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package turm_von_hanoi;

import java.awt.*;
import java.awt.event.*;
import java.applet.*;

public class hanoi extends Applet implements Runnable{

        public boolean lauf;
        Label tmp=new Label();
        int[] xPosBalken,yPosBalken,belegung;
        int scheibenzahl,pos;
        String loes=new String();
        Thread anima;
        Image image;
        boolean isStandalone = false;
        Button button1 = new Button();
        Button button2 = new Button();
        Button button3 = new Button();
        Button button4 = new Button();
        Button button5 = new Button();
        Panel panel1 = new Panel();
        Choice choice1 = new Choice();
        Label label1 = new Label();

        public String getParameter(String key, String def) {
                return isStandalone ? System.getProperty(key, def) :
                        (getParameter(key) != null ? getParameter(key) : def);
        }

        public hanoi(){}

        public void run()
        {
                Thread thisThread=Thread.currentThread();
                for(;thisThread==anima;)
                {
                        if(pos<(int)Math.pow(2,scheibenzahl)-1 & lauf)
                        {
                                demo(true);
                                tmp.setText("+++"+pos+"+++");
                                try{anima.sleep(500);}
                                catch(Exception E){}
                        }
                }
        }
        //Initialisierung des Applets
        public void init() {
                try {
                        jbInit();
                        minit();
                }
                catch(Exception e) {
                        e.printStackTrace();
                }
        }
        //Initialisierung der Komponenten
        private void jbInit() throws Exception {
                button1.setLabel("Reset");
                button1.setBounds(new Rectangle(5, 5, 90, 27));
                button1.addActionListener(new java.awt.event.ActionListener() {
                        public void actionPerformed(ActionEvent e) {
                                button1_actionPerformed(e);
                        }
                });
                button2.setLabel("Animation");
                button2.setBounds(new Rectangle(5, 35, 90, 27));
                button2.addActionListener(new java.awt.event.ActionListener() {
                        public void actionPerformed(ActionEvent e) {
                                button2_actionPerformed(e);
                        }
                });
                button3.setLabel("Back");
                button3.setBounds(new Rectangle(5, 65, 90, 27));
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                button3.addActionListener (new java.awt.event.ActionListener () {
                        public void actionPerformed (ActionEvent  e) {
                                button3_actionPerformed (e);
                        }
                });
                button4.setLabel("Go");
                button4.setBounds(new Rectangle(5, 95, 90, 27));
                button4.addActionListener (new java.awt.event.ActionListener () {
                        public void actionPerformed (ActionEvent  e) {
                                button4_actionPerformed (e);
                        }
                });
                button5.setLabel("Stop");
                button5.setBounds(new Rectangle(5, 125, 90, 27));
                button5.addActionListener (new java.awt.event.ActionListener () {
                        public void actionPerformed (ActionEvent  e) {
                                button5_actionPerformed (e);
                        }
                });
                panel1.setBounds(new Rectangle(345, 0, 100, 300));
                panel1.setLayout(null);
                choice1.setBounds(new Rectangle(15, 192, 66, 28));
                label1.setText("Scheibenzahl" );
                label1.setBounds(new Rectangle(11, 167, 90, 22));
                tmp.setText("*0*");
                tmp.setBounds(new Rectangle(11, 11, 190, 22));
                panel1.add(button1, null);
                panel1.add(button2, null);
                panel1.add(button3, null);
                panel1.add(button4, null);
                panel1.add(button5, null);
                panel1.add(choice1, null);
                panel1.add(label1, null);
                this.setBackground(Color.black);
                this.setForeground(Color.gray);
                this.setLayout(null);
                this.add(panel1, null);
//                this.add(tmp, null);  // Debug-Meldung
        }
        public void start() {
        }
        public void stop() {
        }
        public void destroy() {
        }
        public String getAppletInfo() {
                return "Applet Information" ;
        }
        public String[][] getParameterInfo() {
                return null;
        }
        public void paint(Graphics  g)
        {

        //waagerechte Linie
        g.drawRect(10,192,90,1);
        g.drawRect(110,192,90,1);
        g.drawRect(210,192,90,1);

