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Course: Java Programming 1  
Homework 7  
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I discovered a difference between the supplied formula for calculating the wind chill index, and that supplied by the NOAA, so I included each as part of the output. They have different effective ranges, so each will report when it is outside of its range..

**Source:**

**WindChill.java:**

```
import java.applet.Applet;
import java.awt.Button;
import java.awt.Checkbox;
import java.awt.CheckboxGroup;
import java.awt.Color;
import java.awt.event AdjustmentListener;
import java.awt.event AdjustmentEvent;
import java.awt.event ItemListener;
import java.awt.event ItemEvent;
import java.awt.Font;
import java.awt.GridLayout;
import java.awt.Label;
import java.awt.Panel;
import java.awt.Scrollbar;

public class WindChill
    extends Applet
    implements AdjustmentListener, ItemListener
{
    public static final long serialVersionUID = 1L;

    private Scrollbar speedSlider = new
Scrollbar(Scrollbar.HORIZONTAL, 10, 10, 5, 70);
    private Label speedLabel = new Label();
    private CheckboxGroup groupSpeed = new CheckboxGroup();
    private Checkbox radioSpeedM = new Checkbox("MPH (Miles per
Hour)", groupSpeed, true);
    private Checkbox radioSpeedK = new Checkbox("KPH (Kilometers per
Hour)", groupSpeed, false);

    private Scrollbar tempSlider = new
Scrollbar(Scrollbar.HORIZONTAL, 32, 30, -50, 120);
    private Label tempLabel = new Label();
    private CheckboxGroup groupTemp = new CheckboxGroup();
    private Checkbox radioTempF = new Checkbox("'F (Fahrenheit)",
```

```

groupTemp, true);
    private Checkbox radioTempC = new Checkbox("°C (Celcius)",
groupTemp, false);

    private CheckboxGroup groupEquation = new CheckboxGroup();
    private Label indexLabelNOAA = new Label("");
    private Label indexLabelLegacy = new Label("");

    public void init() {
        setLayout(new GridLayout(3,1));
        Font font = getFont();
        setFont(font.deriveFont(Font.BOLD));

        Panel speedPanel = new Panel(new GridLayout(4,1));
        speedPanel.add(speedSlider);
        speedPanel.add(speedLabel);
        speedPanel.add(radioSpeedM);
        speedPanel.add(radioSpeedK);
        speedPanel.setBackground(color(0.8, 0.8, 1.0));
        add(speedPanel);

        Panel tempPanel = new Panel(new GridLayout(4,1));
        tempPanel.add(tempSlider);
        tempPanel.add(tempLabel);
        tempPanel.add(radioTempF);
        tempPanel.add(radioTempC);
        tempPanel.setBackground(color(1.0, 0.5999999, 0.0));
        add(tempPanel);

        Panel displayPanel = new Panel(new GridLayout(2,1));
        displayPanel.add(indexLabelNOAA);
        displayPanel.add(indexLabelLegacy);
        displayPanel.setBackground(color(0.8, 1.0, 0.4));

        add(displayPanel);

        // Configure widgets
        speedSlider.addAdjustmentListener(this);
        tempSlider.addAdjustmentListener(this);

        radioSpeedM.addItemListener(this);
        radioSpeedK.addItemListener(this);
        radioTempF.addItemListener(this);
        radioTempC.addItemListener(this);

        // Calculater initial index
        reportWindSpeed();

```

```

        reportTemperature();
        updateIndex();
    }

    private Color color(double r, double g, double b) {
        return new Color((float)r, (float)g, (float)b);
    }

    private void updateIndex() {
        double windSpeed = speedSlider.getValue();
        double temperature = tempSlider.getValue();
        double indexNOAA = 35.74 + (0.6215 * temperature) - (35.75 *
(Math.pow(windSpeed, 0.16))) + (0.4275 * temperature *
Math.pow(windSpeed, 0.16));
        double indexLegacy = 91.9 - (91.4 - temperature) * ((0.303439
* Math.sqrt(windSpeed) - 0.0202886 * windSpeed) + 0.474266);

        indexNOAA = radioTempF.getState() ? indexNOAA :
(indexNOAA - 32) * (5.0/9.0);
        indexLegacy = radioTempF.getState() ? indexLegacy :
(indexLegacy - 32) * (5.0/9.0);
        String units = radioTempF.getState() ? "°F" : "°C";

        String indexStringNOAA = (int)indexNOAA + " " + units;
        String indexStringLegacy = (int)indexLegacy + " " + units;

        if ((windSpeed < 5) || (windSpeed > 60) || (temperature <
-45) || (temperature > 40)) {
            indexStringNOAA = "Outside of Range!";
        }
        if ((windSpeed < 5) || (windSpeed > 50) || (temperature <
-50) || (temperature > 90)) {
            indexStringLegacy = "Outside of Range!";
        }

        indexLabelNOAA.setText("NOAA Index: " + indexStringNOAA);
        indexLabelLegacy.setText("Legacy Index: " +
indexStringLegacy);
    }

    private void reportWindSpeed() {
        int windSpeed = speedSlider.getValue();
        String units = "MPH";
        if (radioSpeedK.getState()) {
            units = "KPH";
            windSpeed *= 1.609344;
        }
        speedLabel.setText("Wind Speed: " +windSpeed+ " " +units);
    }

```

```

private void reportTemperature() {
    int temperature = tempSlider.getValue();
    String units = "°F";
    if (radioTempC.getState()) {
        temperature = (int)((temperature - 32) * (5.0 / 9.0));
        units = "°C";
    }
    tempLabel.setText("Temperature: " +temperature+ " " +units);
}

public void itemStateChanged(ItemEvent evt) {
    Object source = evt.getSource();
    if ((source == radioSpeedM) || (source == radioSpeedK)) {
        reportWindSpeed();
        updateIndex();
    } else if ((source == radioTempF) || (source == radioTempC))
{
        reportTemperature();
        updateIndex();
    }
}

public void adjustmentValueChanged(AdjustmentEvent evt) {
    Object source = evt.getSource();
    if (source == speedSlider) {
        reportWindSpeed();
        updateIndex();
    } else if (source == tempSlider) {
        reportTemperature();
        updateIndex();
    }
}
}

```

### **WindChill.html:**

```

<html>
  <head>
    <title>Wind Chill Index</title>
    <meta http-equiv="pragma" content="no-cache" />
    <link rel="icon" href="favicon.ico" type="image/x-icon" />
    <link rel="shortcut icon" href="favicon.ico" type="image/x-
icon" />
  </head>
  <body>
    <applet code="WindChill.class" width="300" height="325">
    </applet>
  </body>
</html>

```

## Test Output:

Applet Viewer: WindChill.class

Applet

Wind Speed: 50 MPH

☒ MPH (Miles per Hour)

☐ KPH (Kilometers per Hour)

Temperature: 0 °F

☒ °F (Fahrenheit)

☐ °C (Celcius)

NOAA Index: -31 °F

Legacy Index: -54 °F

Applet started.

Applet Viewer: WindChill.class

Applet

Wind Speed: 10 MPH

☒ MPH (Miles per Hour)

☐ KPH (Kilometers per Hour)

Temperature: 32 °F

☒ °F (Fahrenheit)

☐ °C (Celcius)

NOAA Index: 23 °F

Legacy Index: 18 °F

Applet started.

**Webpage:**

<http://scaglietti.dyndns.org/WindChill/>

