

DM69 — Ugeseddel 5

Husk, at der ikke er timer i uge 10.

Øvelser 13/3

Cormen:

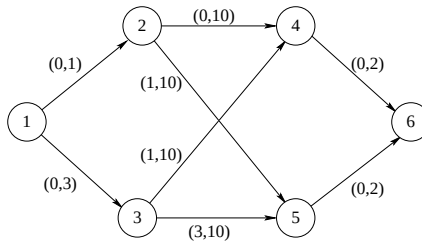
- Opgave 26-3.

Bang-Jensen og Gutin:

- Opgave 3.8.
- Gennemgå eksemplet på s. 129–131.
- Opgave 3.49, 3.50 og 3.52.

Desuden:

- Equivalence of minimum cost flow algorithms.
- (a) Consider the minimum cost flow problem below with $b(1) = -b(6) = 4$ and $b(2) = b(3) = b(4) = b(5) = 0$. The numbers next to the arcs are (c, u) .

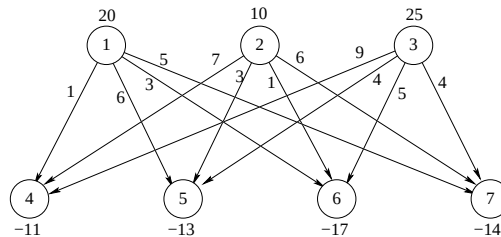


Apply the Buildup Algorithm to this network. Show that it performs four augmentations from vertex 1 to vertex 6.

- (b) Add the arc $(1, 6)$ with sufficiently large cost and $u_{16} = 4$. Setting $x_{16} = 4$ and $x_{ij} = 0$ for all other arcs ij in the network gives a feasible flow. With this flow as the initial flow, apply the Cycle Canceling Algorithm and always augment flow along a negative cycle with minimum cost. Show that this algorithm also performs four unit flow augmentations from vertex 1 to vertex 6 along the same paths as in part (a) and in the same order, except that the flow returns to vertex 1 through the arc $(6, 1)$ in the residual network.

- More for less.

- (a) Consider the minimum cost flow problem shown below. The numbers next to arcs are costs, and the numbers next to vertices are balances. All capacities are infinite.



Show that the following flow is an optimal flow. $x_{14} = 11$, $x_{16} = 9$, $x_{25} = 2$, $x_{26} = 8$, $x_{35} = 11$, $x_{37} = 14$, and $x_{ij} = 0$ for all other arcs ij . What is the cost of the flow?

- (b) Suppose that we increase $b(2)$ by 2 units, decrease $b(4)$ by 2 units, and reoptimize the flow. Show that the cost of the flow decreases.

Forelæsning 14/3

Maksimum pardannelser i todelte grafer:

- Bang-Jensen og Gutin: Afsnit 3.11.1.
- Papadimitriou og Steiglitz: Afsnit 10.1–10.2.
 Til dem, der ikke var til timerne i uge 9, har jeg stillet en kopi på semesterhylden på biblioteket.

Eksamensspørgsmål

Listen af mulige eksamensspørgsmål er blevet lidt længere:

1. Korteste veje i vægtede grafer
2. Strømning i netværk — Edmonds-Karp og Dinics algoritme
3. Strømning i netværk — Preflow-push-algoritmer
4. Strømning i netværk — minimum omkostning