

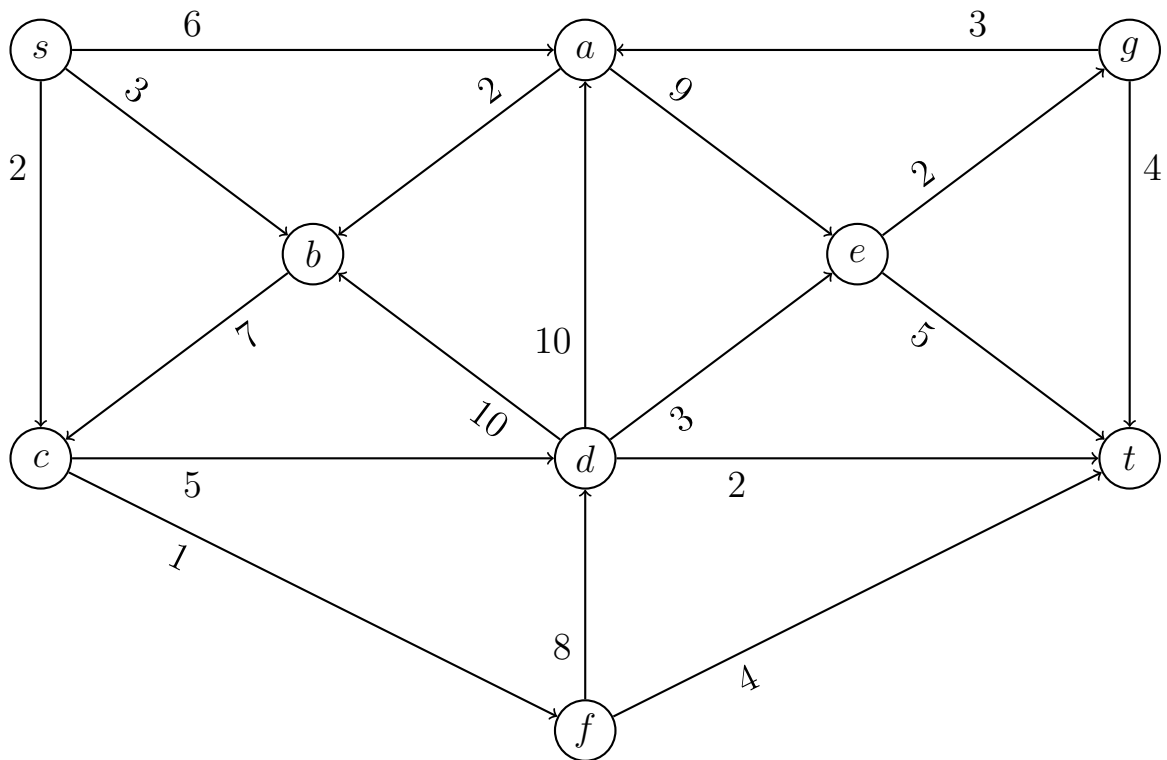
Optimizacijske metode – vaje

Problem pretoka

24.4.2020

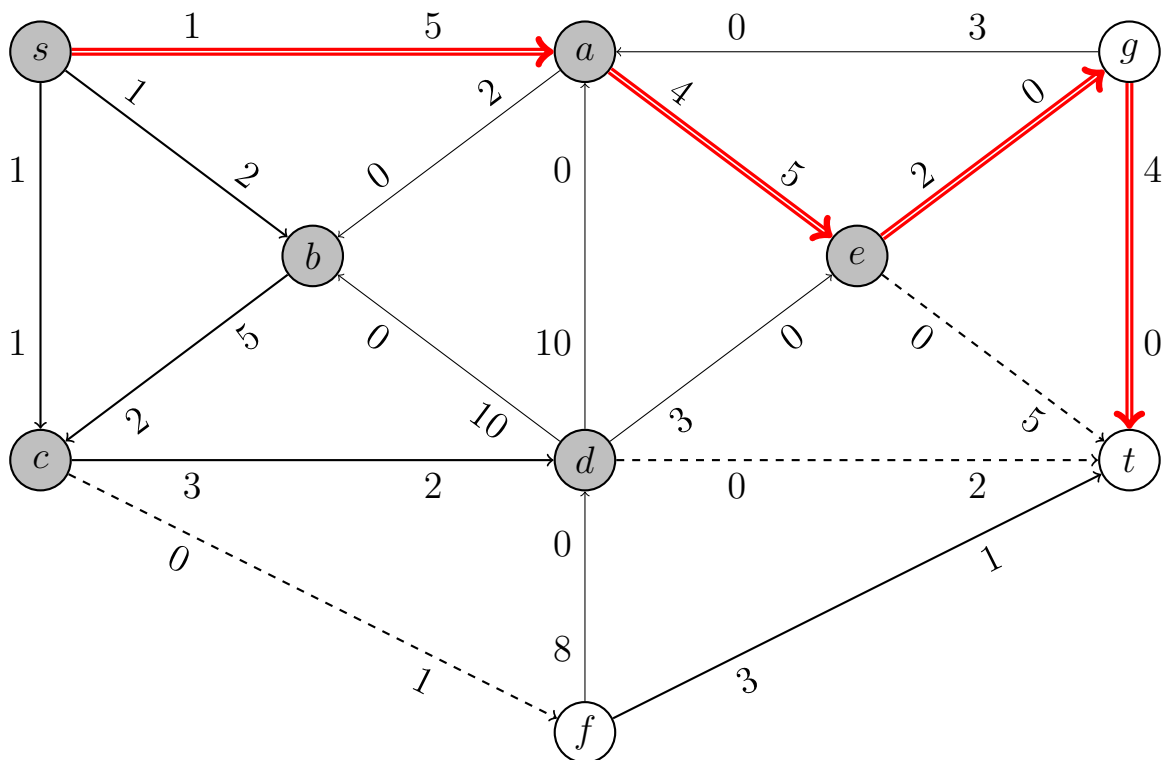
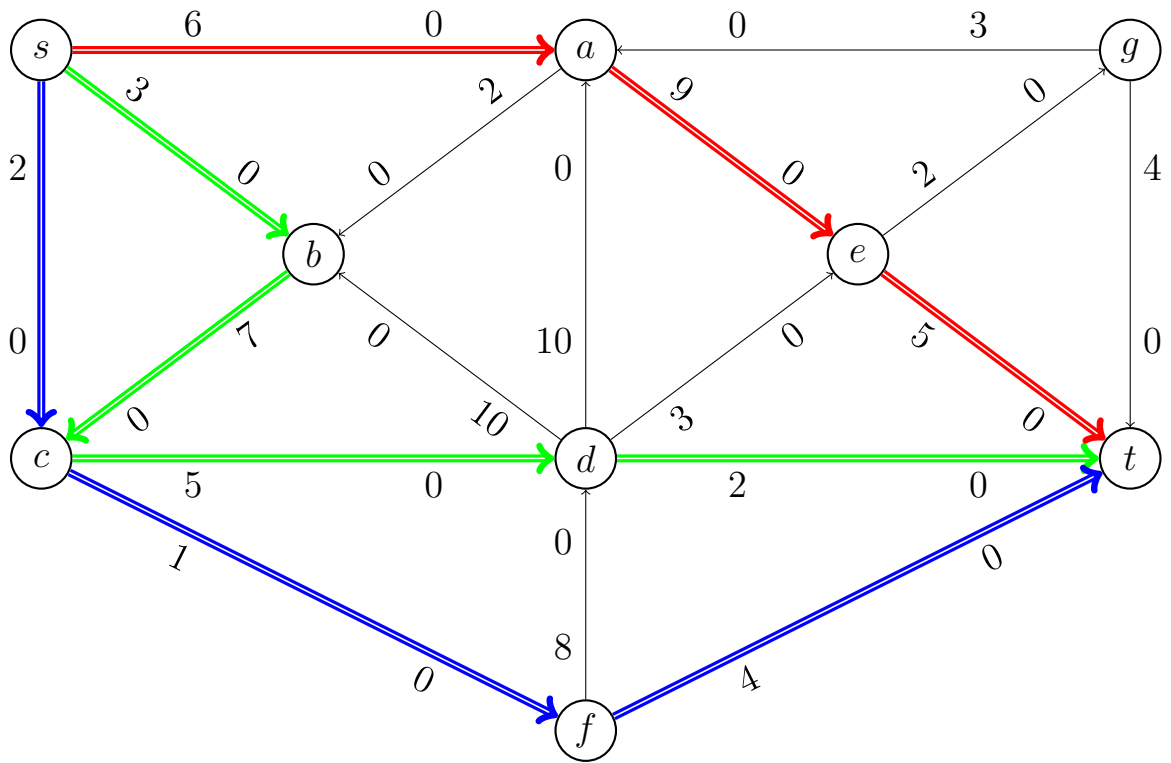
Naloga 1

