CS 2336 – PROJECT 3 – Revenge of the Tie Fighter Patrols

Implementation Due: 11/26 by 11:59 PM (No late submission)

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:

- All project source code will be submitted in eLearning.
    - Projects submitted after the due date are not graded as stated in Syllabus.
- Each submitted program will be graded with the rubric as well as a set of test cases. These test cases will be posted in eLearning after the due date.
- Type your name and netID in the comments at the top of all files submitted. (-5 points)

Objective:

- Create and utilize a graph 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 if the patrol path is valid.

Pseudocode Details:

- What functions will you create other than main
    - What parameters will you have
    - What will the function return
    - What is the logic of the function
- What will the logic of main be?

Details:

- A map of the galaxy will be given and will be stored in a graph
- Each pilot will have a patrol route associated with their name
- You must determine if a given patrol route is valid based on the graph structure
    - Does the given path exist in the graph?
- The number of pilots in each file is unknown
- The number of destinations in the patrol route for each pilot is unknown
- Pilot names and planet names will be single words
- All input will be valid.

Graph Class

- The file will be named Graph.java
- The graph will be divided into two pieces: edges and vertices
    - You may choose how to implement both of these
- The class must have a function to insert into the graph
- The graph class does not have to be generic

User Interface:

- There will be no user interface for this program. All I/O will be performed with files

Input:

- There will be 2 input files
    - Prompt the user for the name of the file containing the map of the galaxy first
    - Prompt the user for the name of the file containing the pilot routes next
- Galaxy map file
    - Read this file first
    - Use this information to create the graph
    - Each line will contain a vertex and a list of edges with weights
    - Each edge will be represented as <adjacent vertex><comma><weight>
    - Line example:

        Hoth Endor,9 Coruscant,3 Tatooine,1 Dagobah,5
    - All vertices will have at least 1 edge
- The pilot routes file
    - Read this file second
    - Each line in the file will contain the pilot's name followed by a list of planets
        - Each planet will be separated by a space
        - Example: Sully_Olvar Tatooine Dagobah Naboo Yavin Alderaan
        - The first vertex listed is the starting vertex of the patrol
    - There will be a new line at the end of each line except for the last line
    - The last line may or may not have a new line character
    - Each line in the file will represent a different pilot.

Output:

- Output will be written to a file named patrols.txt
- For each pilot, print the following to the file separated by tabs
    - Pilot Name
    - Path weight
    - valid or invalid
        - whether or not the path is valid

- Pilots will be sorted from least to greatest path weight
    - In the event of a tie, order the pilot names alphabetically
    - If the path is invalid, the path weight will be zero
- Each pilot's data will be written on a separate line.