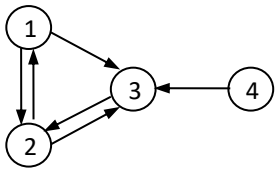
CS583 – Programming Assignment 4

Demo date: the week of Nov. 30, 2020

Task: Implement the PageRank algorithm in our textbook. Note that there are slight variations of the algorithm. You must implement the version given in the lecture.

Input: A graph like the following represented as an adjacent matrix.




```
(0  1  1  0
 1  0  1  0
 0  1  0  0
 0  0  1  0)
```

Output: Please print the following results in a text file. For each decimal number, please round it to only two digits after the decimal point.

a. Print the initial transition probability matrix following the matrix format above.

b. If the transition probability matrix is not a stochastic matrix, convert it to a stochastic matrix and print the resulting matrix in the same format as above.

c. If the resulting matrix is not irreducible, convert it to an irreducible matrix and compute and print the matrix with $d = 0.9$ in the same format as above.

d. Run two iterations of the power iteration algorithm and print out the PageRank value of each node in a vector like the following:

   (0.3 0.4 0.45 0.33)

   Note: this vector is an example. It isn't the vector of PageRank values of the nodes in the figure.

Test data. The test graph represented as an adjacent matrix like the input matrix above will be given to you at the demo time.

Project team: This is a team project. Each team/group can have no more than 2 students.