MP305 Practical 2017/2018 - Network Flows I

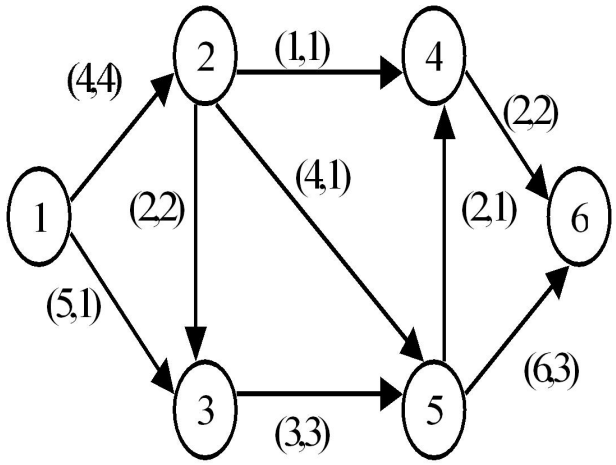
The Maple procedures that perform the maximal network flow algorithm is found by opening up the Maple worksheet `Network.mw`.

The file `Network.mw` may be downloded from the **MP305 Blackboard** web page.

An explanation is given there of all the procedures used. Network nodes are assumed to be labelled from 1 to some maximum value `NV` where node 1 is the **source** and node `NV` is the **sink**. The network arcs are then described as a set of two element lists e.g. `G:={[1,2],[1,3],[3,5],..}` etc. The capacity, flow and cost of each arc `[i,j]` is `c[i,j]`, `phi[i,j]`and `l[i,j]` respectively. The main procedures are `Initialise(G)` which initialises all capacities, flows and costs to zero and `Iterate(G)` which performs one iteration of the algorithm.

Solutions to **all** questions with **(*)** have to be shown (and explained) to the instructor at the practicals in order to get 3% that count towards the overall mark.

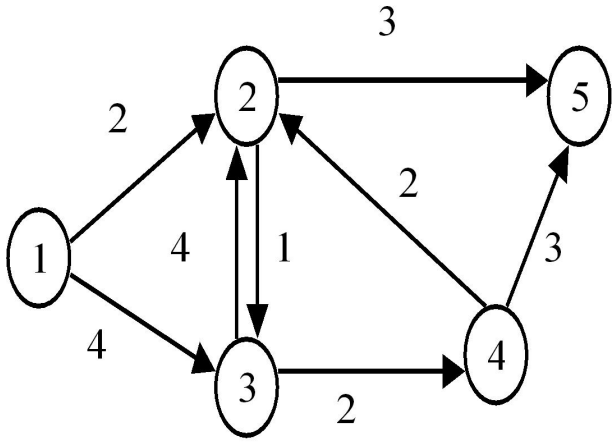
1. Find the maximal flow for minimal capacity for the network below:



This is the example discussed in class. You may read in the data for the example from the Maple worksheet `net1.mw`. This file may be downloded from the **MP305 Blackboard** web page.

Find the incremental networks and capacities at each iteration. Set the initial flow to 0 at each arc and find the incremental networks and capacities at each iteration.

2. (*) Find the maximal flow through the 5 node network shown where the capacities are shown on each arc. Find the incremental networks and capacities at each iteration.



3. (*) A road network is shown below with the capacity on each road indicated. Find the maximal flow through the network. Compare this to flow from B to A.