Homework 1

IST 402: Network Science

January 19, 2016

General Instructions

Submission instructions: Submit by the beginning of Tuesday’s class (January 26th).
1 Undirected network – First encounter

Figure 1 shows an undirected network. Answer the following questions.

a) Draw Adjacency matrix of this network.

b) What is the $N, L, \langle k \rangle$ of this network?

c) What is the degree of node $f, k_f$?

d) What is the probability to find a node with degree $k = 3$ in this network?

e) What is the clustering coefficient of node $b$? What is the average clustering coefficient of the network?
2 Directed network – First encounter

Figure 2: An directed network

Figure 2 shows a directed network. Answer the following questions.

a) Draw Adjacency matrix of this network.

b) What is the in-degree of node A? What is its out-degree?

c) Are there strongly connected components in this network? If so, list all strongly connected component(s).

d) What is the probability to find a node with out-degree $k_{out} = 2$ in this network?