计算机图形学作业

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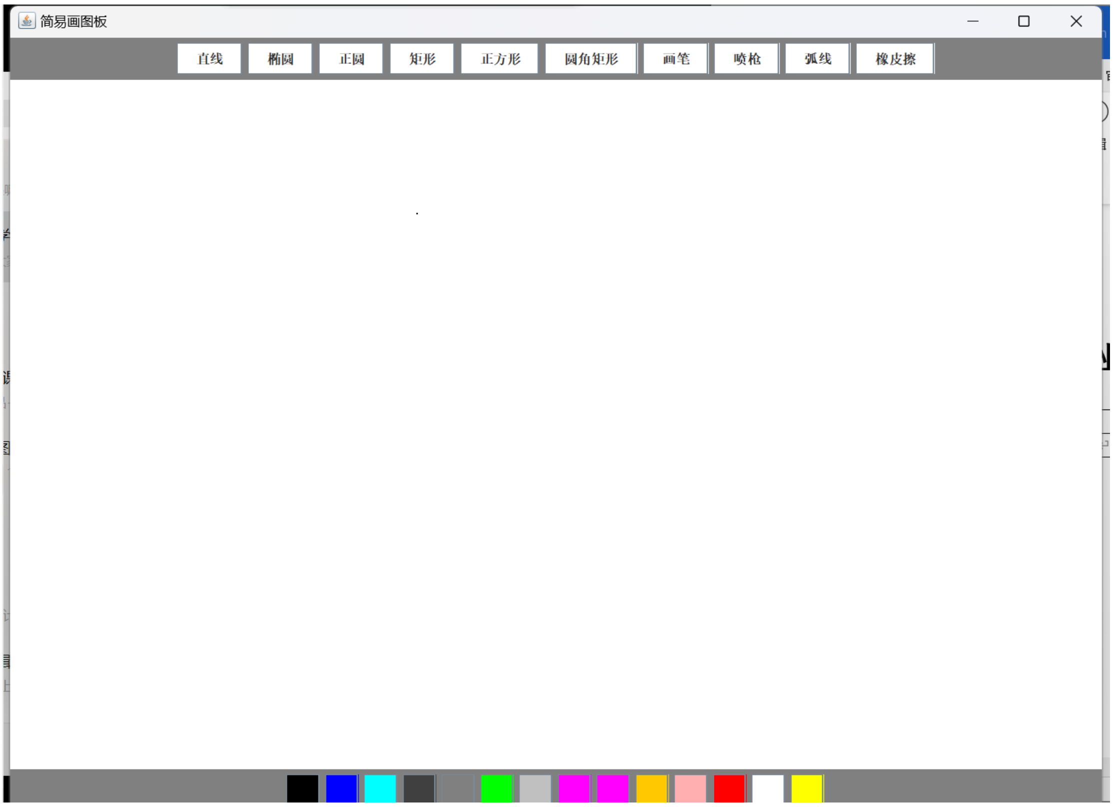
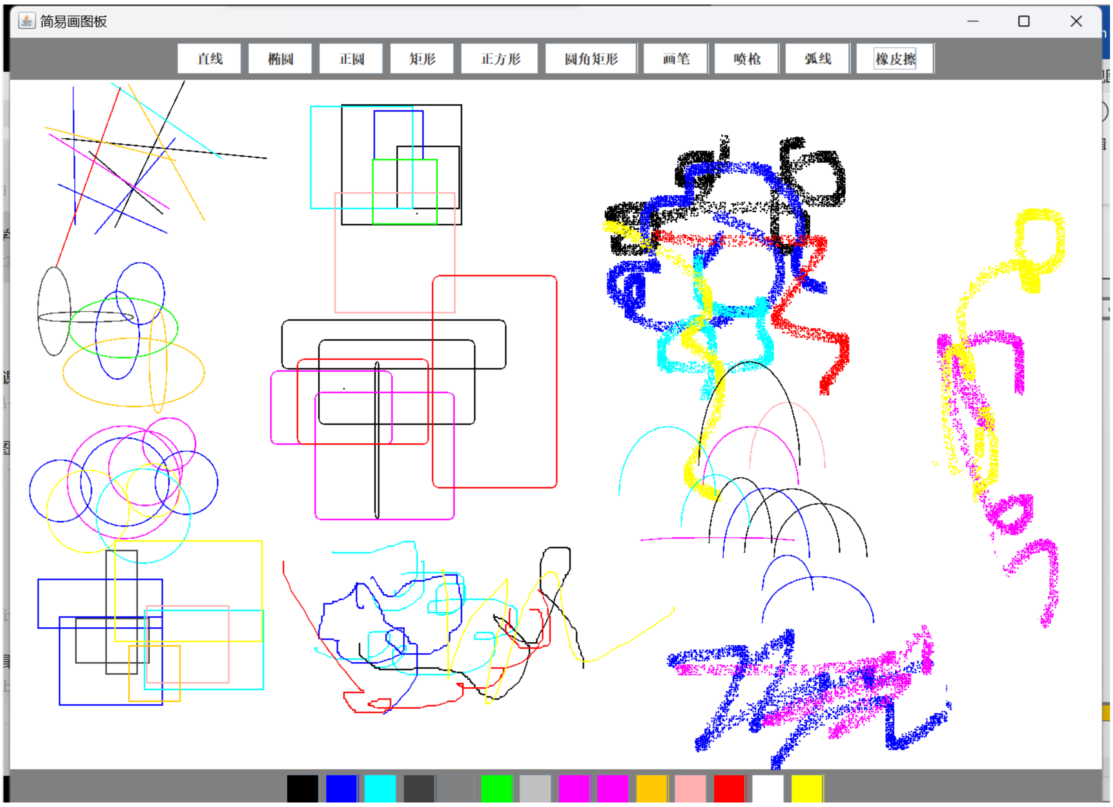
内容：	计算机图形学大作业	**日期：**	2022/10/20

