Web Science

Assignment #4

PageRank

Master 1 IFI — DSC — International
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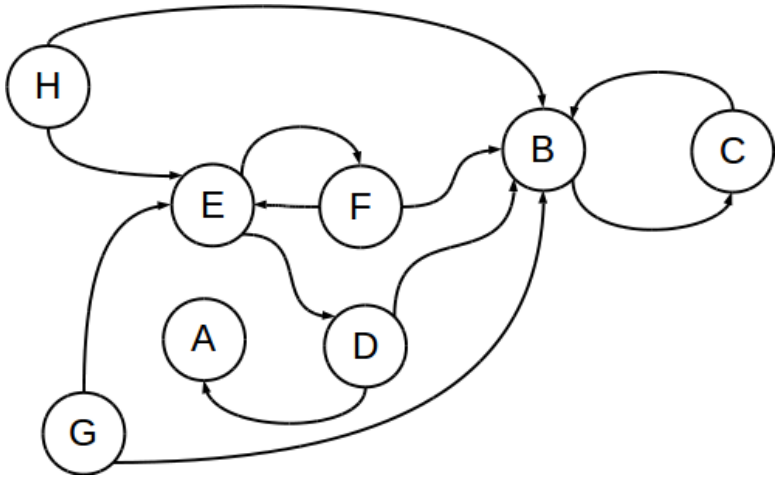
Consider the follwoing graph, representing a tiny subset of the pages of the WWW:



1. Write the corresponding matrix $\mathbf{S}$, as explained during the class.
2. Compute, from matrix $\mathbf{S}$, matrix $\mathbf{G} = \delta\mathbf{S} + (1-\delta)\mathbf{E}$, for $\delta = 0.85$ and a teleportation matrix $\mathbf{E}$, whose rows consist of the vector $\mathbf{u} = (1/n, \ldots, 1/n)$.
3. Compute vector π, solution of the equation $\pi = \pi\mathbf{G}$, using the power method. Carry out the calculations for at least two iterations of the method.

Bonus Code, using your favorite programming language among C, C++, Java, Python, and R, a program taking as input a text file containing matrix $\mathbf{S}$ (the number of pages n on the first line, followed by n lines, each containing n positive numbers separated by tabulations) and computes vector π under the same assumptions as above.

Submission Format Please submit your paper on a sheet, marked with your given and family name; your solution should show all the passages in detail. If you opt for the bonus, please send your code by e-mail to your instructor before the end of the session.