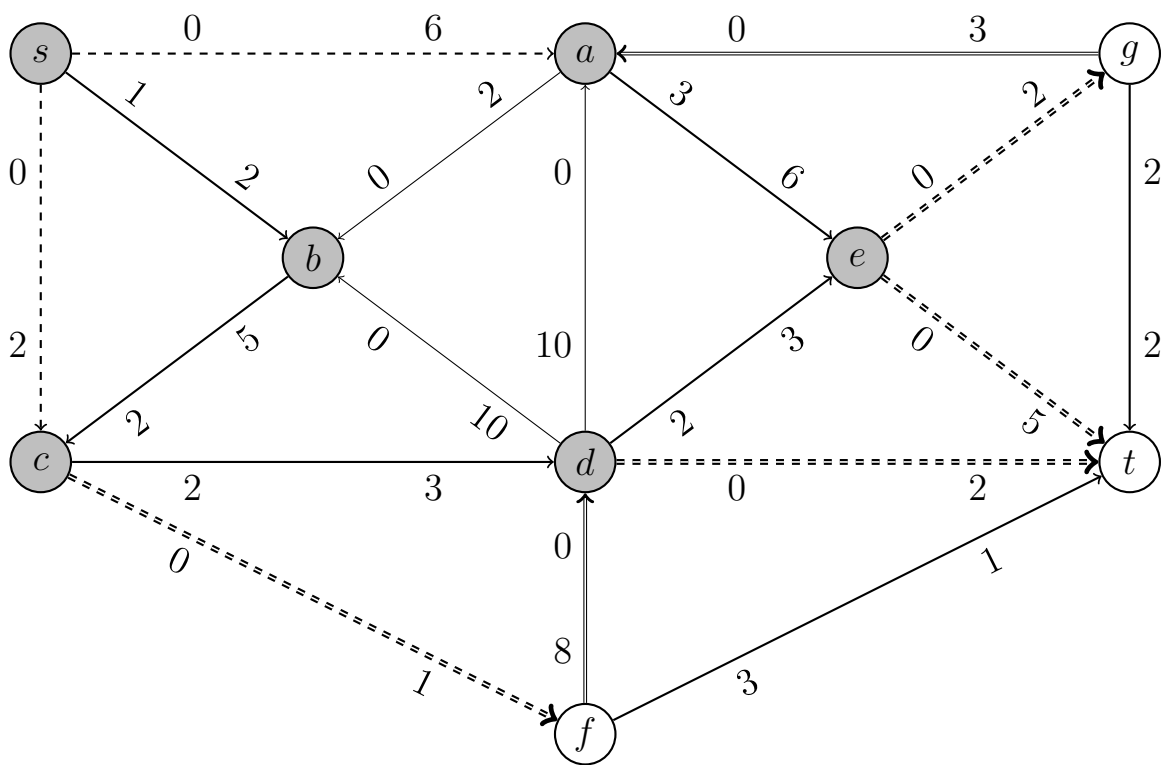
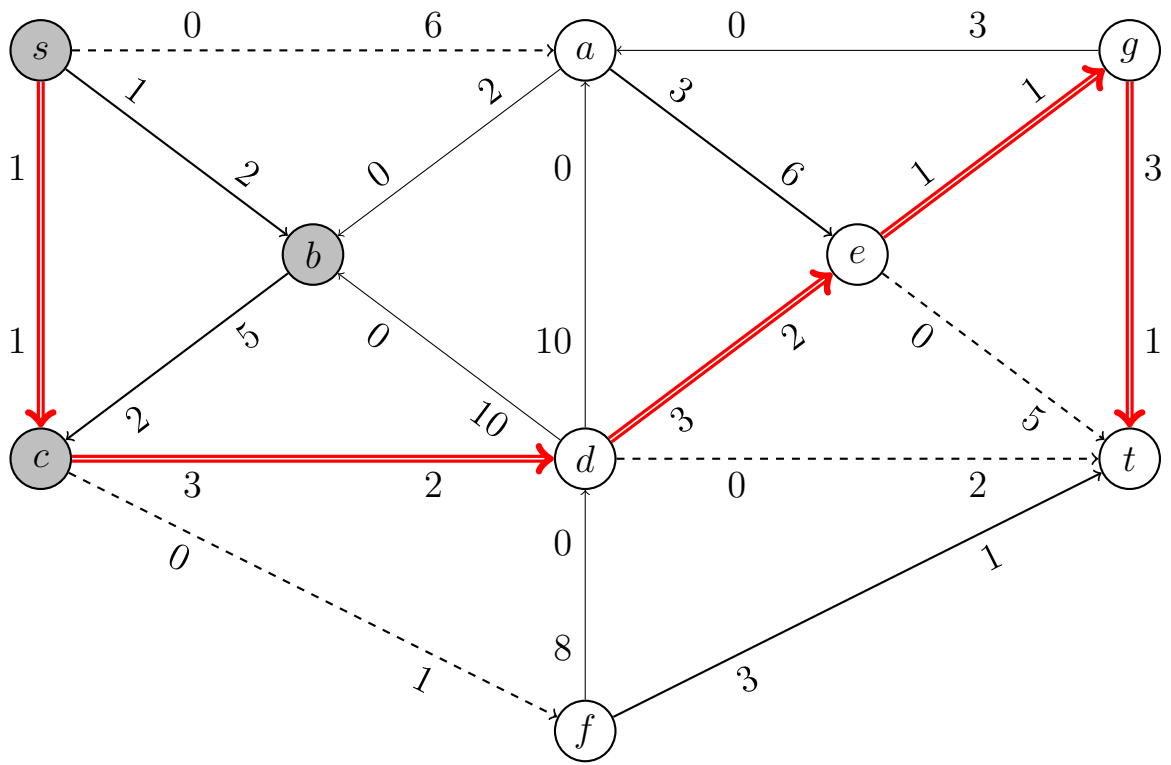
Poišči maksimalni pretok in minimalni prerez na sledečem grafu.



Rešitev

Poiščemo disjunktno povečujoče poti.