效果展示





代码部分

1.构建窗体,按钮,面板

```
import javax.swing.*;
import java.awt.*;
import java.awt.event.KeyEvent;
import java.awt.event.KeyListener;

public class Prepare {
    JFrame jf;
    JPanel jp1;
    JPanel jp2;
    JPanel jp3;
    JButton [] drawButton;
    JButton [] colorButton;
    Graphics g;
    ButtonListener buttonListener;
    DrawListener drawListener;

    public Prepare(JFrame jf, JPanel jp1,JPanel jp2, JPanel jp3, JButton[] drawButton, JButton[] colorButton, ButtonListener buttonListener, DrawListener drawListener) {
        this.jf = jf;
        this.jp1 = jp1;
        this.jp2 = jp2;
        this.jp3 = jp3;
        this.drawButton = drawButton;
        this.colorButton = colorButton;
        this.buttonListener = buttonListener;
        this.drawListener = drawListener;

    }

    public void prepareJf(){
        jf.setVisible(true);
        jf.setTitle("简易画图板");
        jf.setSize(1000,1000);
        jf.setLayout(new BorderLayout());
        jf.setDefaultCloseOperation(3);
        jf.addMouseListener(drawListener);
    }

    public void preparePanel(){
        jp1.setBackground(Color.BLACK);
        jp1.setLayout(new FlowLayout(FlowLayout.CENTER));
        jp1.setBackground(Color.GRAY);
        jf.add(jp1,BorderLayout.NORTH);

        jp2.setBackground(Color.WHITE);
        jp2.addMouseListener(drawListener);
        jp2.addMouseMotionListener(drawListener);
        jp2.setVisible(true);
        g = jp2.getGraphics();
        drawListener.g = g;
        jf.add(jp2,BorderLayout.CENTER);

        jp3.setLayout(new FlowLayout((FlowLayout.CENTER)));
        jp3.setBackground(Color.black);
        jp3.setLayout(new FlowLayout(FlowLayout.CENTER));
        jp3.setBackground(Color.gray);
        jf.add(jp3,BorderLayout.SOUTH);
    }

    public void prepareButton(){
        String [] shape = {"直线","椭圆","正圆","矩形","正方形","圆角矩形","画笔","喷枪","弧线","橡皮擦"};
        for(int i = 0; i < shape.length; i++){
            drawButton[i] = new JButton(shape[i]);
            drawButton[i].setBackground(Color.WHITE);
            drawButton[i].addActionListener(buttonListener);
            jp1.add(drawButton[i]);
        }


        Color[] colorList = {Color.BLACK,Color.BLUE,Color.CYAN,Color.DARK_GRAY,Color.GRAY,Color.GREEN,Color.LIGHT_GRAY,Color.MAGENTA,Color.magenta,Color.ORANGE,Color.PINK,Color.RED,Color.WHITE,Color.YELLOW};
        for(int i = 0; i < colorList.length; i++){
            colorButton[i] = new JButton();
            colorButton[i].setBackground(colorList[i]);
            colorButton[i].setPreferredSize(new Dimension(30,30));
            colorButton[i].addActionListener(buttonListener);
            jp3.add(colorButton[i]);
        }

    }

    public void prepareDraw(){
        jp2.setVisible(true);
        g = jp2.getGraphics();
        drawListener.g = g;
    }


}
```

