Assignment 5 – The Banker's algorithm

In this assignment, you are asked to implement a Python program, that reads information from *banker.txt* file and dynamically grants or rejects requests. The *banker.txt* file is a tab-separated file, and it includes information as described below:

Each line must begin with one of these letters: *e*, *d*, or *r*.

- e: will be used only once, and at the beginning of the file. It is used for describing the number of existing instances for each resource type.
- d: is used to declare a new process. This line will indicate how many instances of each resource type this process requires in total to complete its execution.
- r: is used to indicate resource requests, made by processes. You should execute the banker's algorithm to decide whether requested resources will be granted or not.

A sample *banker.txt* file of a system having only one resource type and five processes, and its output is provided below.

bankers.txt			output
e	10		existing resources are defined (10)
d	a	6	process a is defined with max (6)
d	b	5	process b is defined with max (5)
r	a	1	process a requests (1) -> granted
r	b	1	process b requests (1) -> granted
d	c	4	process c is defined with max (4)
d	d	7	process d is defined with max (7)
r	c	2	process c requests (2) -> granted
r	d	4	process d requests (4) -> granted
r	b	1	process b requests (1) -> rejected
r	a	2	process a requests (2) -> rejected
r	d	3	process d requests (3) -> rejected
r	c	2	process c requests (2) -> granted ... process c is complete
r	a	3	process a requests (3) -> rejected
r	a	1	process a requests (1) -> granted
r	d	2	process d requests (2) -> granted
r	b	1	process b requests (1) -> rejected
r	a	1	process a requests (1) -> rejected
r	d	1	process d requests (1) -> granted ... process d is complete
d	e	4	process e is defined with max (4)
r	a	3	process a requests (3) -> granted
r	e	3	process e requests (3) -> granted
r	b	1	process b requests (1) -> rejected
r	b	3	process b requests (3) -> rejected
r	e	1	process e requests (1) -> granted ... process e is complete
r	a	1	process a requests (1) -> granted ... process a is complete
r	b	2	process b requests (2) -> granted
r	b	2	process b requests (2) -> granted ... process b is complete

The input and its output should be updated as follows when there are more than one resource types:

bankers.txt	output
e 4 2	existing resources are defined (4, 2)
d a 2 1	process a is defined with max (2, 1)
r a 0 1	process a requests (0, 1) -> granted
…	…

The assignment is due by 23.59 on April 29th. It must be submitted as a single .zip file, containing all your source codes, a simple README file on execution details, and any additional files you would like to add, to hkiziloz+asg5@nd.edu. You may send multiple copies, if necessary. Only your latest submission will be evaluated.

You are expected to complete the assignment individually. Please refer to the CSE Guide to the Honor Code (https://cse.nd.edu/undergraduates/honor-code) when searching for help from other students and/or available sources. Simply, you may consult resources, but you must cite if you copy them. On the other hand, you may not consult or copy solutions in your assignment.