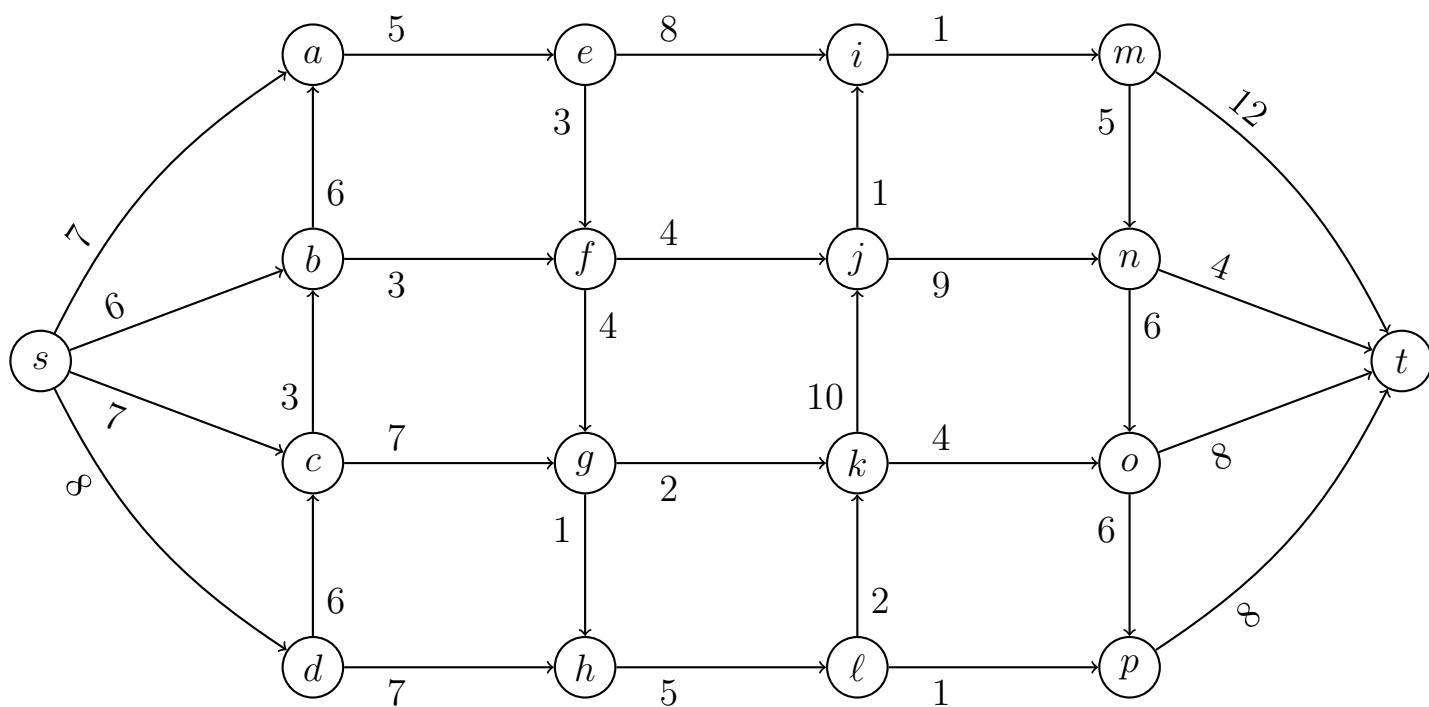




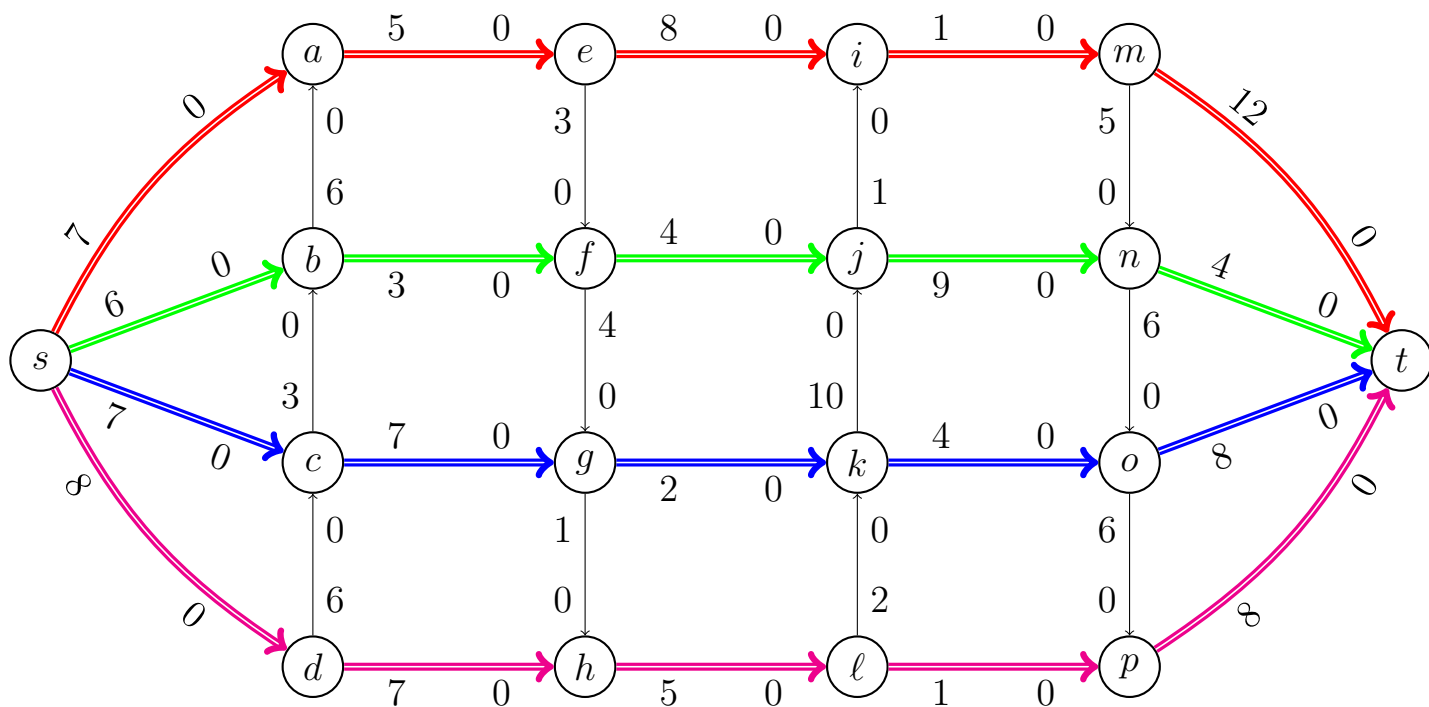
Maksimalni pretok: $6 + 2 + 2 = 1 + 2 + 5 + 2 = 10$, minimalni prerez eg, et, dt, cf , kapaciteta $2 + 5 + 2 + 1 = 10$.

