COMP 6651: Algorithm Design Techniques
Fall 2017: Programming Assignment 3
Due: November 22, 2017 at midnight

1 Problem

Your task is to implement and analyze the Page Rank algorithm, which is one of the algorithms used in web search. Given a graph of web pages, the algorithm computes a rank for each page, called its PageRank that measures its relative importance among the set of web pages.

You are given as input a text file called `links`. On every line of this is pair of URLs (w_1, w_2) separated by a comma. The pair w_1, w_2 denotes the fact that webpage w_1 points to w_2.

Your job is to compute the PageRank of every webpage mentioned in the file `links`.

Write your output into a file called `Output.txt`. This file contains on every line a webpage and its page rank separated by a comma. Webpages should be sorted in decreasing order of page rank.

Analyze the performance of the algorithm in the following ways.

1. What is the effect of the size of the input on the convergence time?

2. What is the effect of the scaling factor on the convergence time?

3. What is the effect of the type of input graph on the distribution of page ranks? Consider at least two models of random graphs.

Some test cases will be provided on the course website. You should verify if your programs work on the test cases before submitting. Your code will also be tested on some larger input files which are not given to you in advance.

2 Requirements

You must submit a zip file containing the following three items:

- Source code for the algorithm written in C#/C++/Java and

- A report with the results of your analysis.

- The data files you used in your analysis.

3   Programmer-on-duty

There will be a programmer-on-duty, Meghrig Terzian, available to help you with the assignment in the lab H-827 on Tuesdays and Thursdays from 5-8 p.m.