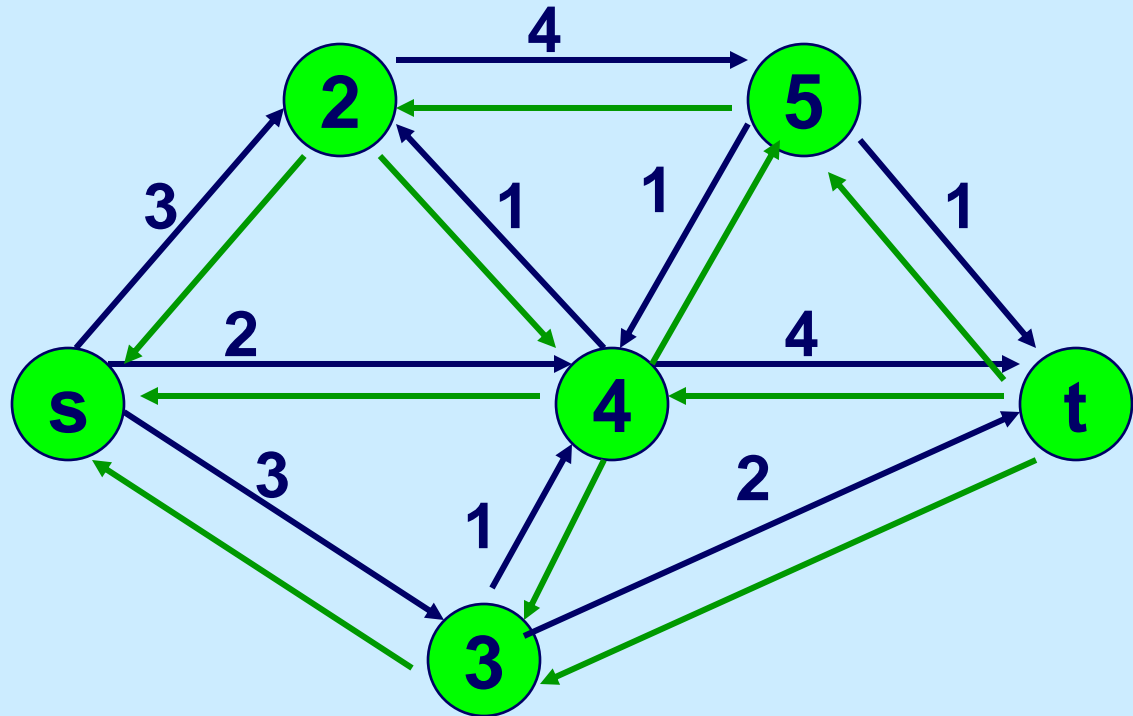


15.082 and 6.855J

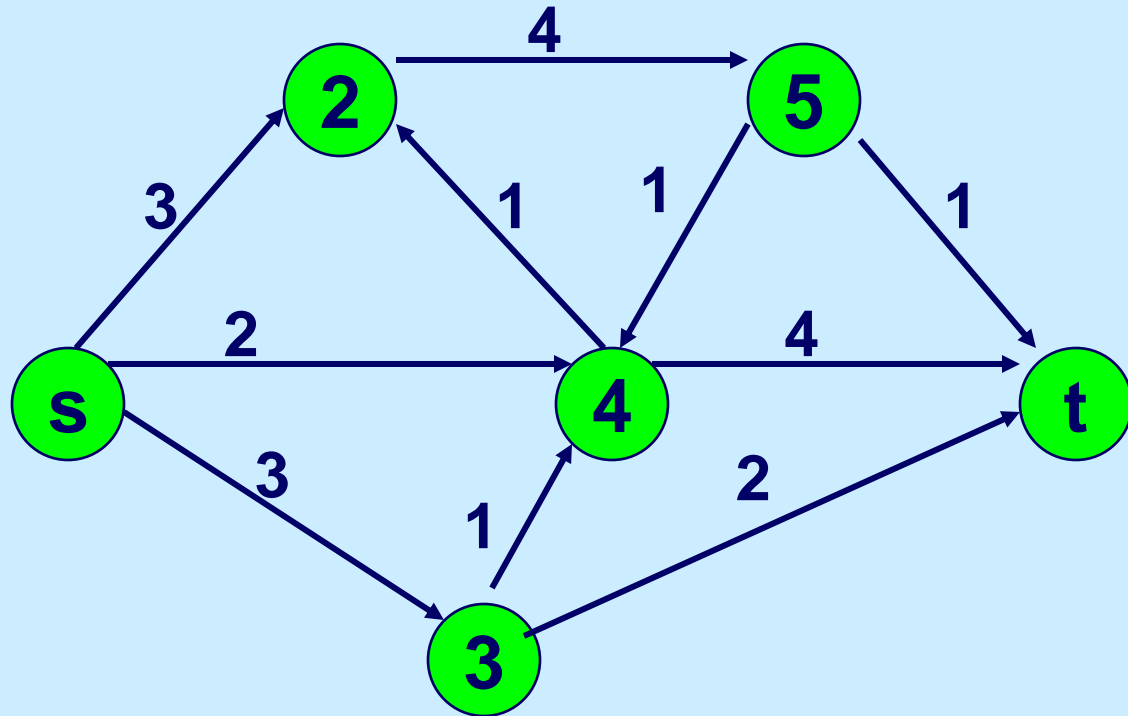
**The Goldberg-Tarjan Preflow Push
Algorithm for the Maximum Flow
Problem**