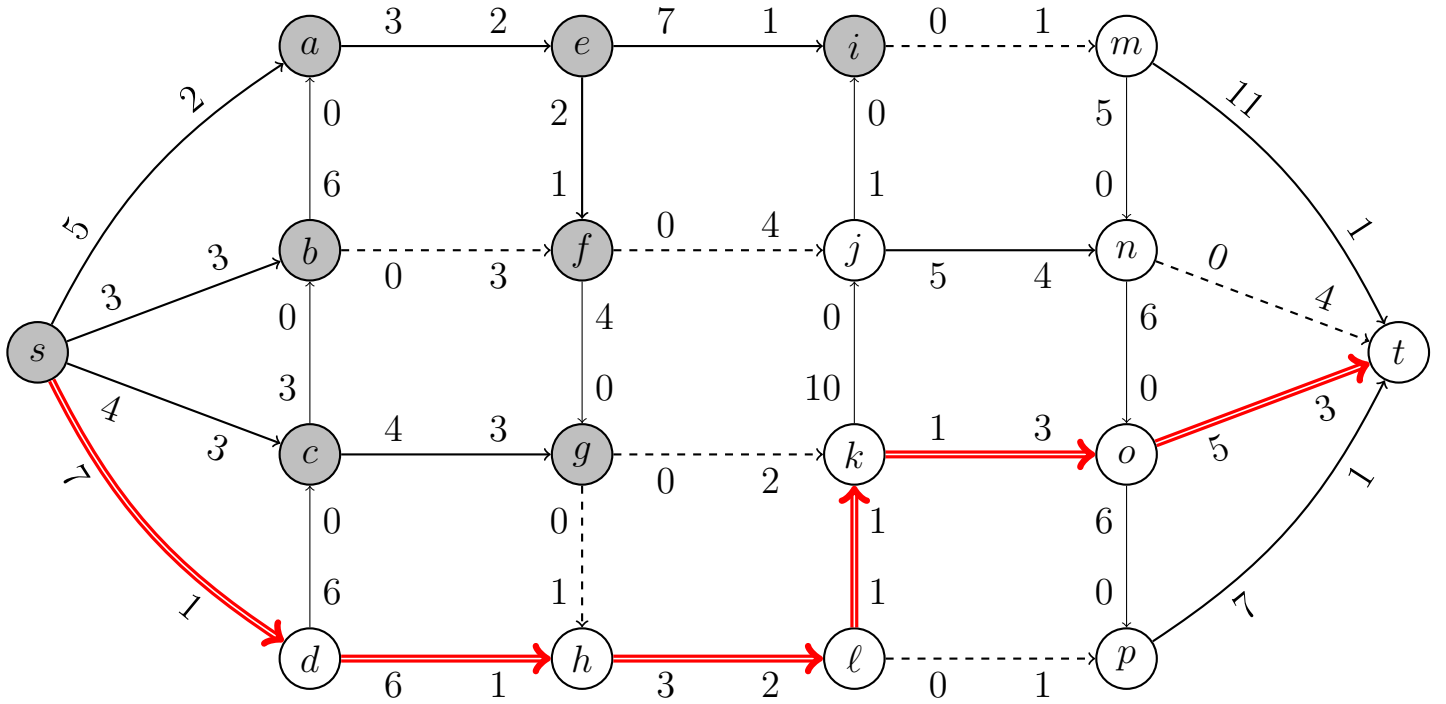
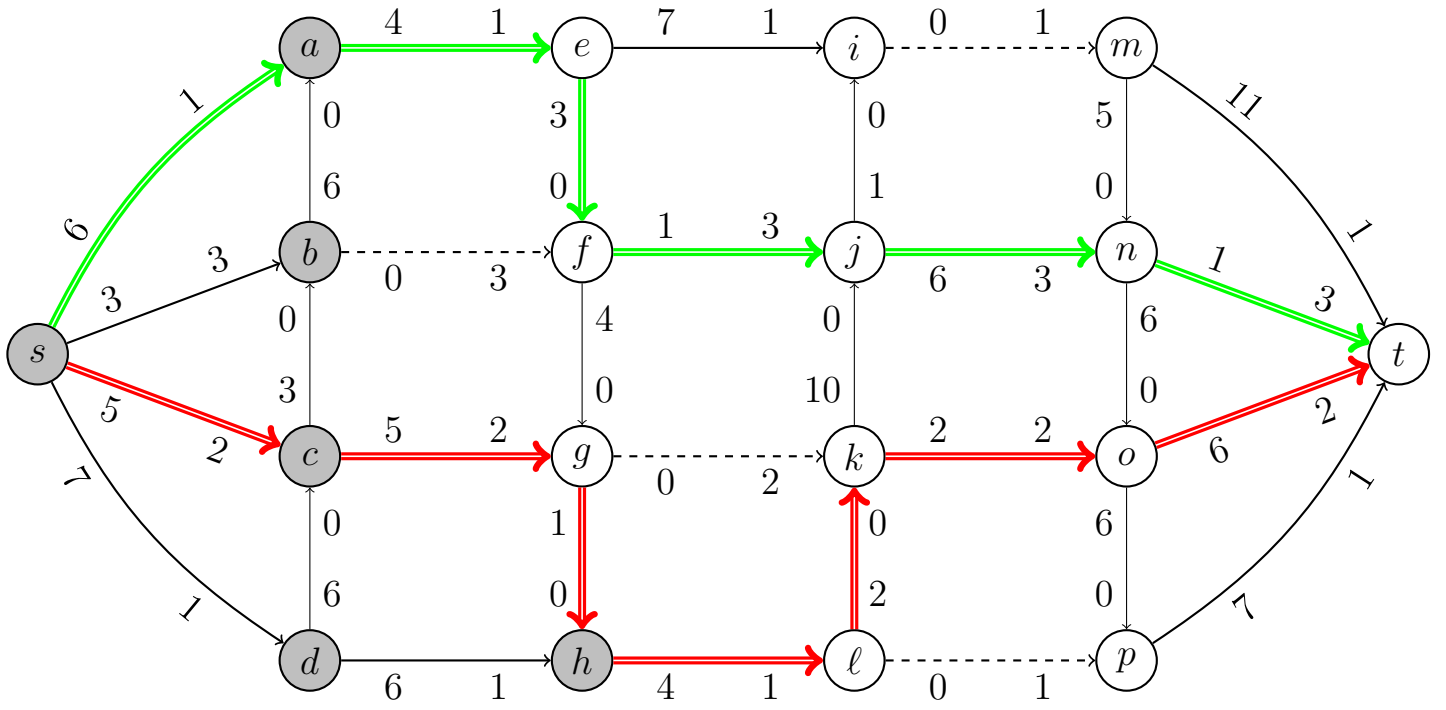
Naloga 2

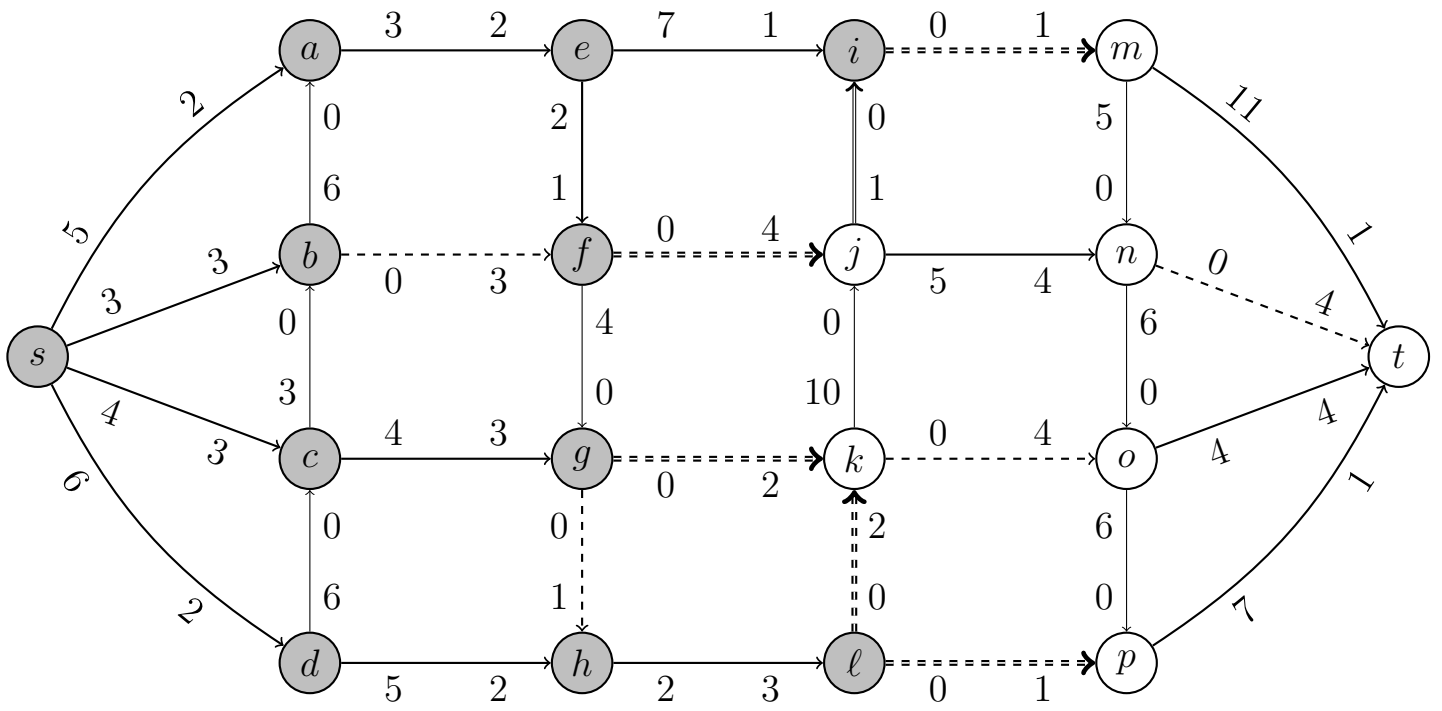
Poišči maksimalni pretok in minimalni prerez na sledečem grafu.



Rešitev



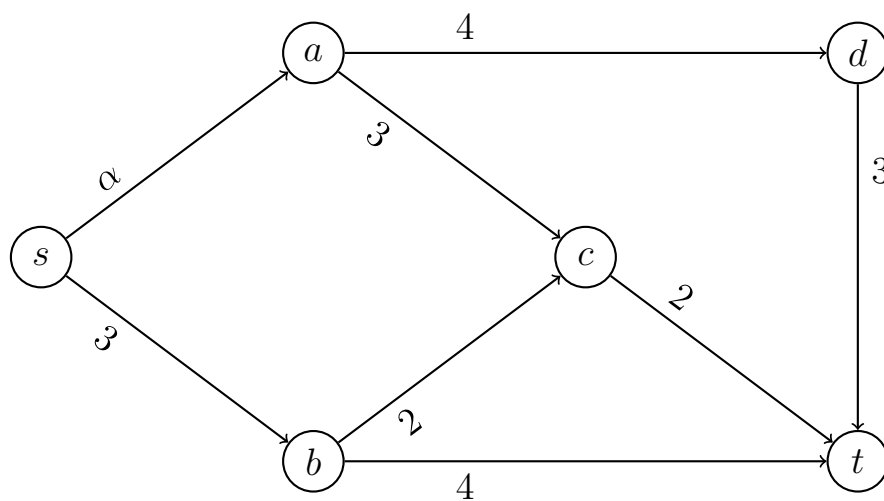




Maksimalni pretok $2 + 3 + 3 + 2 = 1 + 4 + 4 + 1 = 10$, minimalni prerez fj, fk, im, lk, lp , kapaciteta $4 + 2 + 1 + 2 + 1 = 10$.

