

Opgave 5.5

```
import java.applet.*;
import java.util.*;
import java.awt.*;

public class AnalogClock extends Applet implements Runnable {
    public void paint(Graphics g) {
        Dimension d = getSize();
        int x = d.width/2;
        int y = d.height/2;
        int r = (int) (0.45*Math.min(d.width, d.height));
        g.drawOval((d.width - 2*r)/2, (d.height - 2*r)/2, 2*r, 2*r);
        Calendar calendar = Calendar.getInstance();
        double hour = calendar.get(Calendar.HOUR_OF_DAY);
        double minute = calendar.get(Calendar.MINUTE);
        double second = calendar.get(Calendar.SECOND);
        double a = second/60.0*2*Math.PI - Math.PI/2;
        g.setColor(Color.black);
        g.drawLine(x, y, x + (int) (0.95*r*Math.cos(a)),
                  y + (int) (0.95*r*Math.sin(a)));
        a = (minute/60.0 + second/60.0/60.0)*2*Math.PI - Math.PI/2;
        g.setColor(Color.blue);
        g.drawLine(x, y, x + (int) (0.8*r*Math.cos(a)),
                  y + (int) (0.8*r*Math.sin(a)));
        a = (hour/12.0 + minute/60.0/12.0 +
            second/60.0/60.0/12.0)*2*Math.PI - Math.PI/2;
        g.setColor(Color.red);
        g.drawLine(x, y, x + (int) (0.6*r*Math.cos(a)),
                  y + (int) (0.6*r*Math.sin(a)));
    }

    public void start() {
        if (clockThread == null) {
            clockThread = new Thread(this);
            clockThread.start();
        }
    }

    public void stop() { clockThread = null; }

    public void run() {
        while (clockThread != null) {
            try {
                Thread.sleep(1000); }
            catch (InterruptedException e){}
            repaint();
        }
    }

    Thread clockThread;
}
```

Nedenfor er skitseret en løsning, der benytter klasserne `Timer` og `TimerTask` fra pakken `java.util`.

```
import java.util.*;
import java.awt.*;
import java.applet.*;

public class AnalogClock extends Applet {
    public void paint(Graphics g) {
        ....
    }

    public void start() {
        TimerTask repaintTask = new TimerTask() {
            public void run() {
                repaint();
            }
        };
        timer = new Timer();
        timer.schedule(repaintTask, 0, 1000);
    }

    public void stop() {
        timer.cancel();
    }

    Timer timer;
}
```

Også pakken javax.swing indeholder en Timer-klasse. Nedenfor skitseres en løsning, der benytter denne klasse. Bemærk, at klassen importeres eksplicit for at forhindre navnekonflikt med Timer-klassen fra java.util.

```
import java.util.*;
import java.awt.*;
import java.applet.*;
import java.awt.event.*;
import javax.swing.Timer;

public class AnalogClock extends Applet {
    public void paint(Graphics g) {
        ...
    }

    public void start() {
        ActionListener listener = new ActionListener() {
            public void actionPerformed(ActionEvent e) {
                repaint();
            }
        };
        timer = new Timer(1000, listener);
        timer.start();
    }

    public void stop() {
        timer.stop();
    }

    Timer timer;
}
```