Preflow Push

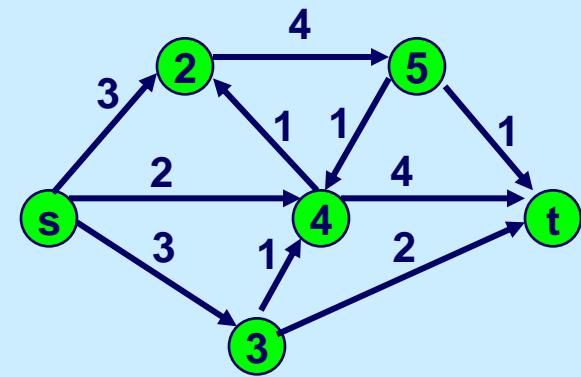


This is the original network, plus reversals of the arcs.

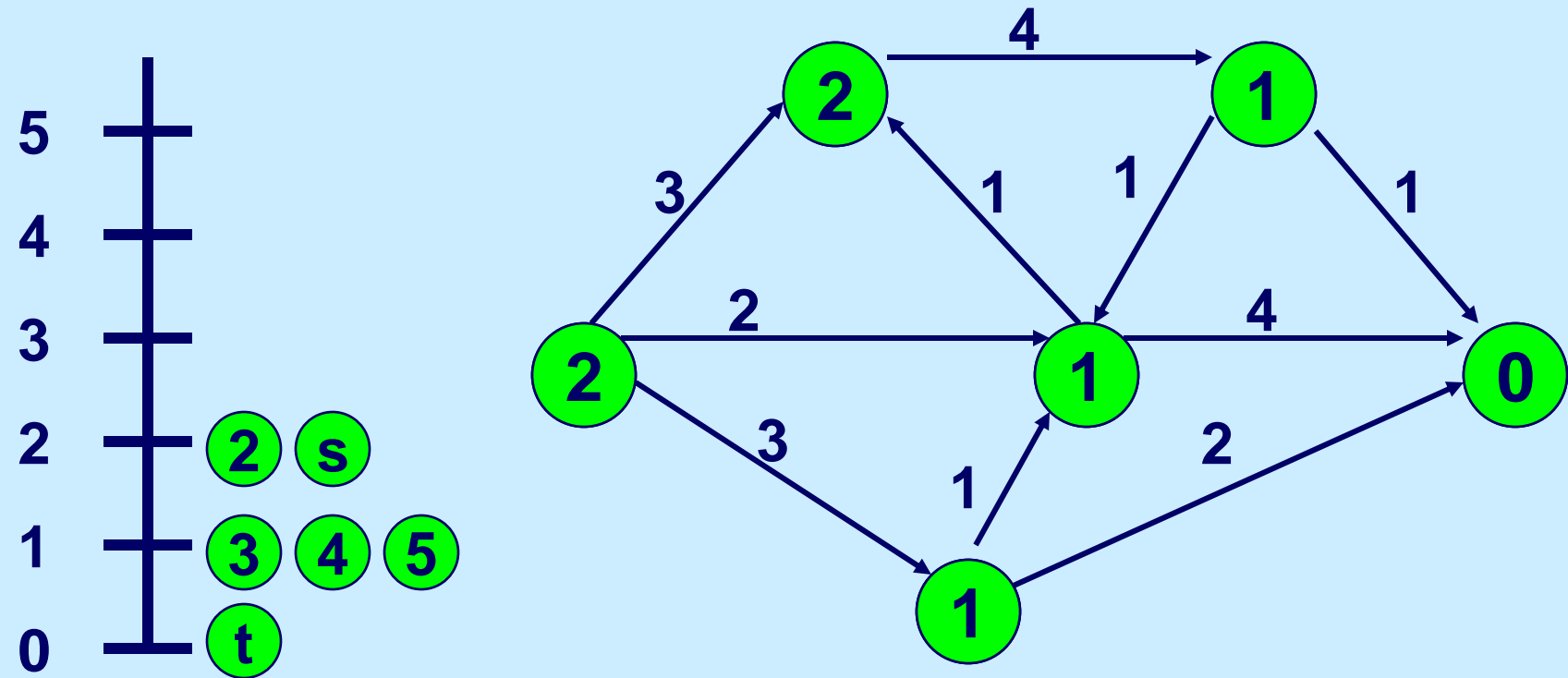
Preflow Push



This is the original network, which is also the original residual network.