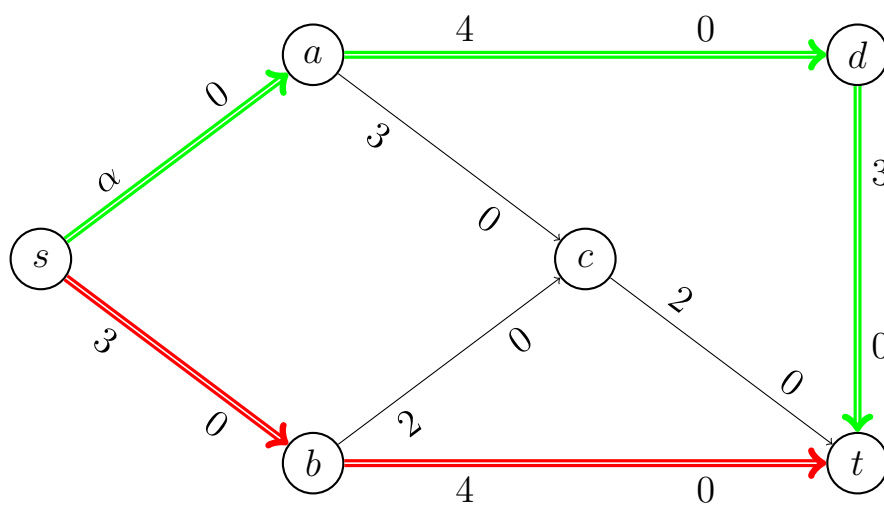
Naloga 3

Poišči maksimalni pretok in minimalni prerez na sledečem grafu v odvisnosti od parametra α .

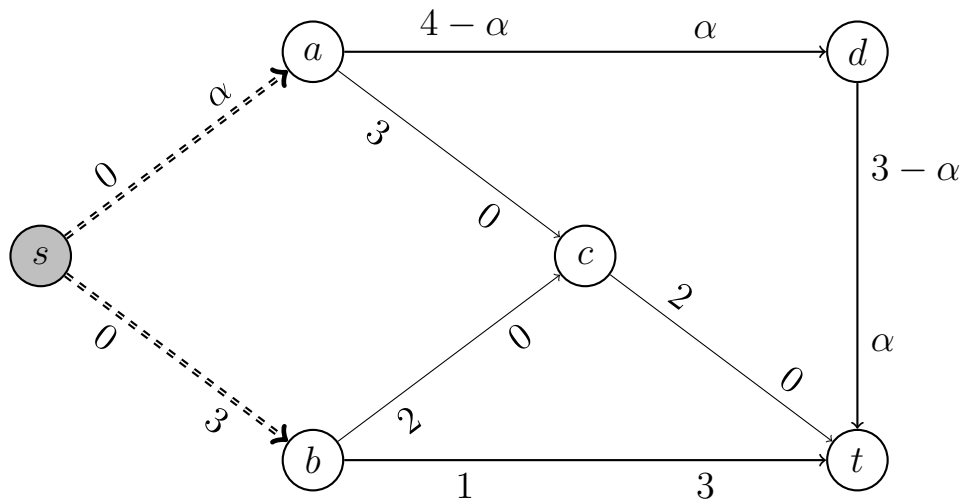


Rešitev

Najprej rešimo nalogo pri $\alpha = 0$.

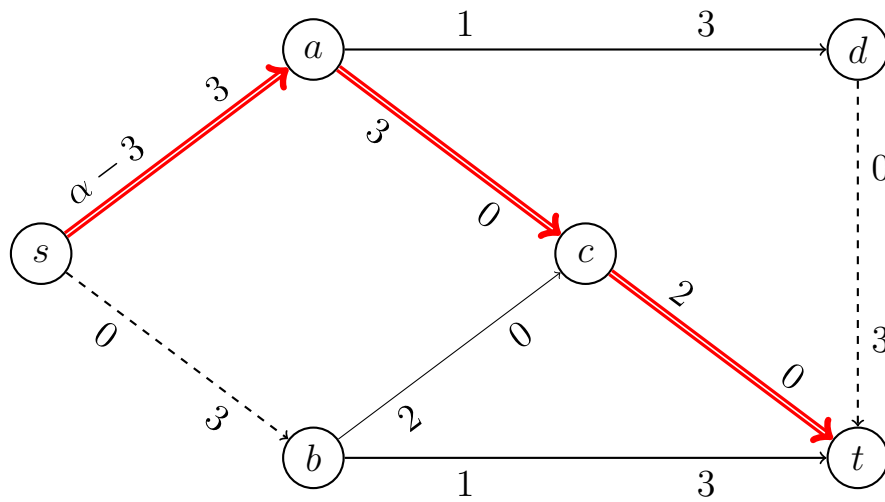


Če je $0 \leq \alpha < 3$, potem imamo maksimalni pretok $\alpha + 3$.

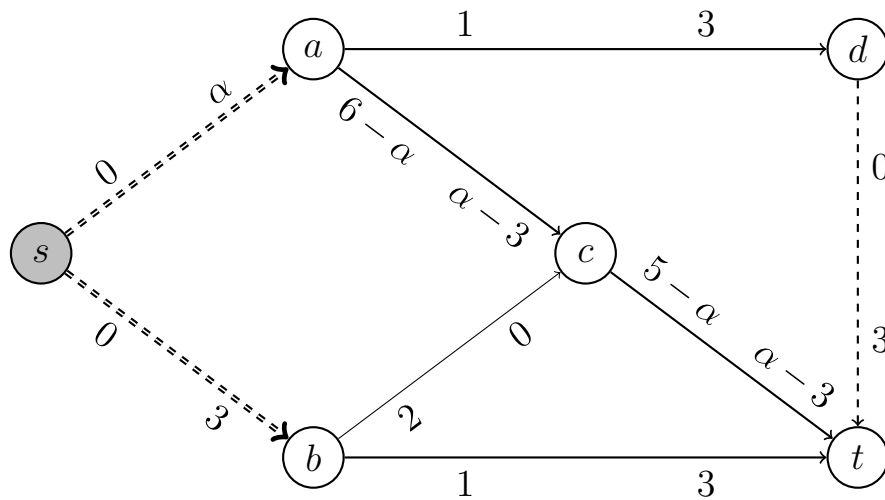


Minimalni prerez: sa, sb , kapaciteta $\alpha + 3$.

Če je $\alpha \geq 3$:

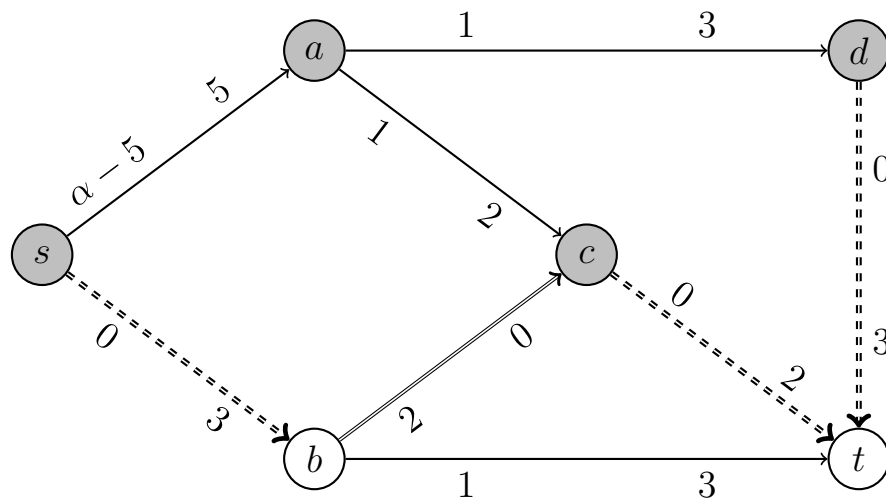


Če je $3 \leq \alpha < 5$, potem imamo maksimalni pretok $\alpha + 3$.



