

Network Programming (DM817) — Ugeseddel 3

Lectures in Week 6 We covered parts of the following sections.

- Ahuja 5.2-5.6.
- Ahuja 6.1-6.6 See also BG: 3.5.
- Selected applications from Ahuja 6.2.
- Ahuja 7.1-7.4 (corresponds to BJG 3.6) .
- BJG 3.11.1 (König and Hall's theorem).

In particular we covered the Bellman-Ford algorithm for shortest paths which works as long as there are no negative length cycles in D . We also saw how to detect a negative cycle in a digraph, something which plays a central role in many min cost flow algorithms. We proved the max flow min cut theorem and gave some other important results such as the integrality theorem. We showed how to formulate the problem of finding the maximum number of (edge-)disjoint (s, t) -paths in a (di)graph as an (s, t) -flow problem and then derived Menger's theorem from this formulation. Finally we started on polynomial algorithms for finding maximum (s, t) -flows.

Problems for Wednesday February 15, 2012:

- Ahuja 3.25, 3.27, 3.48, 3.52, 3.53, 3.54, 4.13, 4.37, 6.1, 6.2
- Ahuja 6.22, 6.26, 6.30,6.33, 6.34, 6.35.

Lectures February 14 and 16, 2012:

- Ahuja 6.7. See also BJG 3.8.
- BJG 3.9.
- Ahuja 7.3-7.5.
- The preflow push algorithm. Ahuja 7.6 (corresponds to BJG 3.6.3)
- Ahuja 7.7.
- Ahuja 8.2. BJG 3.7.

Problems for February 22, 2012: This is a preliminary list and there may be more exercises.

- BJG 3.28, 3.33, 3.34, 3.35, 3.45, 3.55
- Ahuja 6.45, 6.46, 6.47