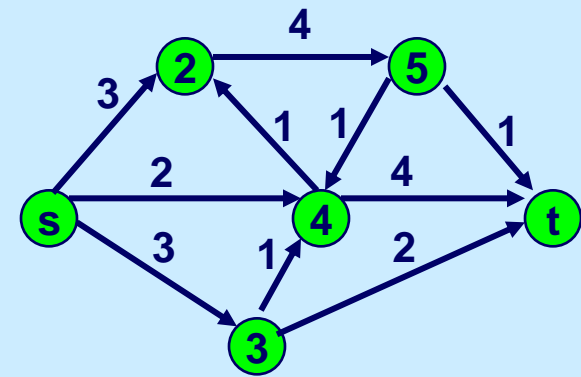


Initialize Distances

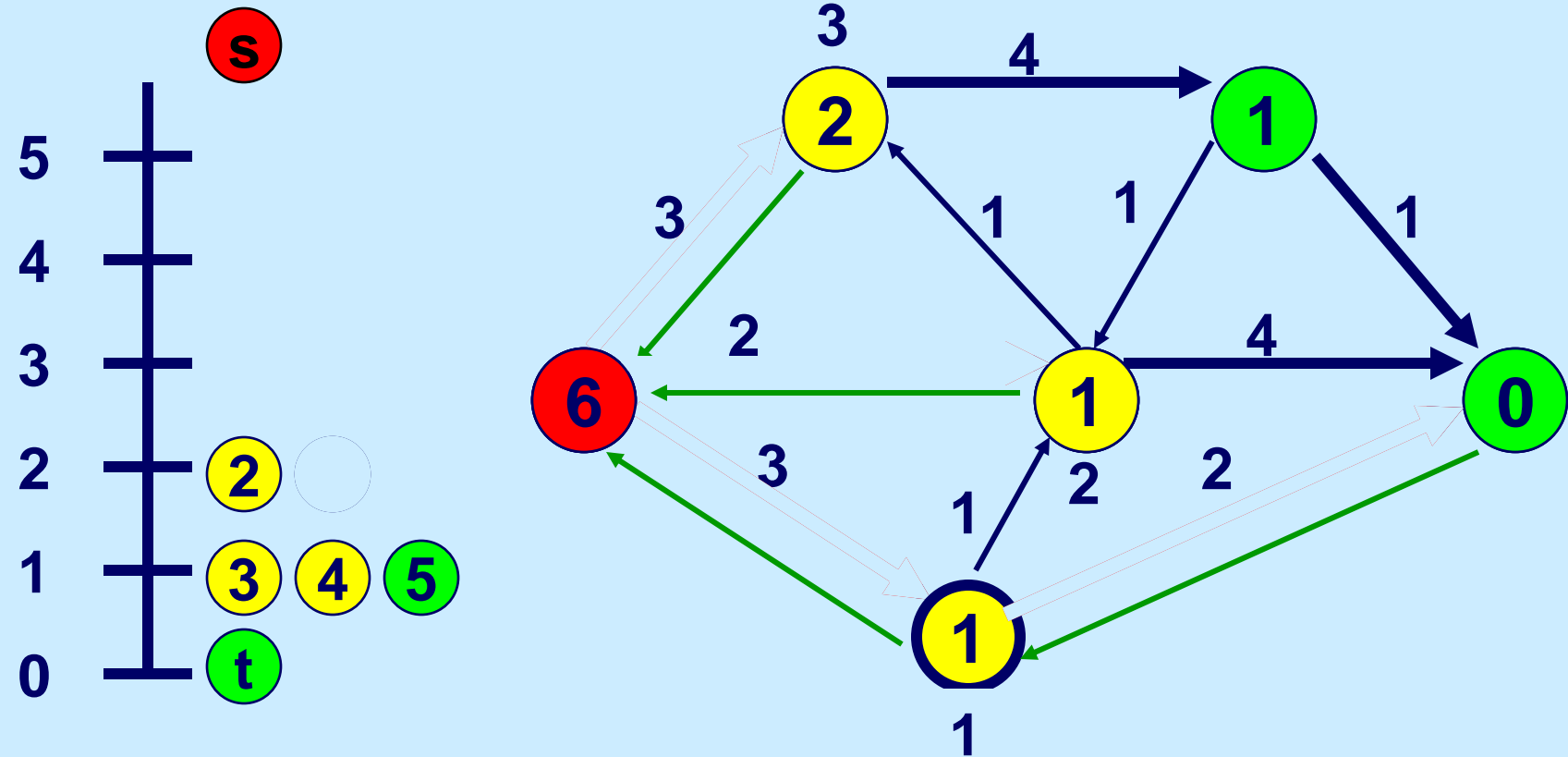


The node label henceforth will be the distance label.