Minimalni prerez: sa, sb , kapaciteta $\alpha + 3$.

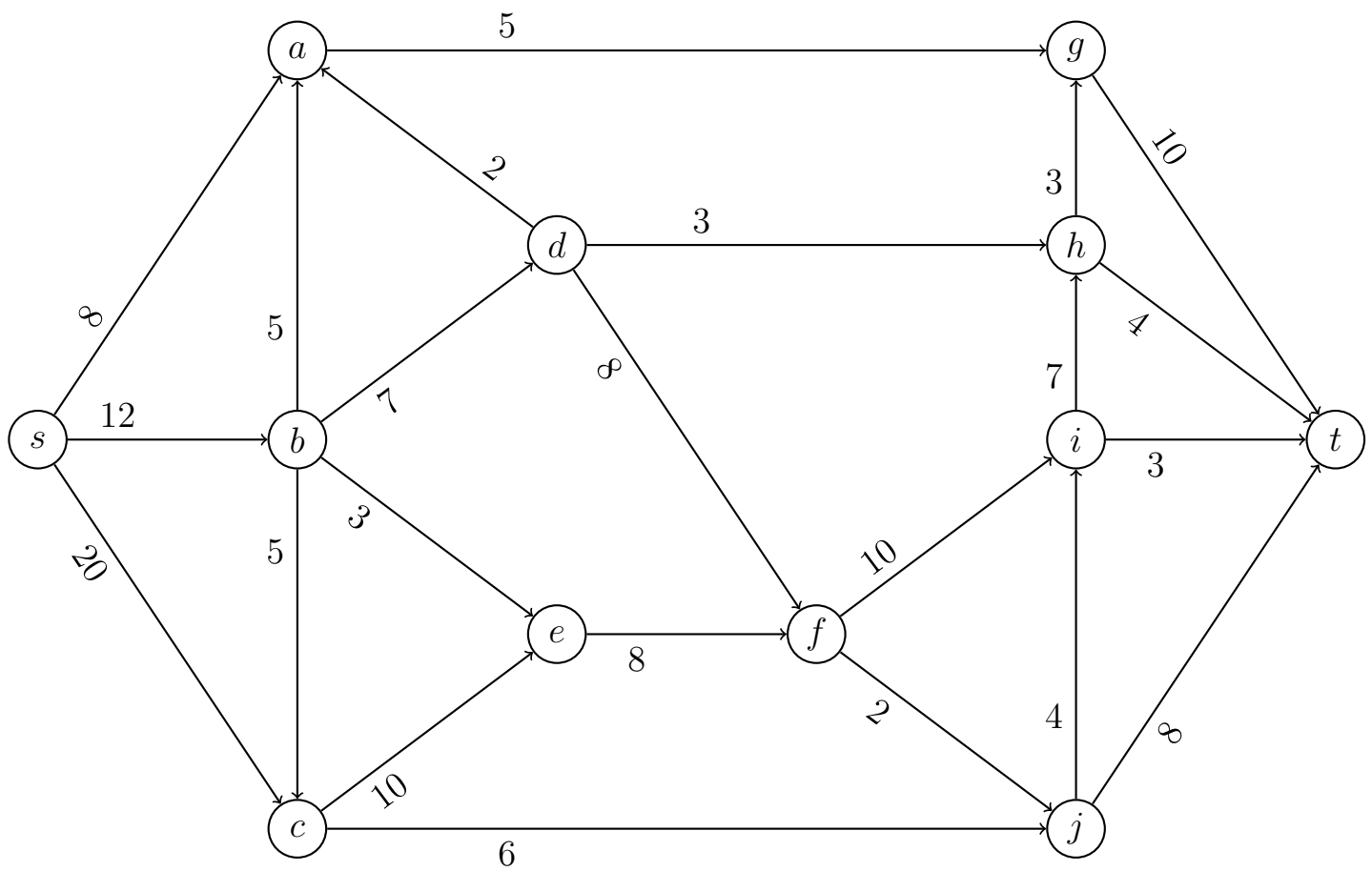
Če je $\alpha \geq 5$:



Maksimalni pretok $5 + 3 = 3 + 2 + 3 = 8$, minimalni prerez sb, ct, dt , kapaciteta $3 + 2 + 3 = 8$.

