPanel

ComplexSamplesPanel

SamplesPanel

SamplesPanel

```
class ComplexSamplesPanel extends Panel {

    public ComplexSamplesPanel( ) {
        setLayout(new BorderLayout());
        add("North", new Label(label,Label.CENTER));

        Panel panel = new Panel();
        panel.setLayout(new GridLayout(1,2,1,1));
        panel.add(new SamplesPanel());
        panel.add(new SamplesPanel());
        add("Center", panel);
    }

    public void paint(Graphics g) {
        Dimension d = size();
        g.setColor(Color.blue);
        g.draw3DRect(0,0,d.width-1,d.height-1,true);
    }

    public Insets insets() {
        return new Insets(1,1,1,1);
    }
}
```

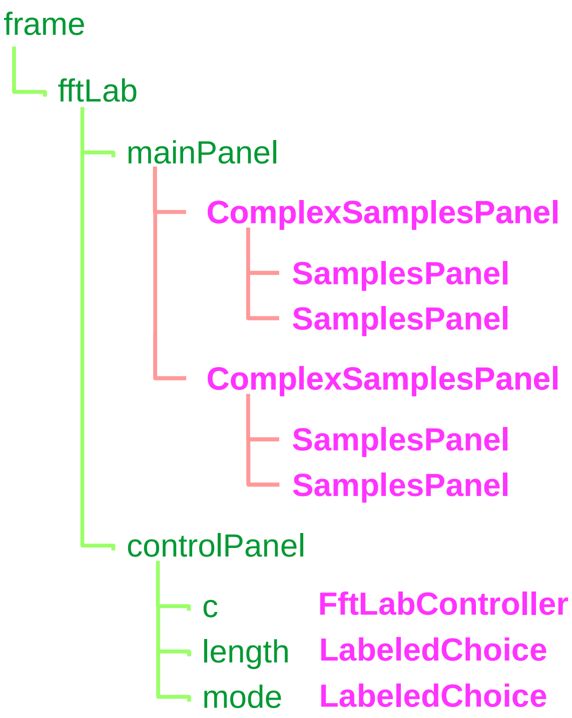
SamplesPanel

```
class SamplesPanel extends Panel {

    public SamplesPanel( ) {
        setLayout(new BorderLayout());
        add("North",new Label(label, Label.CENTER));
        add("Center",view);
    }

    public void paint(Graphics g) {
        Dimension d = size();
        g.setColor(Color.blue);
        g.draw3DRect(0,0,d.width-1,d.height-1,true);
    }

    public Insets insets() {
        return new Insets(1,1,1,1);
    }
}
```



frame
fftLab
mainPanel
ComplexSamplesPanel
SamplesPanel
SamplesPanel
ComplexSamplesPanel
SamplesPanel
SamplesPanel
controlPanel
c FftLabController
length LabeledChoice
mode LabeledChoice

ControlPanel

```
class ControlPanel extends Panel {

    public ControlPanel(FftLabController c) {
        this.c = c;
        add(new Checkbox("Origin Centered"));

        length = new LabeledChoice("Length:");

        length.choice.addItem("16");
        length.choice.addItem("32");
        length.choice.addItem("64");
        length.choice.select("32");
        add(length);

        mode = new LabeledChoice("Editing:");

        mode.choice.addItem("Draw");
        mode.choice.addItem("Negate");
        mode.choice.addItem("Zero");
        mode.choice.addItem("Shift");
        mode.choice.addItem("None");
        mode.choice.select("Draw");
        add(mode);

        add(new Button("Zero All"));
    }
```

```
public void paint(Graphics g) {
    Dimension d = size();
    g.setColor(Color.blue);
    g.draw3DRect(0,0, d.width-1, d.height-1,true);
}

public Insets insets() {
    return new Insets(1,1,1,1);
}



private FftLabController c;
private LabeledChoice length;
private LabeledChoice mode;
```

SamplesView

```
class SamplesView extends Canvas {

    public SamplesView(Samples s) {
        setBackground(Color.yellow);
    }

    public void setSampleValue(float v) {
        int height = size().height;
    }

    public Dimension minimumSize() {
        return new Dimension(100,50);
    }

    public boolean mouseDrag(Event e, int x, int y) {
        if (x<0 || x>size().width) return true;

        Graphics g = getGraphics();

        if (editMode==EDIT_SHIFT) {
            if (i != lastDrag && lastDrag>=0) {
                g.setColor(getBackground());

                g.setColor(getForeground());
            }
        }
```

```
        g.setColor(getBackground());
        g.setColor(getForeground());
    }

    public boolean mouseUp(Event e, int x, int y) {
        if (editMode!=EDIT_NONE) samples.notifyObservers();
        return true;
    }


    private void drawOneSample(Graphics g, int i) {
        g.drawLine(x-w/2,y, x+w/2,y);
        g.drawLine(x,y, x,y+h);
        if (i==samples.origin) {
            g.drawOval(x-r, y+h-r, 2*r, 2*r);
        } else {
            g.fillOval(x-r, y+h-r, 2*r+1, 2*r+1);
        }
    }
```

FftLabController

```
class FftLabController implements Observer {

        fReal.addObserver(this);
        fImag.addObserver(this);
        gReal.addObserver(this);
        gImag.addObserver(this);
```

```
// class FftLabController implements Observer { // 3 of 7

    public void zeroAll() {
        repaintViews();
    }

    public void update(Observable o, Object arg) {
            gRealView.repaint();
            gImagView.repaint();
        } else {
            fRealView.repaint();
            fImagView.repaint();
        }
    }
```

```
// class FftLabController implements Observer { // 2 of 7

    public void setLength(int length) {
        repaintViews();
    }

    public void setOriginCentered(boolean centered) {
        repaintViews();
    }
```

```
// class FftLabController implements Observer { // 7 of 7

    private void repaintViews() {
        fRealView.repaint();
        fImagView.repaint();
        gRealView.repaint();
        gImagView.repaint();
    }
```

Insets

The dimensions of the border area of a container component are found from its Insets object. The border values are given by the integer fields top, left, bottom, right. An insets object can be created by passing the border values as follows:

```
Insets(int top, int left, int bottom, int right
```

// class **FftLabController** implements Observer { // 6 of 7

References

[1] Java in a nutshell, 4th ed, David Flanagan

[2] An Introduction to Object-Oriented Programming with Java, C. Thomas, Wu

[3] Power Java, I. K. Chun (in Korean)

[4] http://sepwww.stanford.edu/oldsep/hale/FftLab.html