$d(j)$ is at most the distance of j to t in $G(x)$

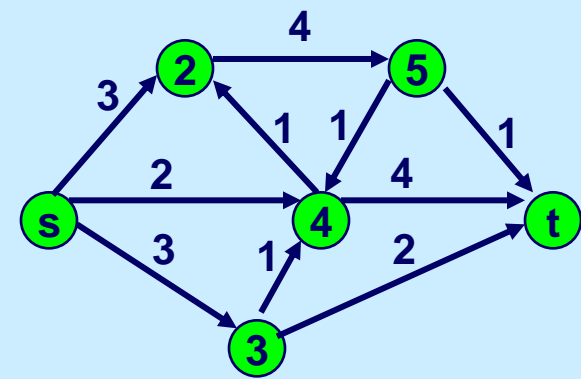


Select, then relabel/push

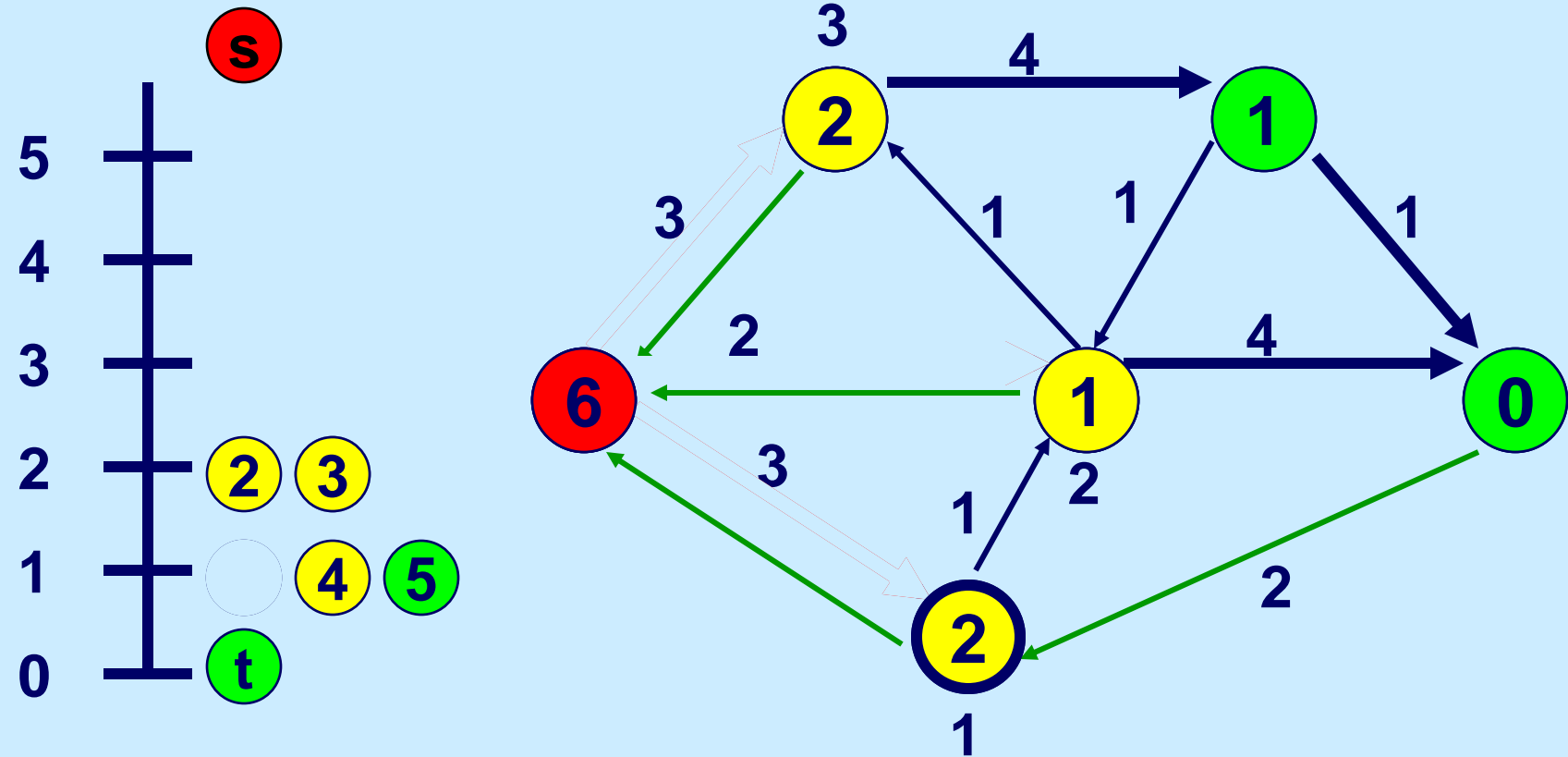


Select an active node, that is,
one with excess
Push/Relabel