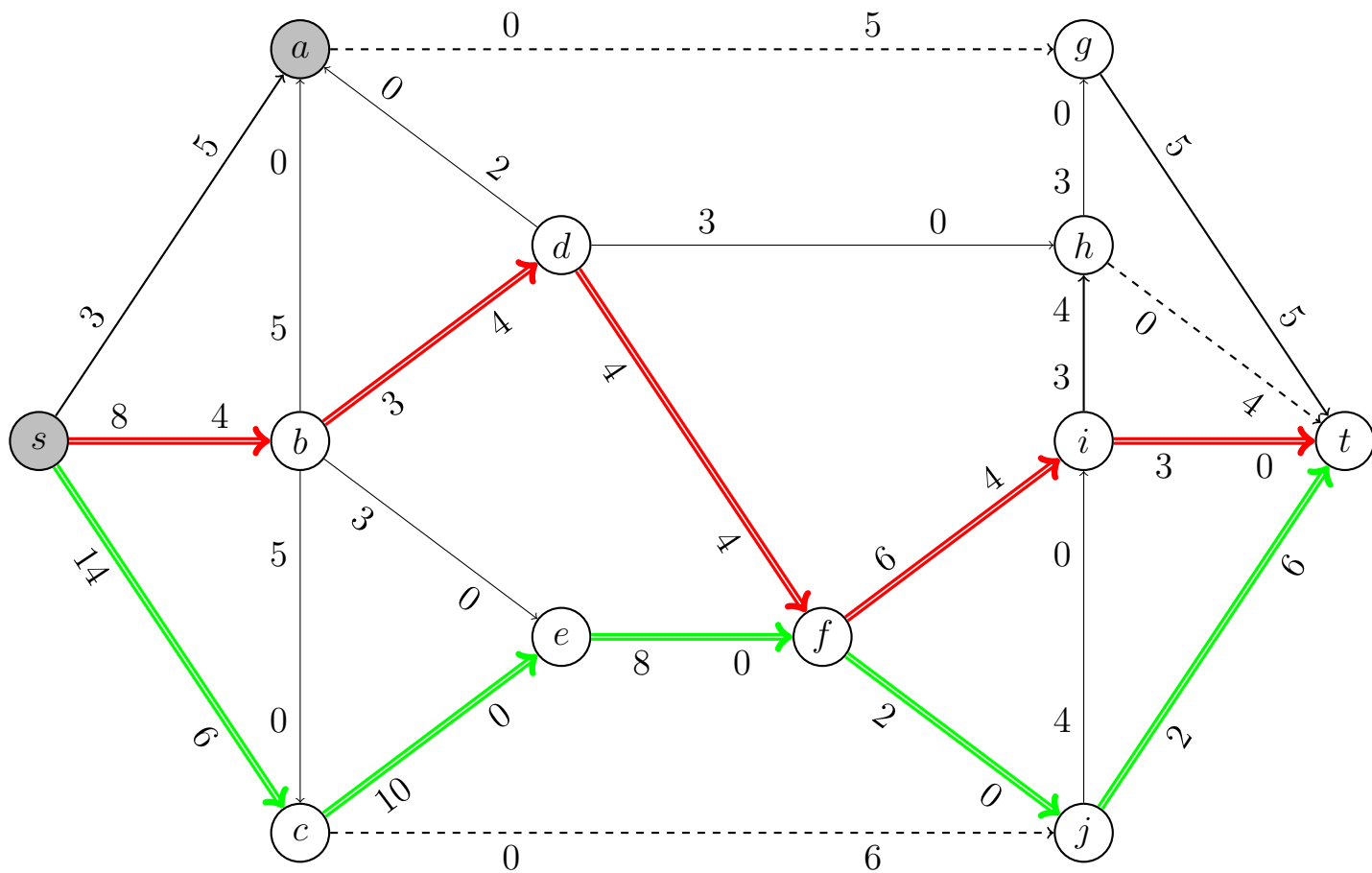
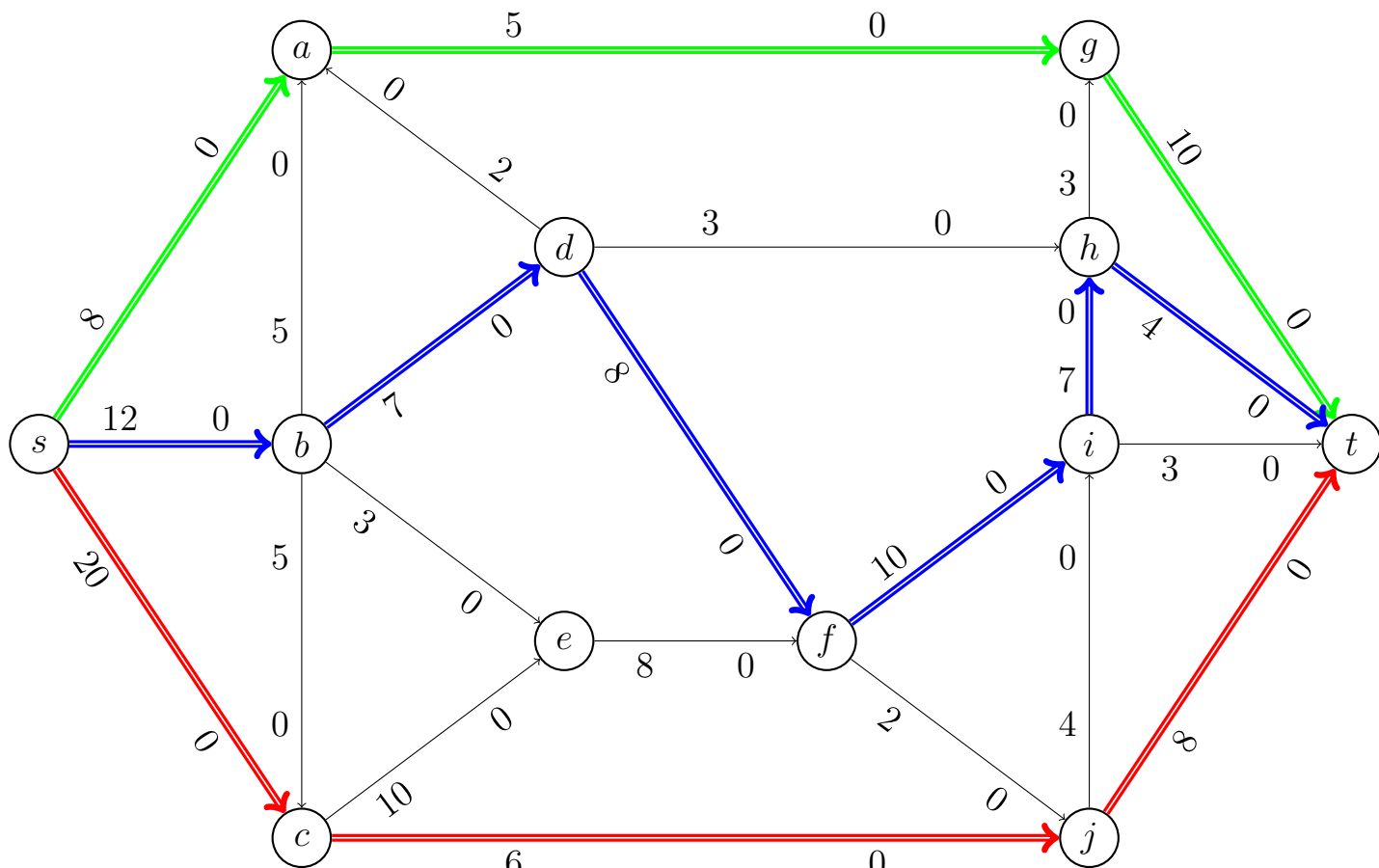
Naloga 4

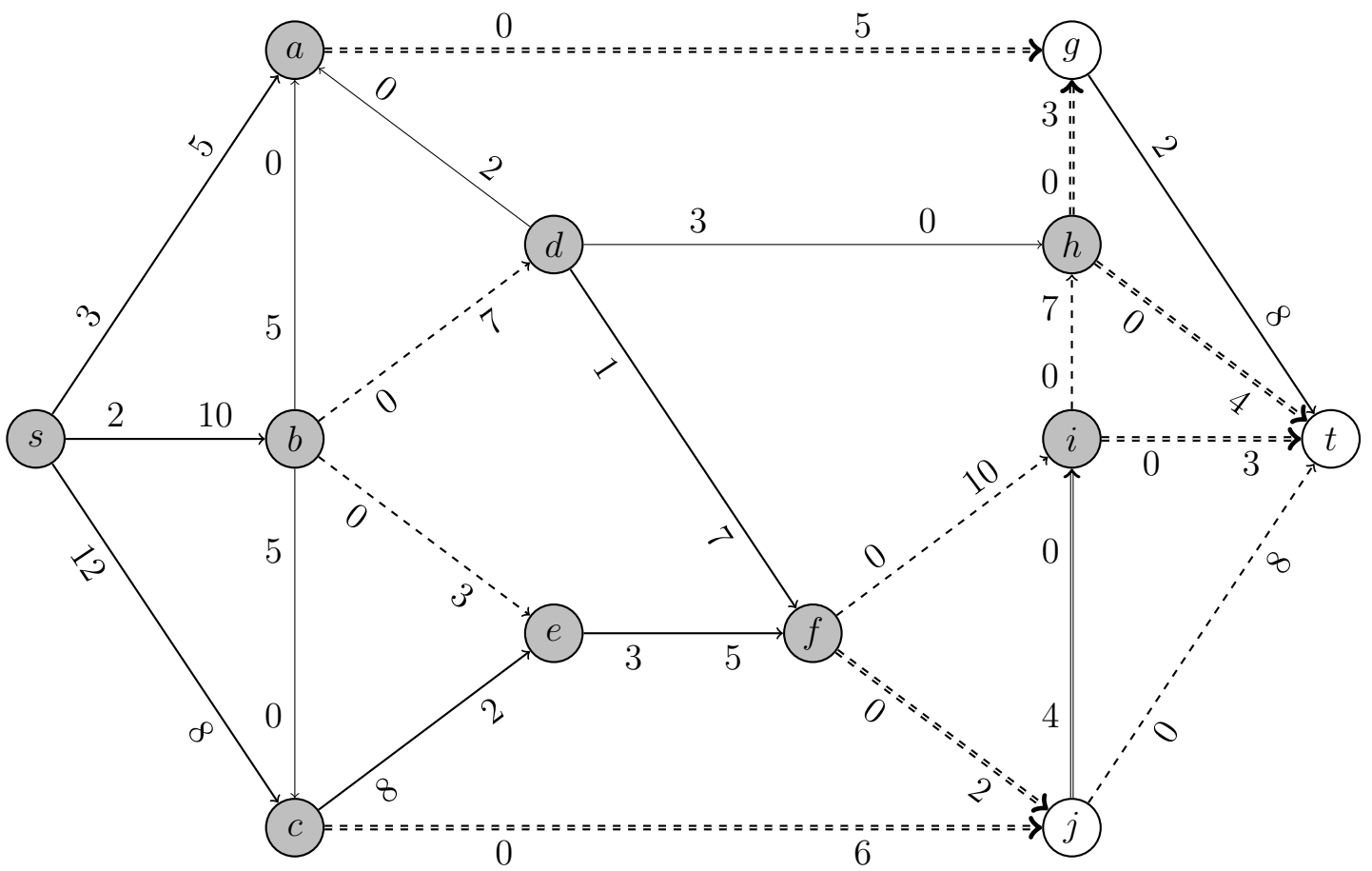
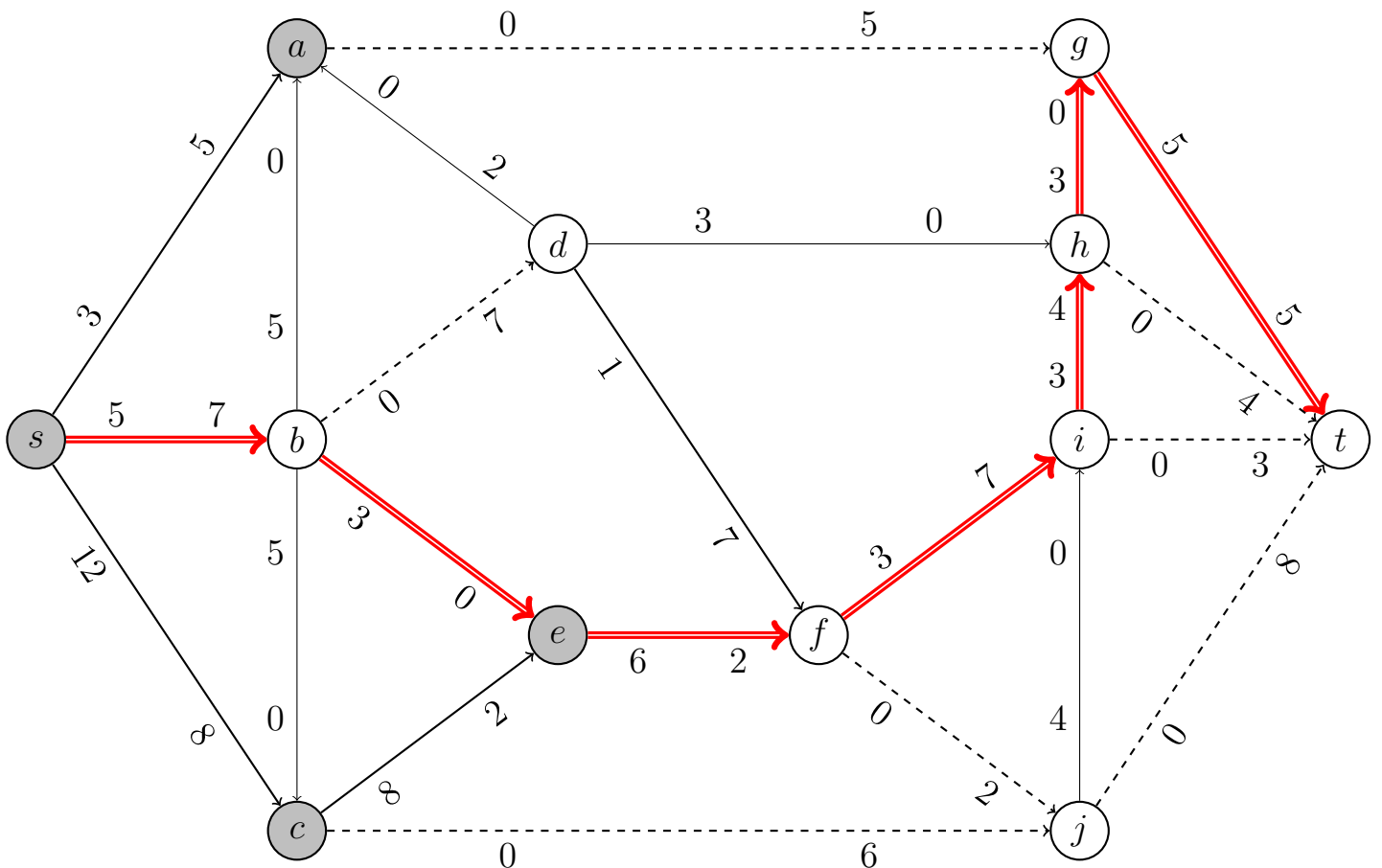
V sledečem grafu lahko kapaciteto ene povezave povečamo za 1. Katera naj bo ta povezava, da bomo povečali maksimalni pretok?



