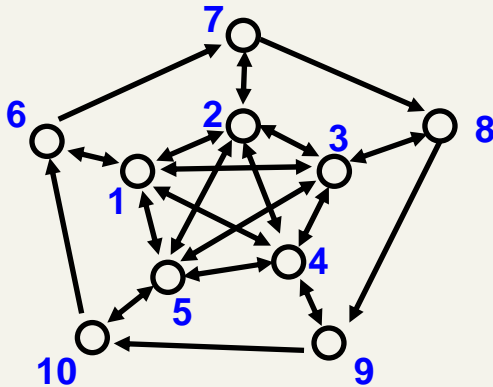


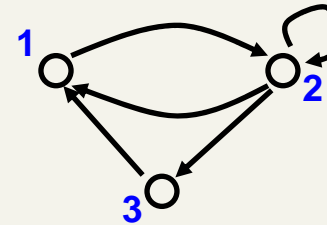
1. If the in-degree distribution of the nodes in a graph is a power law with exponent 2.1 as in the web graph, what is the average in-degree of the pages?

2. For the following graph

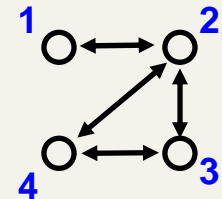
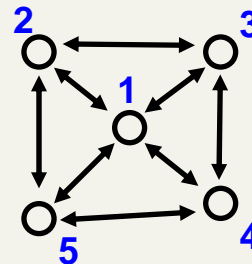


compute the PageRank of each node for general  $\alpha$ .  
(Hint: exploit the symmetries.)

3. Compute the HITS hubs and authority scores of the following graph.



4. Compute the pagerank for the following graphs, for  $\alpha = 0$ :



What is the pagerank in a general graph if all the edges are bidirectional and if  $\alpha = 0$ ?

After observing the scores of the above examples make a conjecture and prove it.