Update excess after a push

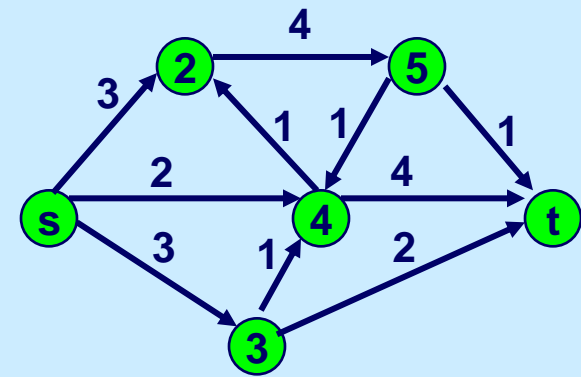


Select, then relabel/push

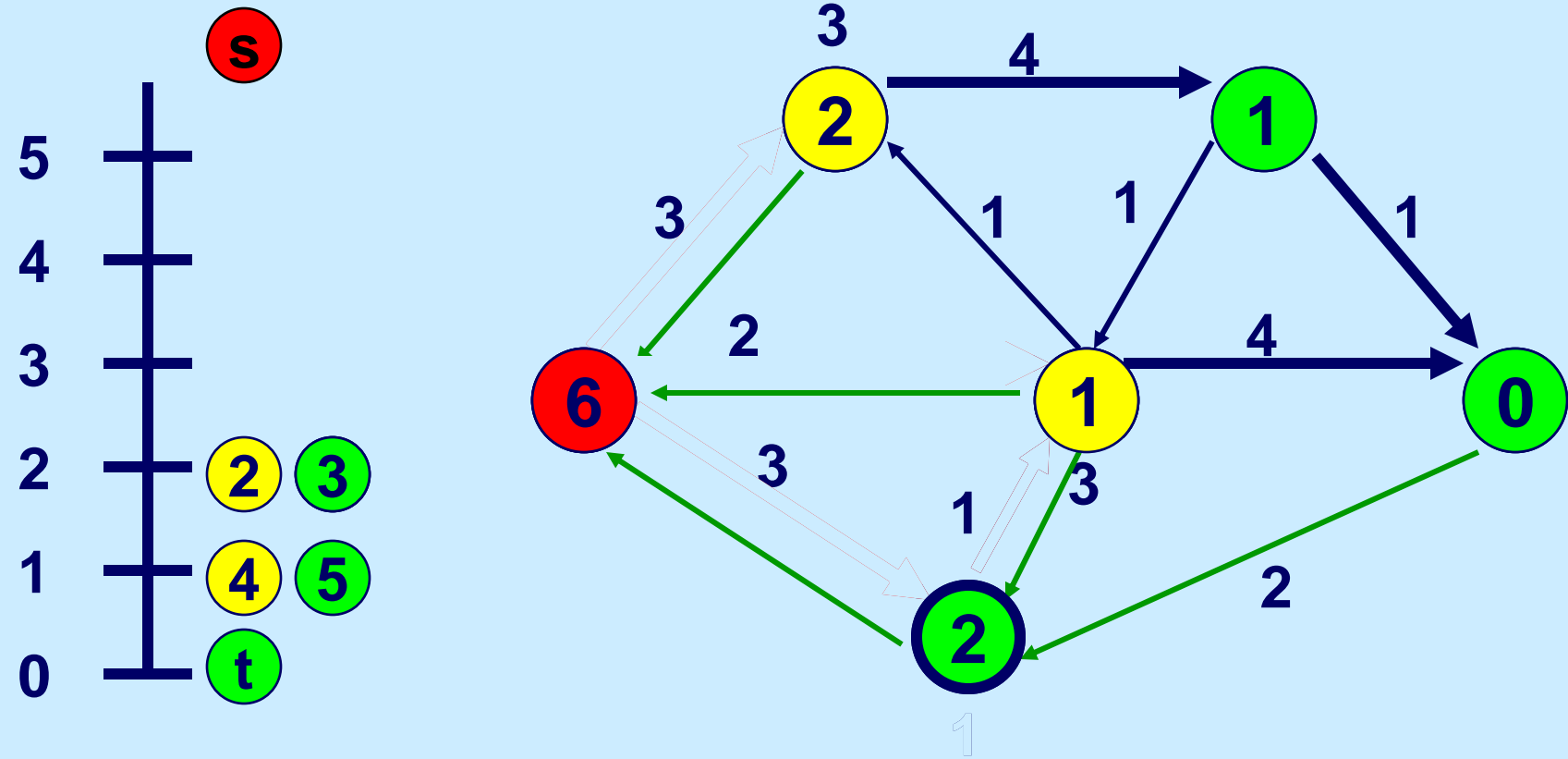


Select an active node, that is, one with excess

No arc incident to the selected node is admissible. So relabel.