2.创建监听器(按钮监听器)

```
import javax.swing.*;
import java.awt.*;
import java.awt.event.ActionEvent;
import java.awt.event.ActionListener;

//获取形状和颜色

public class ButtonListener implements ActionListener {
    Color color;
    String shape;
    DrawListener drawListener;

    public ButtonListener(DrawListener drawListener) {
        this.drawListener = drawListener;
    }

    @Override
    public void actionPerformed(ActionEvent actionEvent) {
        if(actionEvent.getActionCommand().equals("")){
            JButton btn = (JButton) actionEvent.getSource();
            color = btn.getBackground();
            drawListener.setColor(color);
            System.out.println(color.toString());
        }else {
            JButton btn = (JButton) actionEvent.getSource();
            shape = btn.getActionCommand();
            drawListener.setShape(shape);
            System.out.println(shape.toString());
        }
    }

    public Color getColor() {
        return color;
    }

    public String getShape() {
        return shape;
    }


}
```

3.创建监听器(画板监听器)

```
import javax.swing.*;
import java.awt.*;
import java.awt.event.MouseEvent;
import java.awt.event.MouseListener;
import java.awt.event.MouseMotionListener;
import java.util.Random;


public class DrawListener extends JFrame implements MouseListener, MouseMotionListener {


    Color color = Color.black;
```

```java
    String shape = "直线";
    Graphics g;
    JPanel jp2;
    int x0,x1,x2,y0,y1,y2,newx1,newy1,newx2,newy2;
    boolean flag = true;




    @Override
    public void mouseClicked(MouseEvent e) {
    }


    @Override
    public void mousePressed(MouseEvent e) {
        Graphics2D g2 = (Graphics2D) g;
        g2.setStroke(new BasicStroke(1));
        System.out.println("mousePressed");
        x1 = e.getX();
        y1 = e.getY();
    }


    @Override
    public void mouseReleased(MouseEvent e) {
        Graphics2D g2 = (Graphics2D) g;
        g2.setStroke(new BasicStroke(1));
        System.out.println("mouseReleased");
        x2 = e.getX();
        y2 = e.getY();
        int w = x2-x1;
        int h = y2-y1;

        //绘制图形
        if (shape.equals("直线")){
            System.out.println("2");
            g.drawLine(x1,y1,x2,y2);
        }else if (shape.equals("矩形")){
            g.drawRect(Math.min(x1,x2),Math.min(y1,y2),Math.abs(w),Math.abs(h));
        }else if (shape.equals("椭圆")){
            g.drawOval(Math.min(x1,x2),Math.min(y1,y2),Math.abs(w),Math.abs(h));
        }else if(shape.equals("弧线")){
            g.drawArc(Math.min(x1,x2), Math.min(y1,y2), Math.abs(x2-x1), Math.abs(y2-y1), 0, 180);
        }else if (shape.equals("正圆")){
            g.drawOval(Math.min(x1,x2),Math.min(y1,y2),Math.abs(w),Math.abs(w));
        }else if (shape.equals("正方形")){
            g.drawRect(Math.min(x1,x2),Math.min(y1,y2),Math.abs(w),Math.abs(w));
        }else if(shape.equals("圆角矩形")){
            g.drawRoundRect(Math.min(x1,x2),Math.min(y1,y2),Math.abs(w),Math.abs(h),10,10);
        }
    }


    @Override
    public void mouseDragged(MouseEvent e) {
        Graphics2D g2 = (Graphics2D) g;
        g2.setStroke(new BasicStroke(1));
        System.out.println("mouseDragged");
        x2 = e.getX();
        y2 = e.getY();
        if (shape.equals("画笔")) {
            g.drawLine(x1, y1, x2, y2);
            x1 = x2;
            y1 = y2;
        }else if(shape.equals("橡皮擦")){
            g2.setStroke(new BasicStroke(80));
            g2.setRenderingHint(RenderingHints.KEY_ANTIALIASING, RenderingHints.VALUE_ANTIALIAS_ON);
            g.setColor(Color.WHITE);
            g.drawLine(x1, y1, x2, y2);
            x1 = x2;
            y1 = y2;
        }else if(shape.equals("喷枪")){
            for(int k=0;k<20;k++){
                Random i=new Random();
                int a=i.nextInt(8);
                int b=i.nextInt(10);
                g.drawLine(x2+a, y2+b, x2+a, y2+b);
            }
        }
    }
```

```java


 @Override
 public void mouseMoved(MouseEvent mouseEvent) {

 }

    @Override
    public void mouseEntered(MouseEvent mouseEvent) {

    }

    @Override
    public void mouseExited(MouseEvent mouseEvent) {

    }

    public void setColor(Color color) {
        this.color = color;
        g.setColor(color);
    }

    public void setShape(String shape) {
        Graphics2D g2 = (Graphics2D) g;
        if(this.shape.equals("橡皮擦")){
            g.setColor(Color.black);
        }else {
            this.shape = shape;
        }
    }

}
```

