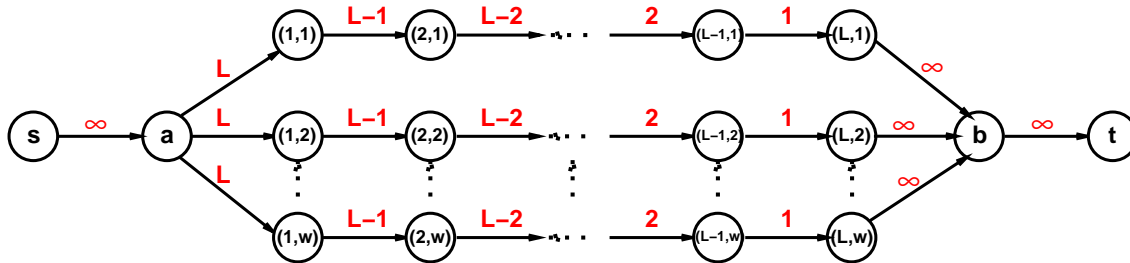


Home work for
Fundamental Algorithms
 SS 2007
 Sheet 8

Exercise 20:



- a) Apply the FIFO preflow push algorithm to the above network
- b) Determine the number of pushes as a function of the parameters w, l .
- c) For a given $|V| = n$, what values of w and L produce the largest number of pushes ?

Exercise 21: Let (G, s, t, c) be a flow network, $G = (V, E)$. For all pairs $(u, v) \in V^2$, define a function $\xi : V^2 \rightarrow \mathbb{R}$ as follows: $\xi(u, v)$ is the increase of the value of a maximum flow, resulting from

- a) setting $c(u, v) = \infty$, if $(u, v) \in E$ or
- b) adding an edge (u, v) with capacity $c(u, v) = \infty$ to E , if $(u, v) \notin E$.

Prove:

- a) $\xi(u, v) \leq \xi(s, v)$ and $\xi(u, v) \leq \xi(u, t)$ for all $u, v \in V$.
- b) $\xi(u, v) = \min\{\xi(s, v), \xi(u, t)\}$ for all $u, v \in V$.
- c) The matrix $(\xi(u, v))_{u, v \in V}$ can be computed by solving $O(n)$ maximum flow problems.