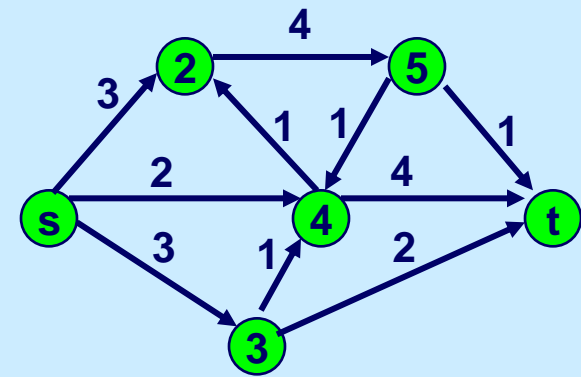


Select, then relabel/push

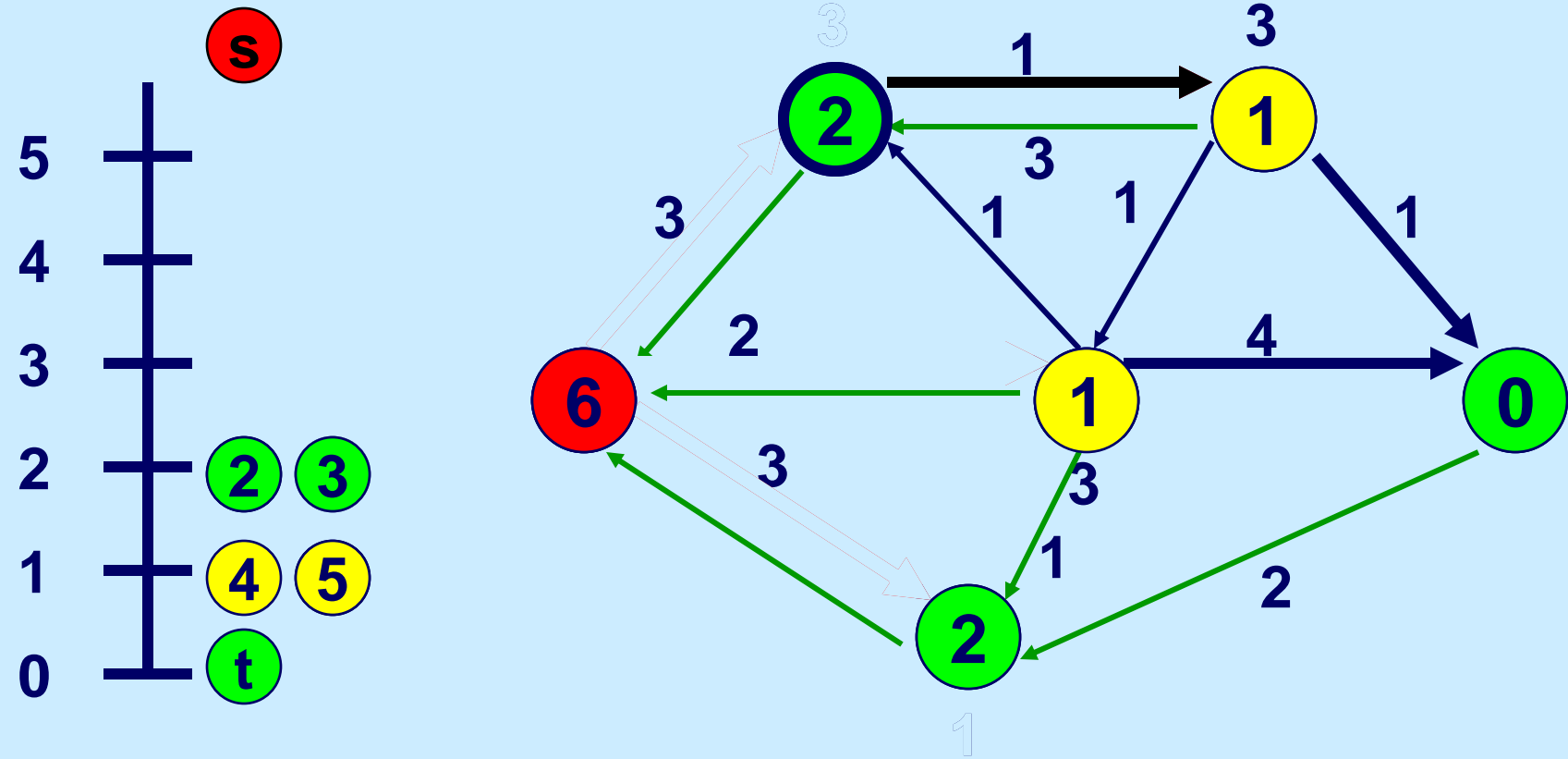


Select an active node, that is, one with excess