4.打包放进 main 函数

```java
import javax.swing.*;
import java.awt.*;
import java.awt.event.KeyEvent;
import java.awt.event.KeyListener;

public class Prepare {
    JFrame jf;
    JPanel jp1;
    JPanel jp2;
    JPanel jp3;
    JButton [] drawButton;
    JButton [] colorButton;
    Graphics g;
    ButtonListener buttonListener;
    DrawListener drawListener;

    public Prepare(JFrame jf, JPanel jp1,JPanel jp2, JPanel jp3, JButton[] drawButton, JButton[] colorButton, ButtonListener buttonListener, DrawListener drawListener) {
        this.jf = jf;
        this.jp1 = jp1;
        this.jp2 = jp2;
        this.jp3 = jp3;
        this.drawButton = drawButton;
        this.colorButton = colorButton;
        this.buttonListener = buttonListener;
        this.drawListener = drawListener;

    }

    public void prepareJf(){
        jf.setVisible(true);
        jf.setTitle("简易画图板");
        jf.setSize(1000,1000);
        jf.setLayout(new BorderLayout());
        jf.setDefaultCloseOperation(3);
        jf.addMouseListener(drawListener);
    }

    public void preparePanel(){
        jp1.setBackground(Color.BLACK);
        jp1.setLayout(new FlowLayout(FlowLayout.CENTER));
        jp1.setBackground(Color.GRAY);
        jf.add(jp1,BorderLayout.NORTH);

        jp2.setBackground(Color.WHITE);
        jp2.addMouseListener(drawListener);
        jp2.addMouseMotionListener(drawListener);
        jp2.setVisible(true);
        g = jp2.getGraphics();
        drawListener.g = g;
        jf.add(jp2,BorderLayout.CENTER);

        jp3.setLayout(new FlowLayout((FlowLayout.CENTER)));
        jp3.setBackground(Color.black);
        jp3.setLayout(new FlowLayout(FlowLayout.CENTER));
        jp3.setBackground(Color.gray);
        jf.add(jp3,BorderLayout.SOUTH);
    }

    public void prepareButton(){
        String [] shape = {"直线","椭圆","正圆","矩形","正方形","圆角矩形","画笔","喷枪","弧线","橡皮擦"};
        for(int i = 0; i < shape.length; i++){
            drawButton[i] = new JButton(shape[i]);
            drawButton[i].setBackground(Color.WHITE);
            drawButton[i].addActionListener(buttonListener);
            jp1.add(drawButton[i]);
        }


        Color[] colorList = {Color.BLACK,Color.BLUE,Color.CYAN,Color.DARK_GRAY,Color.GRAY,Color.GREEN,Color.LIGHT_GRAY,Color.MAGENTA,Color.magenta,Color.ORANGE,Color.PINK,Color.RED,Color.WHITE,Color.YELLOW};
        for(int i = 0; i < colorList.length; i++){
            colorButton[i] = new JButton();
            colorButton[i].setBackground(colorList[i]);
            colorButton[i].setPreferredSize(new Dimension(30,30));
            colorButton[i].addActionListener(buttonListener);
            jp3.add(colorButton[i]);
        }

    }

    public void prepareDraw(){
        jp2.setVisible(true);
        g = jp2.getGraphics();
        drawListener.g = g;
    }


}
```