Performance Evaluation – Master UBINET
Assignment 1

Solutions have to be sent by December 30th 2012 to `giovanni.neglia@ inria.fr`.

Ex. 1 — (Network analysis)
You are asked to study a real network trace investigating in particular the aspects covered during the first lesson (diameter, average distance, clustering, degree distribution, etc.). You have also to compare the actual trace with the average characteristic of an Erdös-Rényi (ER) graph with the same number of nodes and the same average degree, obtained by generating an adequate number of graph samples. Additional points will be given if you compare the actual trace also with a Configuration Model (CM) with the same number of nodes and the same degree distribution of the real trace. Partial answers, like bounds or Monte Carlo estimations for the quantities of interest, will be taken into account for the final mark.

You can develop from scratch your own code (in C, Java, Python or MatLab) or use existing libraries, like SNAP (`http://snap.stanford.edu/`) or NetworkX (`http://networkx.lanl.gov/`).

The report should be organized as follows. First, describe how you stored and generated the graphs in your program: how you imported the real trace, how you generated the ER graph samples (and the configuration model ones if it is the case). Then, for each metric you want to evaluate, present your methodology, your code (that should be in an appendix), the results you got on the given trace and on the corresponding ER (/CM) samples. Compare the results for the different types of graphs.

In the table below you can find your trace. All the traces are available at `http://snap.stanford.edu/data/index.html`. Directed networks have to be studied as undirected. If there are multiple components, you can simply to study the largest one.

Student	Trace name	Nodes#	Edges#
Boumlik	soc-Epinions1	75,879	508,837
Ertl	soc-Slashdot0811	77,360	905,468
Ha	soc-Slashdot0922	82,168	948,464
Kulankhina	p2p-Gnutella31	62,586	147,892
Melis	soc-sign-Slashdot081106	77,357	516,575
Oita	soc-sign-Slashdot090216	81,871	545,671
Romenska	soc-sign-Slashdot090221	82,144	549,202
Severini	loc-Brightkite	58,228	214,078
Trinh	email-Enron	36,692	367,662

Table 1: Student-trace matching.