**GUI - Drawing Simple Shapes**

1. **If a region is 300 pixels wide and 200 pixels high, determine the coordinates of each point. Draw a small filled circle with a center at each of these coordinates in the specified color**
   1. **the upper left corner (red circle)**

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| Coordinates: (0, 0) |

* 1. **the midpoint of the bottom (blue circle)**

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| Coordinates: (150, 200) |

* 1. **the centre of the left half (green circle)**

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| Coordinates: (75, 100) |

* 1. **the centre of the lower right quadrant (yellow circle)**

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| Coordinates: (225, 150) |

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| **Circles screenshot:** |

1. **Write a paint method that could be used to draw a square each of whose sides are 100 pixels long. The square should be positioned so that it would be at the centre of a window that is 400 pixels wide and 200 pixels high. The top and bottom lines defining the square should be green while the left and right sides should be red.**

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| public void paintComponent(Graphics g)  {  super.paintComponent(g);    g.setColor(Color.);  g.fillRect(getWidth()/2 - 50, getHeight()/2 - 50, 100, 100);      g.setColor(Color.GREEN);    g.drawLine(getWidth()/2 - 50, getHeight()/2 - 50, getWidth()/2 + 50, getHeight()/2 - 50);  g.drawLine(getWidth()/2 - 50, getHeight()/2 + 50, getWidth()/2 + 50, getHeight()/2 + 50);    g.setColor(Color.RED);  g.drawLine(getWidth()/2 - 50, getHeight()/2 - 50, getWidth()/2 - 50, getHeight()/2 + 50);  g.drawLine(getWidth()/2 + 50, getHeight()/2 - 50, getWidth()/2 + 50, getHeight()/2 + 50);    } |
| Screenshot: |

1. **Use the polygon method to draw a red filled hexagon (6 sided shape). Make sure it is close to the center of the screen. Draw the word “STOP” in white near the middle of the shape. Hint:** [**http://www.rdwarf.com/lerickson/hex/**](http://www.rdwarf.com/lerickson/hex/)**. Use Math.toRadians() to convert degrees to radians (remember Java trig methods uses radians).**

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| import javax.swing.\*;  import java.awt.\*;  import java.awt.event.\*;  public class GUI  {    JFrame f;    public GUI()  {  f = new JFrame("Hexagon");    DrawPanel draw = new DrawPanel();  draw.setPreferredSize(new Dimension(250,200));    f.add(draw);  f.pack();  f.setVisible(true);  f.setLocationRelativeTo(null);  }    public static void main(String[] args)  {  new GUI();  }  }  class DrawPanel extends JPanel  {  int A, B, C, height, width;    Font font = new Font("Courier New", Font.BOLD, 30);    public DrawPanel()  {  repaint();  }    public void paintComponent(Graphics g)  {  super.paintComponent(g);    C = (int)Math.sqrt(Math.pow(getHeight() / 4, 2) + Math.pow(getWidth() / 8, 2));  A = C / 2;  B = (int)(Math.sin(Math.PI/3) \* C);  height = getHeight() / 2;  width = getWidth() / 2;    //Draw Polygon at the center of the DrawPanel  int[] x = {width - 2 \* A, width - A, width + A, width + 2 \* A, width + A, width - A};  int[] y = {height, height - B, height - B, height, height + B, height + B};    g.setColor(Color.RED);  g.fillPolygon(x, y, 6);    g.setColor(Color.BLACK);  g.drawPolygon(x, y, 6);    //Write "STOP" on the polygon  g.setFont(font);  g.setColor(Color.WHITE);  FontMetrics fm = g.getFontMetrics();    g.drawString("STOP", (2 \* width - fm.stringWidth("STOP")) / 2, height + 10);    }  } |
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1. **Write a complete program containing a paint method that draws a bull's eye with a red centre circle, an orange ring around that, a yellow ring around that, and a green ring around that. The radius of the centre circle and the width of each of the surrounding rings should be 10 pixels. The bull's eye should be located in the centre of a square region that is 100 pixels wide and 100 pixels high.**



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| import javax.swing.\*;  import java.awt.\*;  import java.awt.event.\*;  public class GUI  {    JFrame f;    public GUI()  {  f = new JFrame("PAINTING");    DrawPanel draw = new DrawPanel();  draw.setPreferredSize(new Dimension(100,100));    f.add(draw);  f.pack();  f.setVisible(true);  f.setLocationRelativeTo(null);  }    public static void main(String[] args)  {  new GUI();  }  }  class DrawPanel extends JPanel  {  int r = 10, x, y;  Color[] color = {Color.RED, new Color(255, 154, 0), Color.YELLOW, Color.GREEN};    public DrawPanel()  {  repaint();  }    public void paintComponent(Graphics g)  {  super.paintComponent(g);    x = getWidth() / 2;  y = getHeight() / 2;    for(int i = 4; i > 0; i--)  {  //Draw areas of the bull's eye  g.setColor(color[i - 1]);  g.fillOval(x - i \* r, y - i \* r, 2 \* i \* r, 2 \* i \* r);    //Draw Border  g.setColor(Color.BLACK);  g.drawOval(x - i \* r, y - i \* r, 2 \* i \* r, 2 \* i \* r);  }    }  } |
| Screenshot: |