Rešitev

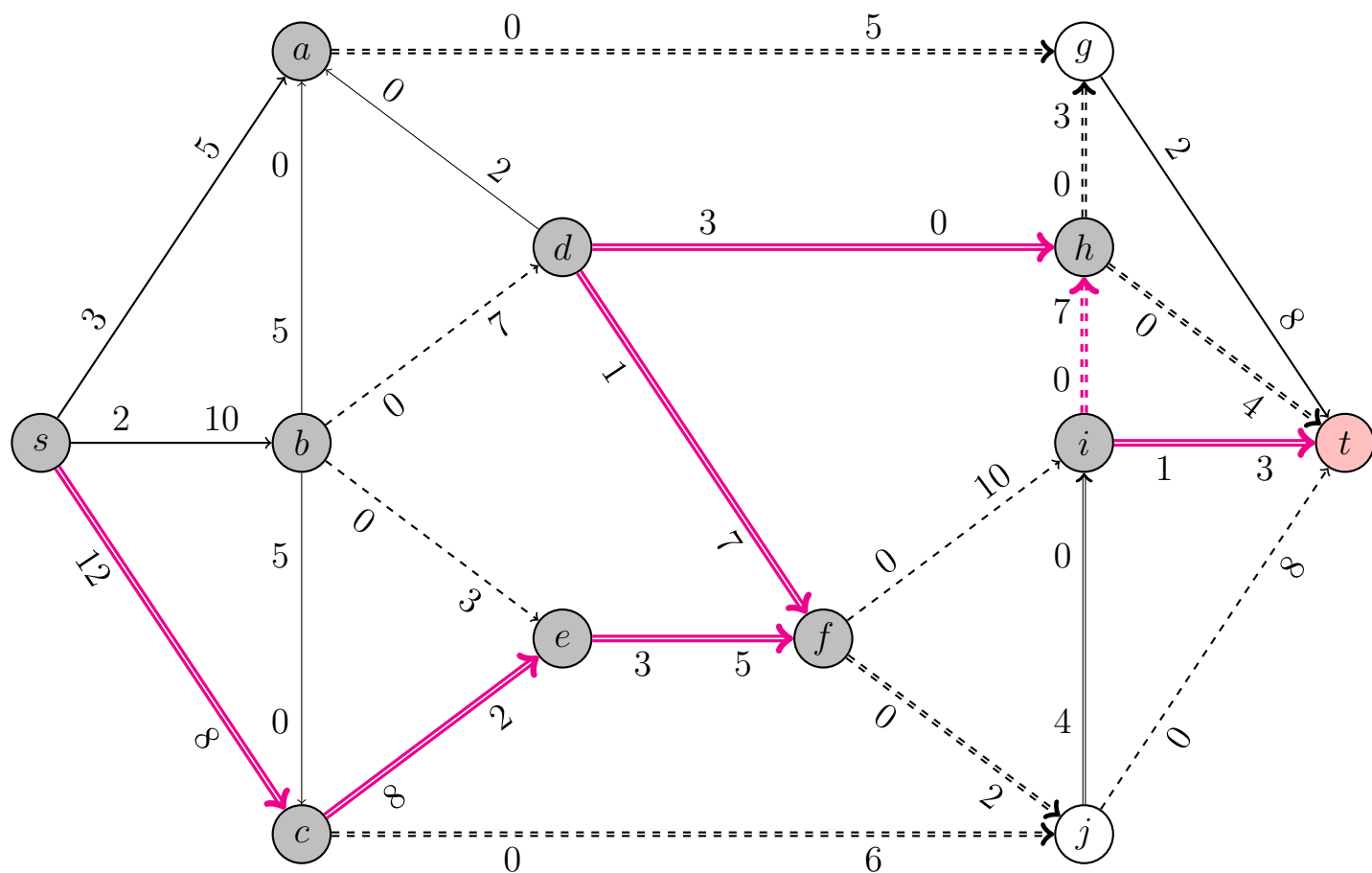
Najprej poiščemo maksimalni pretok in minimalni prerez.





Maksimalni pretok $5 + 10 + 8 = 8 + 4 + 3 + 8 = 23$,
 minimalni prerez ag, cj, fj, hg, ht, it , kapaciteta $5 + 6 + 2 + 3 + 4 + 3 = 23$.

Da povečamo kapaciteto omrežja, lahko povečamo kapaciteto katerikoli povezavi iz minimalnega prereza. Povečajmo kapaciteto povezavi it za 1:



Naloga 5

Poišči maksimalen pretok v sledečem grafu, če ta obstaja!

