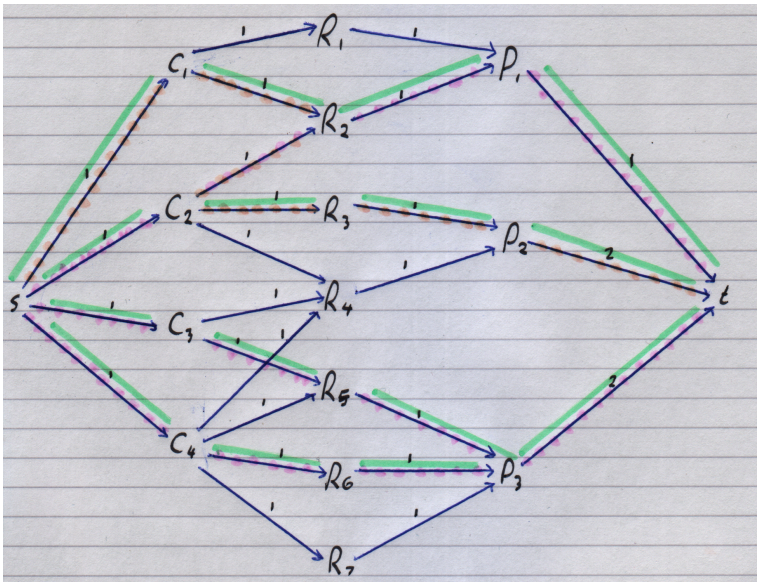
OME: Tutorial, Lecture 3

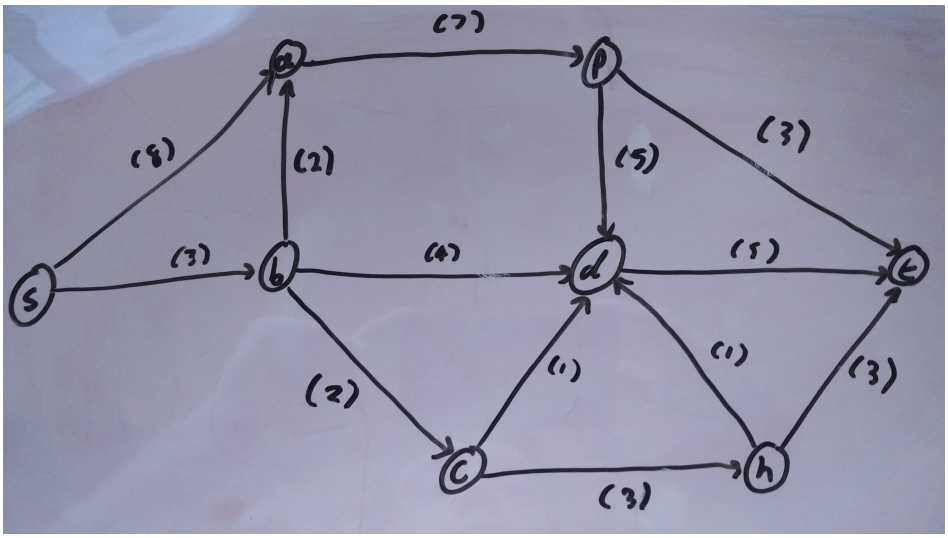
Question 1



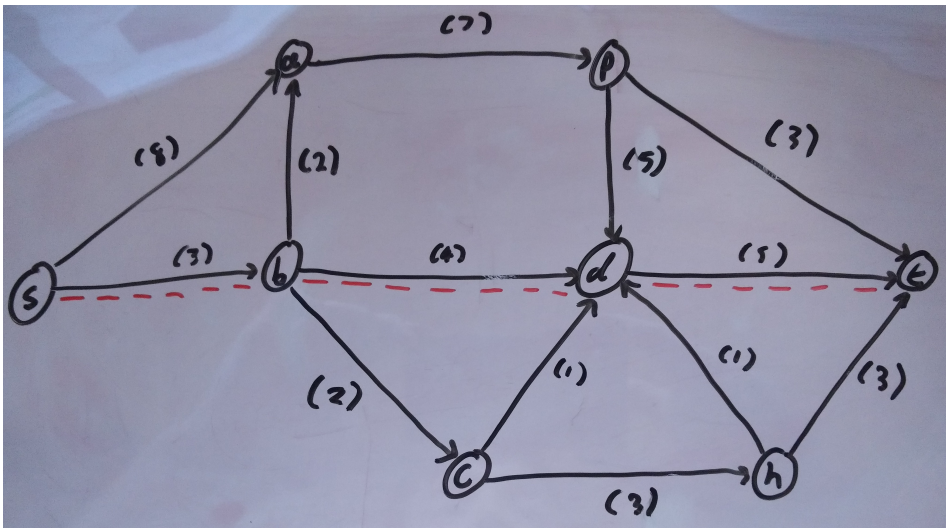
The pre-existing flow, highlighed in pink, had a total value of 3. The orange-highlighted path through the residual network was added. This 'cancelled out' the pink/orange lines and created a maximum flow with a value of 4, highlighed in green.