        //eine Senkrechte im Zwischenlager
        g.drawRect( 55,130,1,61);
        g.drawRect(155,130,1,61);
        g.drawRect(255,130,1,61);
        int a=0;

        //setzt die Balken
        for(int i=0;i<scheibenzahl;i++)
        {
                g.drawImage
                (image,30-i*7+xPosBalken[i]*100,173-yPosBalken[i]*20,48+i*15,20,this);
        }
        }
        //Loesung
        String Loesung(int anzahl,String quelle,String lager,String ziel)
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{
String loesung=new String();
loesung = quelle+ziel;
if (anzahl>1)
        loesung = Loesung(anzahl-1,quelle,ziel,lager)
        +loesung+Loesung(anzahl-1,lager,quelle,ziel);
return loesung;
}
//manuelle init-funktion
private void minit()
{
scheibenzahl=3;
xPosBalken= new int[scheibenzahl];
yPosBalken= new int[scheibenzahl];
belegung=new int[3];
belegung[0]=1230;
belegung[1]=0;
belegung[2]=0;
pos=0;
loes=Loesung(3,"0","2","1");

image=getImage(getCodeBase(),"at56b.gif");
choice1.addItem("1");
choice1.addItem("2");
choice1.addItem("3");
choice1.addItem("4");
choice1.addItem("5");
choice1.select(2);
xPosBalken[0]=0;
xPosBalken[1]=0;
xPosBalken[2]=0;
yPosBalken[0]=2;
yPosBalken[1]=1;
yPosBalken[2]=0;
}
//button-aktionen
void button1_actionPerformed (ActionEvent e) {
        lauf=false;
        scheibenzahl=new Integer
        (Integer.parseInt(choice1.getSelectedItem())).intValue();
        xPosBalken= new int[scheibenzahl];
        yPosBalken= new int[scheibenzahl];
        belegung=new int[3];
        String Sbelegung="";
        for(int i=1;i<scheibenzahl+1;i++)
        {
                Sbelegung=Sbelegung+i;
        }
        Sbelegung=Sbelegung+"0";
        belegung[0]=new Integer(Integer.parseInt(Sbelegung)).intValue();
        belegung[1]=0;
        belegung[2]=0;
        pos=0;
        loes=Loesung(scheibenzahl,"0","2","1");
        for(int i=0;i<scheibenzahl;i++)
        {
                xPosBalken[i]=0;
        }
        for(int i=0;i<scheibenzahl;i++)
        {
                yPosBalken[i]=scheibenzahl-i-1;
        }
        tmp.setText("+++"+belegung[0]+"+++");
        repaint();
}

void button2_actionPerformed (ActionEvent e) {
        if(anima==null)
        {
                tmp.setText("***"+pos+"***");
                anima=new Thread(this);
        anima.start();
        }
        lauf=true;
```

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        }

        void button3_actionPerformed (ActionEvent  e) {
                if(pos>0)
                        demo(false);
        }

        void button4_actionPerformed (ActionEvent  e) {
                if(pos<(int)Math.pow(2,scheibenzahl)-1)
                        demo(true);
        }

        void button5_actionPerformed (ActionEvent  e) {
                lauf=false;
        }
        //Einzelschritt der Animation
        void demo(boolean  go) {
                int  i=go?pos++:--pos;
                int  q,z,j,temp;
                        q=Integer.valueOf(String.valueOf(loes.charAt((i*2)))).intValue();
                        z=Integer.valueOf(String.valueOf(loes.charAt((i*2)+1))).intValue();
                        if(!go)
                        {
                                temp=q;q=z;z=temp;
                        }
                        temp=0;
                        for(j=scheibenzahl;j>0;j--)
                        {
                                temp=belegung[q]/(int)Math.pow(10,j);
                                if(temp>0)
                                {
                                        belegung[q]-=temp*(int)Math.pow(10,j);
                                        if(belegung[z]==0)
                                                j=1;
                                        else
                                                j=(int)(Math.log(belegung[z])/Math.log(10))+1;
                                        belegung[z]+=temp*(int)Math.pow(10,j);
                                        break;
                                }
                        }
                        temp--;
                        xPosBalken[temp]=z;
                        yPosBalken[temp]=--j;
                        repaint();

        }
}
```