Push/Relabel

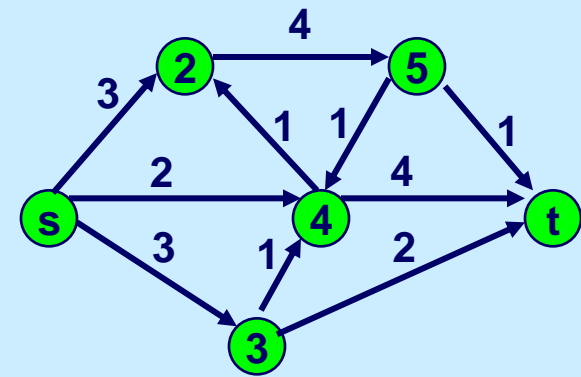


Select, then relabel/push

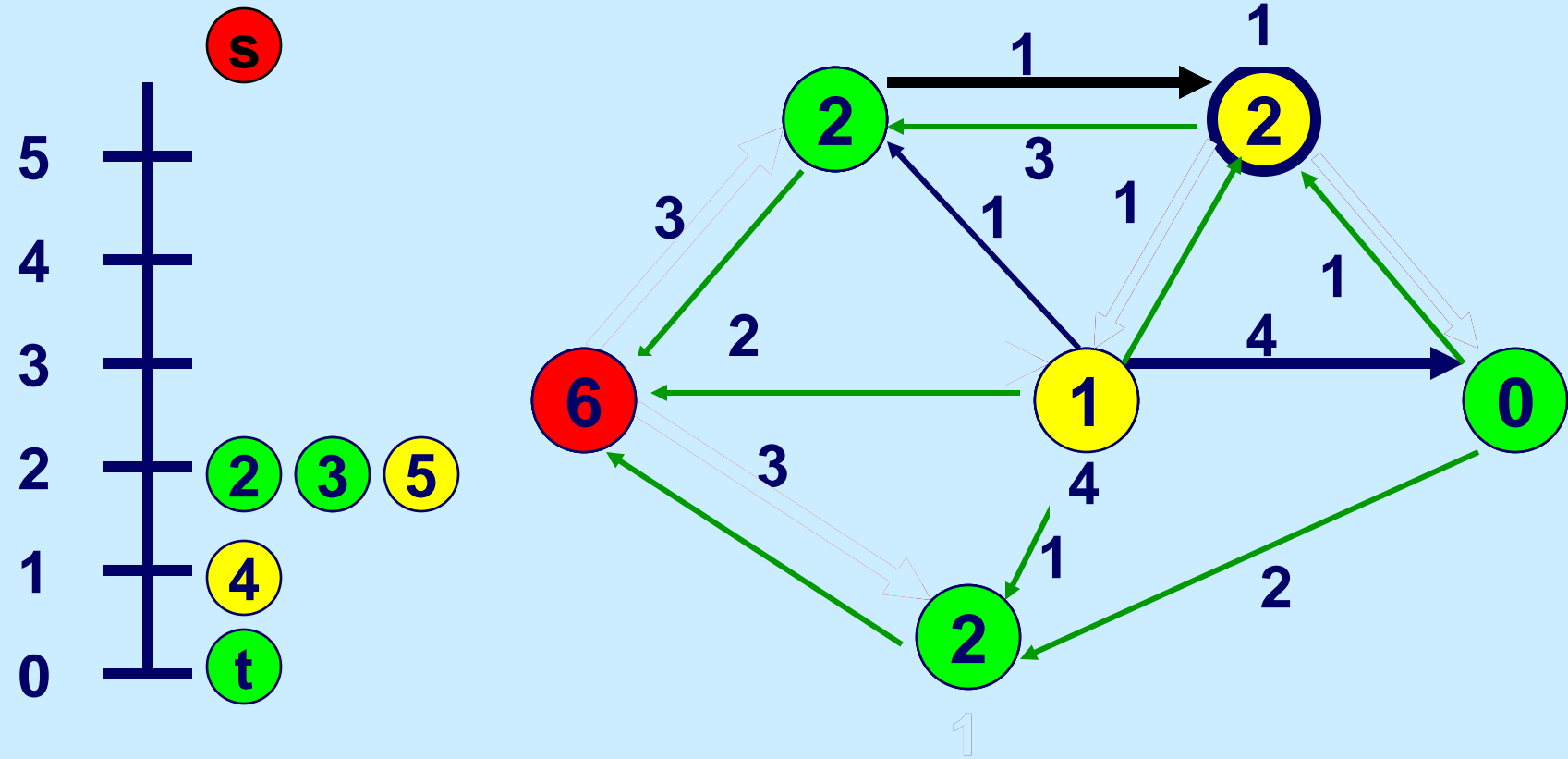


Select an active node.

