Assignment 3
COMP 86

Introduction

In this assignment we will start fleshing out the simulation/game you started in Assignment 2. You can design the rules of the simulation, its graphic design, commands, and operations any way you like, as long as they match the general software design and features described in the assignments. (You need not be restricted by what you did in Assignment 2, you can redesign your program if you wish. But it should still provide all the features required by the previous assignments.)

Drawing Area

Draw some shapes inside your canvas or drawing area, to represent your vehicles, landscape features, or grid markings.

Be sure to do all your drawing in your paintComponent() callback so that your canvas can redraw itself when the system tells it to do so, usually because the window was exposed or resized. You can test this by resizing your window.

Buttons and other Widgets

One of your widgets should cause a change to something that is drawn in the canvas. It does so by modifying some instance variable data that you maintain and that your paintComponent routine uses when it draws. Then you must call repaint() on the panel to cause your changes be displayed.

Main Program

Once this program is running, it will now display your objects, redrawing it as necessary if the window is resized or exposed, and also responding to the buttons and other widgets.

The window should close and the application should quit when a user clicks on the close icon (the "X" or red dot in the top corner of the window title bar). You can also look ahead at the **Layout1** example for more sophisticated ways to lay out your window, if you want.

Program Design and Practices

Your program design should exploit the features of object-oriented programming (encapsulation of code and data, support for abstract data types, polymorphism/overloading, inheritance).

Remember to trigger your drawing to repaint itself explicitly whenever one of your commands causes a change that should be reflected on the screen. And remember that the way to change the screen is first to change the data stored your classes and then to trigger the repaint.

You should follow these general Java programming practices:

- Make all instance variables of your classes **protected** or **private**. If you need access outside of the class, provide it with *set* and/or *get* methods; don't access protected the variables from outside the class (even though Java -- unfortunately -- allows us to).
- Avoid most global variables or widely-accessible public variables; pass the data you need explicitly.
- Put each class in a separate .java file.

Design Documentation

In addition to your program, submit documentation about the design of your system in these forms:

- An outline showing the inheritance hierarchy
- An outline showing the aggregation hierarchy (which objects contain or "own" which other objects)

Submit this documentation electronically in text form, along with brief instructions for how to compile and run your program. Include it as part of the `readme` file that you submit with your assignment.