Lab 2: JavaFX Animation

Lab Overview:
Write a Java program that uses JavaFX to create a window in which is displayed a simple, but creative, interactive, 50K+ particle system at 60 frames per second (fps).

Getting Started:
Set up Eclipse for a JavaFX project: Follow the install instructions on: https://www.eclipse.org/efxclipse/install.html.
Preferably, do this on your own laptop. The CS Linux machines have Java 1.8 installed. NOTE: Java 1.8 may not be the default Java version in your setup. The CS machines have many versions of Java installed. Make sure you use the latest 1.8 version. In particular, JavaFX in Java 1.7 is not very good. You can install your own version of Eclipse in your home directory so that you can configure it with the JavaFX plugin, and later with other plugins we will use.
You should be using the newest version of Eclipse (Eclipse IDE for Java EE Mars.1) with Java SE Development Kit 8u71.
In Eclipse, create a new JavaFX project: File -> new -> Other... -> JavaFX -> JavaFX Project.
We will be drawing shapes so read: https://docs.oracle.com/javafx/2/canvas/jfxpub-canva.htm
Download and run ParticleEmitter.java from the class website. This uses a few high level JavaFX draw commands, but most of the drawing is done using the much faster, must less memory intensive pixel drawing. This drawing only has 50,000 particles so on a modern computer you could likely get 60 fps even if you created 50K JavaFX Nodes and moved them each frame. However, in the next project you will have 100 million cells that need to be drawn. If you attempt to make each a JavaFX node, then your program will, at best, crawl.
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Grading Rubric [15 points total]:

[Turn-in: -2 points]: Your program was not turned in correctly (see syllabus).

[Code Style: as much as -5 points]: Your program does not follow the CS-351 hollowed coding standard. More egregious deviants will lose more points (see course website: http://www.cs.unm.edu/~joel/cs351/).

[Animation: 10 points]: Your program must draw some simple but creative animation significantly different from the given ParticleEmitter.java.

[Interactive: 5 points]: The given particle emitter responds to mouse clicks by printing the mouse coordinates relative to the inside of the window, and moves the emitter point to that location. Your program must do something different at mouse clicks, mouse moves or keyboard input (Note that the requirement is “or” not “and” – you may do “and” but it is not required).

If you choose to use multi colors, avoid instantiating a new color object for each particle each frame. Instead, create individual or an array of colors in start() and reuse those colors each frame. It is okay to one-time create 1000s of colors for fine variation and store them in an array. It is not okay to create and discard 1000s of objects each frame.

Some Ideas: diffusion limited aggregation, fireworks, image dissolving or formation, or earth tone particles moving in spirograph patterns. Actually, any of these examples, if done well, would be a bit of extra credit.

This is a short 15 point lab. Do not spend too much time on it. Mostly, I want to see that you can install and run JavaFX, and that you understand the basic animation loop.