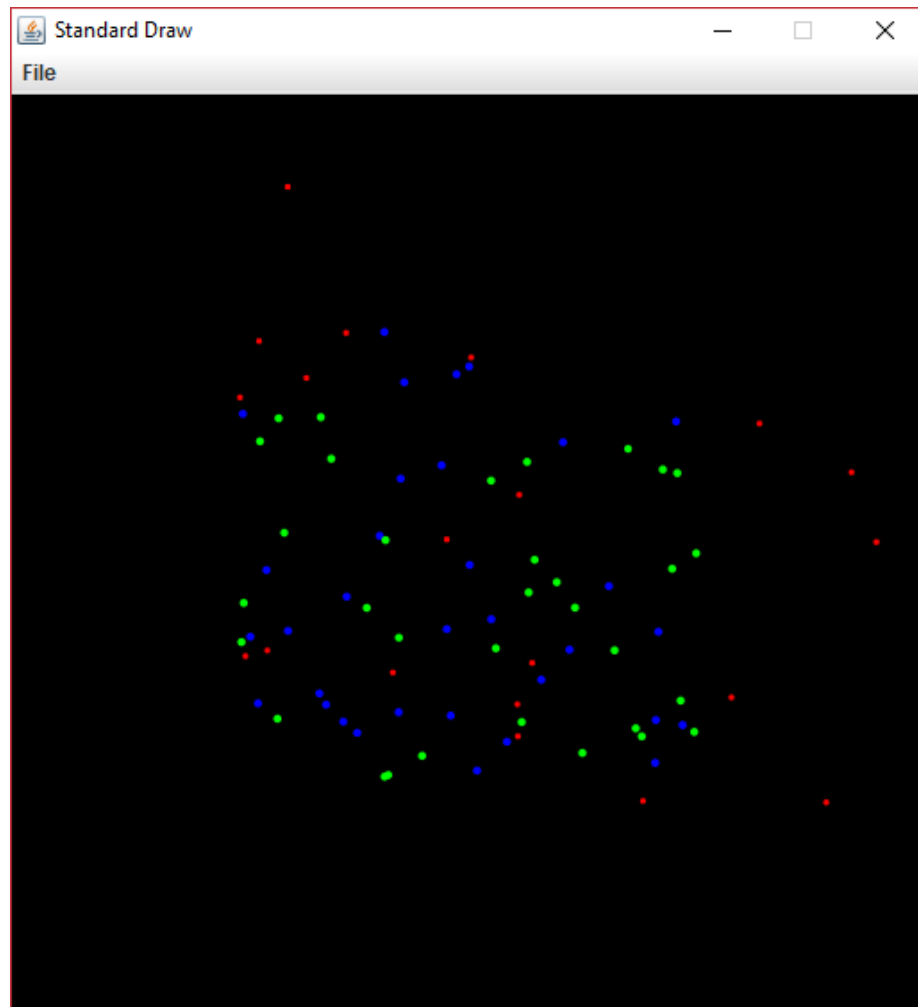


## Lab 6

We are going to practice using inheritance to simulate the motion of the subatomic particles electrons, neutrons, and protons in 2D. Although the locations of these particles will be random, the graphical display of them should look much like the following.



As times goes on, the electrons (represented in red) will whiz around, being attracted by the protons (represented in blue) and repulsed by each other. In general, the electrons will all eventually be flung into space and disappear. Slowly, the protons will repulse each other and drift apart. The neutrons (represented in green) have no charge and will remain in place.

1. Create a project called Lab6 and create a package in your project called particles. Download the file from the website and add the three Java files it contains to the particles package. You will not need to modify these three files, but you will want to look at the top section of Particles.java to see what it consists of.
2. Now, add three new classes to the particles package called **Electron**, **Neutron**, and **Proton**, respectively. Each of these classes should be sub-classes of **Particle**. You will notice that they have compiler errors when you create them in the way because they are extending an abstract class that has some unimplemented methods.
3. Add the required methods to each of your new classes (without the word **abstract** in the signature). The only information you will need are the various values for charge, mass, radius, and color for each subatomic particle. This data is given in the table below:

Particle	Charge (C)	Mass (kg)	Radius (m)	Color
Electron	$-1.602176620898 \times 10^{-19}$	$9.1093835611 \times 10^{-31}$	$1.0 \times 10^{-18}$	Red
Neutron	0.0	$1.67492747121 \times 10^{-27}$	$0.8 \times 10^{-15}$	Green
Proton	$1.602176620898 \times 10^{-19}$	$1.6726219236951 \times 10^{-27}$	$0.876869 \times 10^{-15}$	Blue

**Deliverable:** Zip up Electron.java, Proton.java, and Neutron.java. Email the zip file to prof. stucki. Do not email the entire project. I only want the Java files you created.

**All work must be done individually. Never look at someone else's code. Please refer to the course policies if you have any questions about academic integrity. If you have trouble with the assignment, I am always available for assistance.**