Outlab6 – Intergalactic Navigation
Due: submit by midnight, Apr 23

Objective

Starfleet Federation has contracted you to develop a new navigational system for the fleet. Ships must travel using known routes that avoid asteroid belts. For simplicity, we will assume that space is flat and that the locations of planets and bases are simply 2D coordinates in the range [0.0, 1000.0].

Due to distortions in the time-space continuum, the time it takes to travel between two points is not directly proportional to the distance between them; there is a random multiplier that provides the effective distance:

Effective_distance(x,y) = R * Actual_Distance(x,y)

where R is a random real number in the interval [0.5, 5.0]. The effective distance between each pair of points should be precomputed.

Asteroid belts occur at random locations and are modeled as disks with a certain radius. You may assume that there are 10 asteroid belts in random locations with random radii in the range [50,100]. <u>Ships must not go through asteroid belts!</u>

Assume that there are 25 planets and 10 bases that occur in random locations (<u>but not inside an asteroid belt</u>). Each planet or base should have a name, e.g. "Planet Nebulon", "Tranquility Base", etc.

Your program should create the random asteroid belt and base and planet locations and then prompt the user for a start and final destination (either bases or planets). It should then provide navigation directions in the following form:

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0. Starting at: Planet Nebulon
1. Go to: Tranquility Base, effective distance 56.4, heading = 78.2 degrees
2. Go to: Planet Bubblegum, effective distance 202.8, heading = 104.2 degrees
3. Go to: Base Centrale, effective distance 245.9, heading = 240.6 degrees
4. Arrive at final destination, Base Centrale
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Required (20 pts)
- A working GUI-based Intergalactic Navigation application that finds the shortest effective distance path between the given start and end locations.

Optional (2 bonus pts)
- Provide a graphical view of the planets and bases, and meteorite fields and display the requested path from start to destination.

What to Turn In

Use D2L to submit your project (in Netbeans). Running the main method in the project should launch your program.