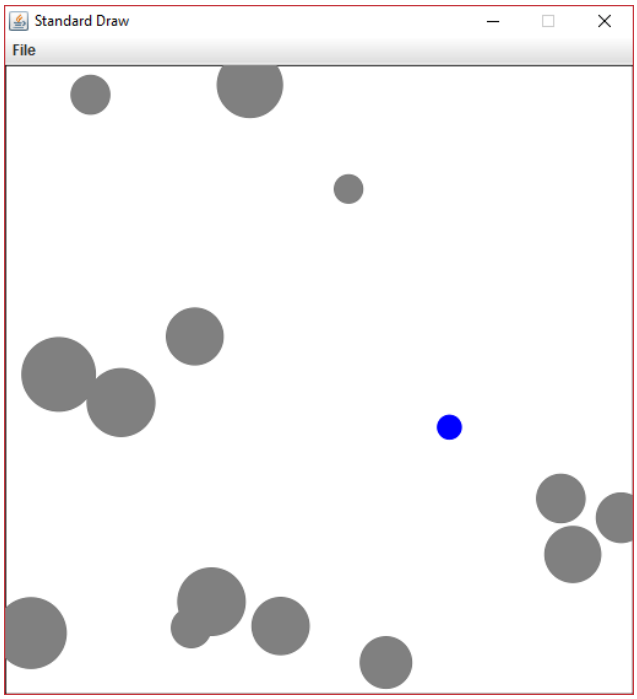
COMP 1600 Fall 2025

Lab 12: Asteroids

Due by the end of class

The goal of this lab is to complete a couple of Java classes to finish the implementation for a simplified game of Asteroids. In the original game of Asteroids, the goal was to destroy asteroids, breaking them into smaller pieces while avoiding the debris and surviving as long as possible. Unfortunately, the game for this lab only includes dodging the asteroids, not destroying them.



Specification

Create a project called `Lab12`. Add the following classes: `Asteroid`, `Ship`, `Simulator`, and `StdDraw`. Delete **everything** inside of all the Java files you have just added.

Below are the instructions for each class file.

Asteroid

Paste the code from **`Asteroid.java`** into your `Asteroid` class file.

Complete the **TODO** segments in each method. First, finish the constructor for `Asteroid` according to the instructions. Then, finish the accessors for the `x`, `y`, and `radius` members. Finally, complete

the `update()` method so that it updates the location of the asteroid. As with the `Ball` class, update the `x` and `y` members based on their velocities multiplied by time.

Ship

Paste the code from **`Ship.java`** into your `Ship` class file.

Complete the **TODO** segments in each method. First, finish the constructor for `Ship` according to the instructions. Then, finish the accessors for the `alive` member. Most of the work in this class is in the `collides()` method. In this method, you need to determine if any asteroid in the given array collides with the ship. Loop through all of the asteroids and compute the distance to the ship, using the standard Euclidean distance formula. If the distance from any asteroid to the ship is less than the radius of the ship plus the radius of the asteroid, return `true`. If you get through the entire list of asteroids and none of them collide, then (and only then) return `false`.

Simulator and StdDraw

For both the `Simulator` and `StdDraw` classes, simply paste in the code from **`Simulator.java`** and **`StdDraw.java`**.

Game Play

Once you have completed all the changes, you should be able to play the limited version of Asteroids. By simply moving your mouse, the ship will accelerate toward the mouse pointer. Try to stay alive as long as possible!

The instructor will give an demonstration of what the game should look like when the lab begins.

Turn In

Turn in your code by uploading `Asteroid.java` **and** `Ship.java` from the `Lab12\src` folder wherever you created your project to **Brightspace**. **Do not** upload the entire project. The `Simulator.java` and `StdDraw.java` files are unnecessary. I only want the `Asteroid.java` and `Ship.java` files.

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.