Homework of the 8th of October; to be discussed on Oct. 15

Based on the presented generation models and/or your own ideas, construct a **simple** stochastic generation model for Weblike graphs. Use the model to generate a small sample (i.e., at least 10 graphs) of graphs of order 1,000–10,000 — the larger the better, but do keep in mind the limitations set to the graph order by the analysis tools you choose to use.

For each graph, calculate the following measures (approximate as necessary for large graphs for, e.g., calculating the full distance matrix; exponentiating the adjacency matrix in Matlab might help):

(a) density

(b) diameter

(c) clustering coefficient (extra: plot the distribution of the vertex clustering coefficients)

(d) average path length (extra: plot this similarly)

(e) degree distribution, plotted on log-log scale

Examine how these measures average over the sample. Are there large deviations? Can you explain by the model structure why the graphs have the observed properties? Could the generated graphs by classified as small-world and/or scale-free networks?

In addition to the numeric results, write (as pseudo code, for example) how your model works and why (and how) it is a good model for the WWW.

Points for the exercises are awarded as follows: by constructing the model and completing 2–3 of the above tasks (a)–(e) one receives a single exercise point, whereas for completing 4–5 tasks, one receives two exercise points.

In case there are questions and/or comments, send e-mail to `satu@tcs.hut.fi`.