GUI Programming 2019-2020 – Year 2

Labwork 10 – 2D Graphics using JFrames:

(Worth 5% - or 50 points out of 500 points for labwork this semester)

IMPORTANT NOTES:

- **NO COPYING PERMITTED AND ZERO MARKS WILL APPLY TO COPIED WORK. FURTHER ACTION MAY BE TAKEN AGAINST STUDENTS THAT HAVE BEEN FOUND TO COPY WORK.**

- **ASSESSMENT WILL INVOLVE ONE-TO-ONE QUESTIONS ABOUT YOUR SUBMITTED WORK. USE COMMENTS IN YOUR CODE TO ENSURE YOU DON'T FORGET WHY YOU WROTE CODE YOU MAY LATER BE ASKED ABOUT.**

- **ALL WORK MUST BE SUBMITTED TO MOODLE BY DATES SPECIFIED (2 LABS SUBMISSIONS OF FIVE LABS THROUGHOUT THE SEMESTER).**

- **MANY OF THE TASKS ASSIGNED BELOW CAN BE COMPLEX AND\OR THE DESCRIPTIONS MAY REQUIRE FURTHER CLARIFICATIONS. PLEASE USE THE AVAILABLE LAB TIMES TO ASK FOR CLARIFICATIONS AND ADVICE\HINTS ON THE TASKS BELOW.**

Part 1 – Draw lines (10 points)

Create a class called **Lab10Part1**. Create a JFrame that draws your initials using the **drawLine** functions in the 2D Graphics API (use at least two initials and make the size of the lines large enough to be easily seen on the screen). You cannot use any other method to draw the initials to the screen. YOU MAY NEED TO DRAW MANY LINES TO ACHIEVE THIS.

- Create the JFrame with the paint method (2 points)
- Use draw line function for first initial (4 points)
- Use draw line function for second initial (4 points)

Part 2 – Draw ovals\circles (10 points)

Create a Java program called **Lab10Part2**. Create a JFrame that draws ten circles in a circle pattern on the JFrame using the **drawOval** method in the 2D Graphics API. Marks will be awarded for the use of a method to modularize the code and reduce repetition. [Note: 10 separate small circles around the screen in a circle pattern - like people sitting around a round table or like Stonehenge – not concentric circles]

- Create the JFrame with the paint method (2 points)
- Use **drawOval** to draw circle (2 points)
- Repeat drawing of circles so they form a circle of circles (2 points)
- Use of iteration to repeat the drawings (2 points)
- Use of method(s) to modularize code and reduce repetition (2 points)

Part 3 – Draw filled shapes (10 points)

Create a JFrame class called **Lab10Part3**. Create a JFrame that draws two boats to the screen (make one red and one black – not overlapping) using the 2D Graphics API. The boats can be quite basic but must use **fill** functions, e.g. **fillRect** and **fillOval** etc. Marks will be awarded for the use of user defined method(s) to reduce the repetition and increase the modularity of the code. [You may use **fill polygon** if you wish also]

- Create the JFrame with the paint method (2 points)
- Use **fill** draw methods for appropriate sections (4 points)
- Two boats of different colours (must look like boats and identical!) (2 points)
- Use of method(s) to modularize code and reduce repetition (2 points)

Part 4 – Draw a complex 2D shape using Java 2D Graphics API (20 points)

Create a Java program called **Lab10Part4**. Create a JFrame that draws a picture of Santa's Sleigh. The sleigh picture must include some use of color, have at least one seat, have the sleigh blades, and the sleigh should have a chassis (a body area to hold the chair). [Note: You do not need to include any reigndeer or a background of snow falling just the sleigh is required]

- Draw the chair on the sleigh (5 points)
- Draw the chassis (body) of the sleigh (5 points)
- Draw the sleigh blades (5 points)
- Quality of the drawing of the sleigh (i.e., looks like a sleigh) (3 points)
- Use of colour (at least black and white) (2 points)