Question 2

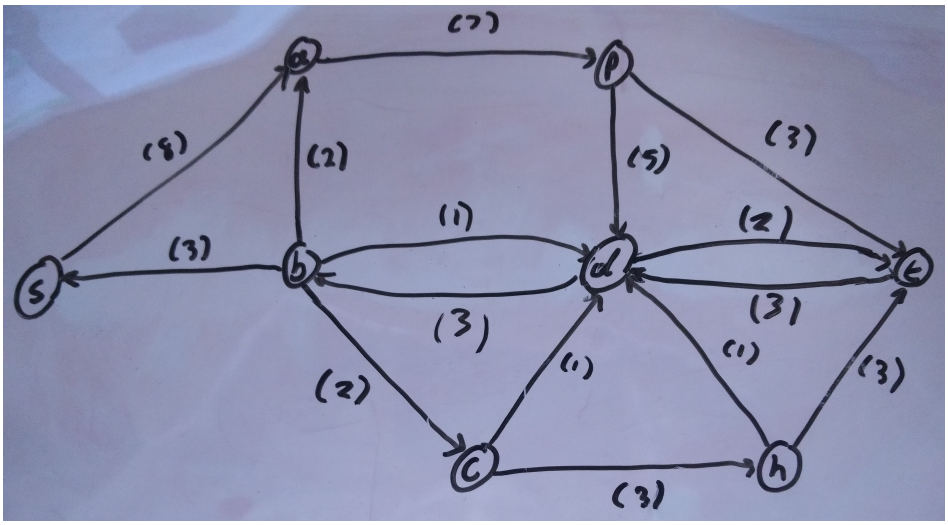
Original network (and original residual network):



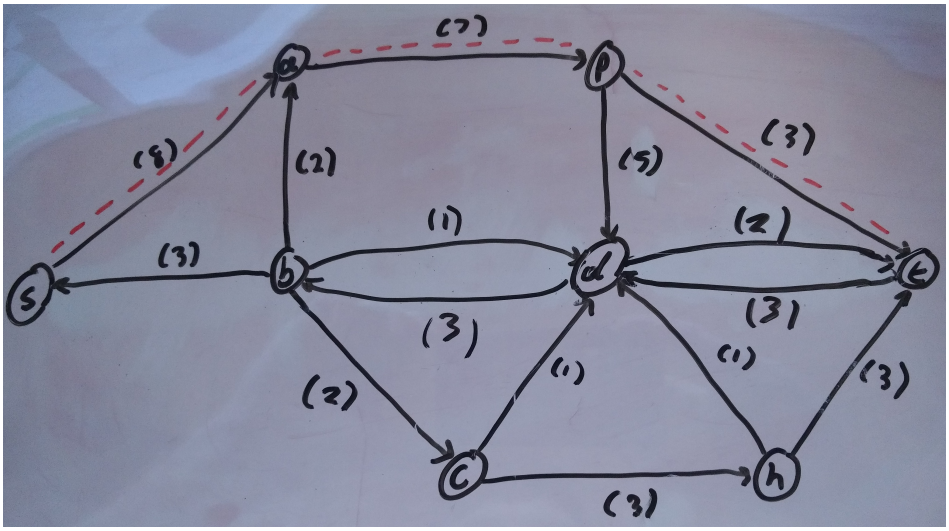
Shortest flow is found in the residual network:



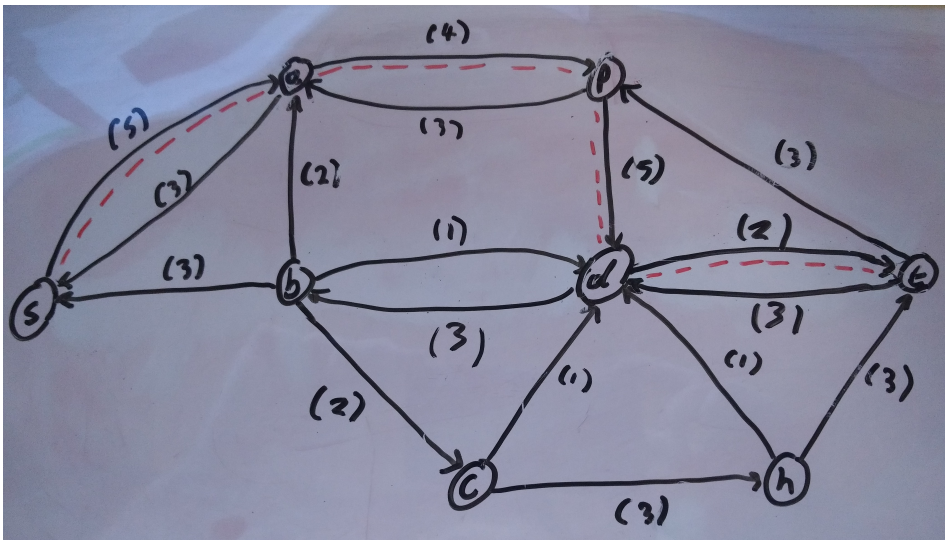
Residual network is updated:



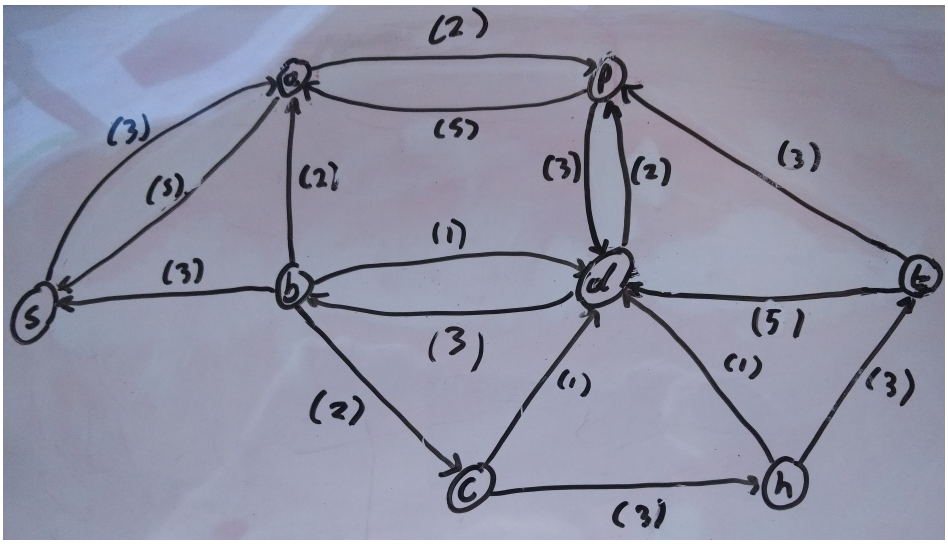
Shortest flow is found in the residual network:



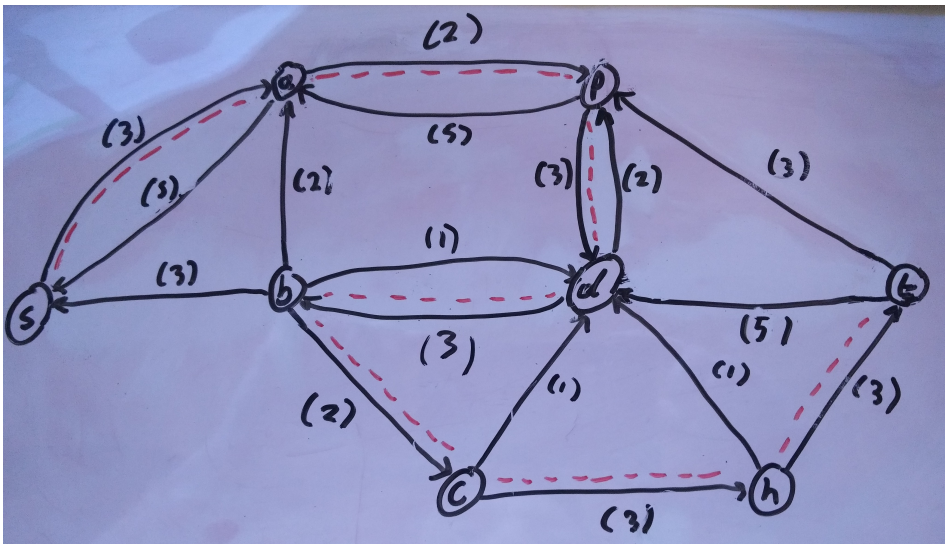
Residual network is updated and shortest flow is found:



