CS 2336 – PROJECT 1 – Tie Fighter Patrols (Maintenance Project 1)

Pseudocode Due: 1/19 by 11:59 PM
Project Due: 1/31 by 11:59 PM

KEY ITEMS: Key items are marked in red. Failure to include or complete key items will incur additional deductions as noted beside the item.

Submission and Grading:

- **The file containing `main` must be named Main.java. (-5 points)**
- **The project files must be in a package named `TieFighter`. (-5 points)**
- All project deliverables are to be submitted in eLearning.
- Zip the contents of the `src` directory into a single zipped file
  - Make sure the zipped file has a .zip extension (not .tar, .rar, .7z, etc.) (-5 points)
  - Please review the submission testing information in eLearning on the Course Homepage
- The pseudocode should be submitted as a Word or PDF document and is not accepted late.
- Projects submitted after the due date are subject to the late penalties described in the syllabus.
- Programs must compile and run with JDK 8.
- Each submitted program will be graded with the rubric provided in eLearning as well as a set of test cases. These test cases will be posted in eLearning after the due date. Each student is responsible for developing sample test cases to ensure the program works as expected.
- **Type your name and netID in the comments at the top of all files submitted.** (-5 points)

Objectives:

- Implement basic file I/O in Java
- Manipulate single and multiple dimension arrays
- Implement basic programming constructs in Java

Problem: Darth Vader wants to check that his TIE fighter pilots are patrolling adequately-sized regions of the galaxy. He has files of data that contain the patrol coordinates for each of his pilots. With the fear of being force choked, you have agreed to write a program that analyzes the data and determines the size of the area patrolled by the pilots.

Details:

- The area of the shape can be calculated with the following formula:

$$\frac{1}{2}\left|\sum_{i=0}^{n-2}(x_{i+1} + x_i)(y_{i+1} - y_i)\right|$$

- The vertices will be stored in a 3-dimensional array
  - The dimensions are 20 x 16 x 2
  - The first dimension is pilot
  - The second dimension is coordinate
  - The third dimension is x or y value

- A single dimension array will be needed to store pilot names
- The entire file will be read and stored in the appropriate array before performing calculations (-15 points)
- The maximum number of pilots is 20
- The maximum number of coordinates on a line is 16
- The last coordinate on the line will be the same as the first
- The program must have a least 3 functions.
    - At least 2 of the functions must be called from main

Input:

- All input will come from a file named *pilot_routes.txt*.
- The file will contain the pilot's first name followed by a list of coordinates separated by spaces.
- Each line in the file will represent a different pilot.
- The format for each line will be the pilot's first name followed by a list of x and y coordinates.
- There will be a space between each pair of coordinates and a comma between the x and y coordinates.
- The first and last set of coordinates will always be the same.
- There may or may not be a new line character at the end of the last line in the file.

Output:

- All output will be written to a file named *pilot_areas.txt*.
- Output file format
    - `<pilot name><tab><area>`
- The area should be rounded to 2 decimal places.
- Each pilot's data will be written on a separate line.

Sample Input Line: `Greedo 4,0 4,7.5 7,7.5 7,3 9,0 7,0 4,0`

Sample Output Line: `Greedo 25.50`