1) a) Given the simplified link diagram between webpages P_1, P_2, and P_3 described by

- P_1 links to P_2 and P_3
- P_2 links to P_3 and P_1
- P_3 links to P_2,

find the PageRank of P_3, using $d = .85$ by i) constructing the link matrix A, then ii) finding the normalized matrix B, iii) calculating the PageRank matrix C, and finally iv) finding the associated eigenvector v with all positive entries whose 1-norm is equal to one and reading off the PageRank. NOTE: last I checked, Wolfram Alpha is VERY stupid here and cannot see that 1 is actually an eigenvalue.

b) Same problem as a), except now P_1, P_2, and P_3 are related as follows:

- P_1 links to P_2
- P_2 links to P_1
- P_3 doesn't link to anything.

Observe how, with a small number of webpages, the PageRank can be skewed by an isolated site.

c) Same problem as a), except now you have 5 pages P_1, P_2, P_3, P_4, and P_5, the pages are related by

- P_1 links to P_2
- P_2 links to P_3
- P_3 links to P_4 and P_5
- P_4 doesn't link to anything
- P_5 links to P_1, P_2, and P_4,

and you should find the PageRank of P_5.

d) Same problem as a), except now you have 4 pages P_1, P_2, P_3, and P_4, the pages are related by

- P_1 links to P_2 and P_4
- P_2 links to P_1
- P_3 links to P_4
- P_4 links to P_3 and P_1.

and you should find the PageRank of P_2.