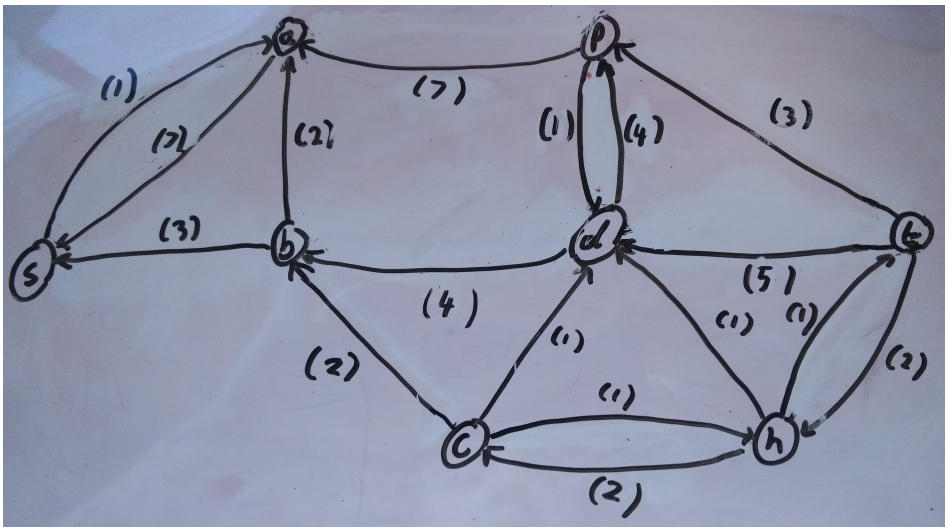
Residual network is updated:



Shortest flow is found in the residual network:

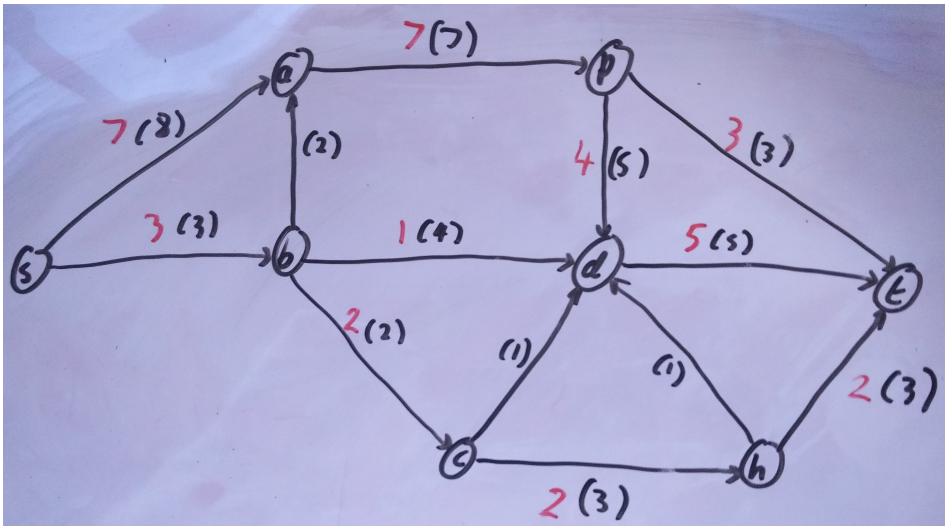


Residual network is updated:



Algorithm stops, because no more paths exist in the residual network.

Final flows:



Question 3

Send 4 units along $\langle s, a, p, d, t \rangle$.

Send 3 units along $\langle s, a, p, t \rangle$.

Send 2 units along $\langle s, b, c, h, t \rangle$.

Send 1 unit along $\langle s, a, d, t \rangle$.

Question 4

$S = \{s, a\}$

$T = \{t, b, c, d, h, p\}$

Cut capacity: 10.

$S = \{s, a, b, d, p\}$

$T = \{t, c, h\}$

Cut capacity: 10.

Question 5

The maximum flow can be increased to 11 by increasing the capacity of (s, b) to 4 and the capacity of (d, t) to 6.