Push/Relabel

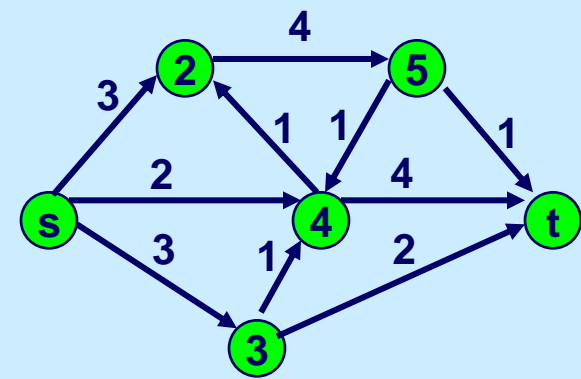


Select, then relabel/push

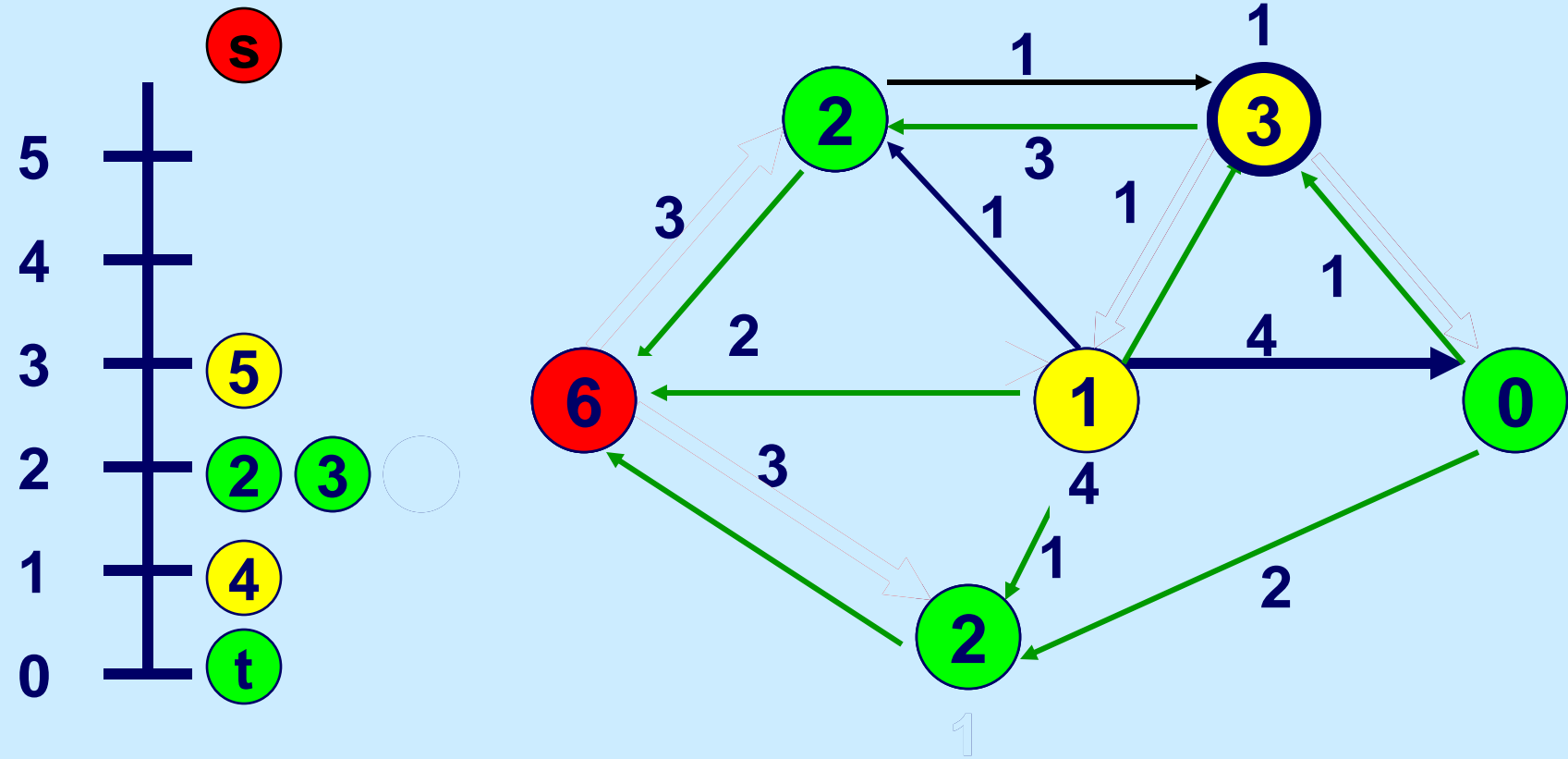


Select an active node.

Push/Relabel

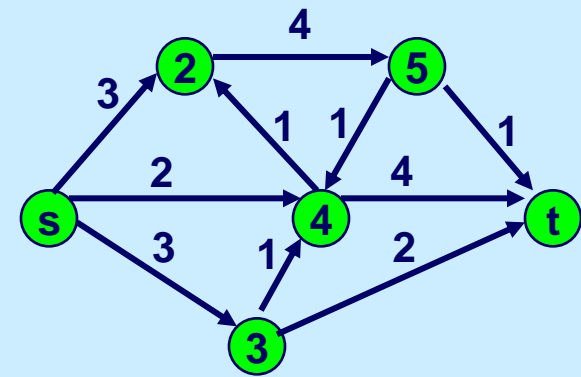


Select, then relabel/push

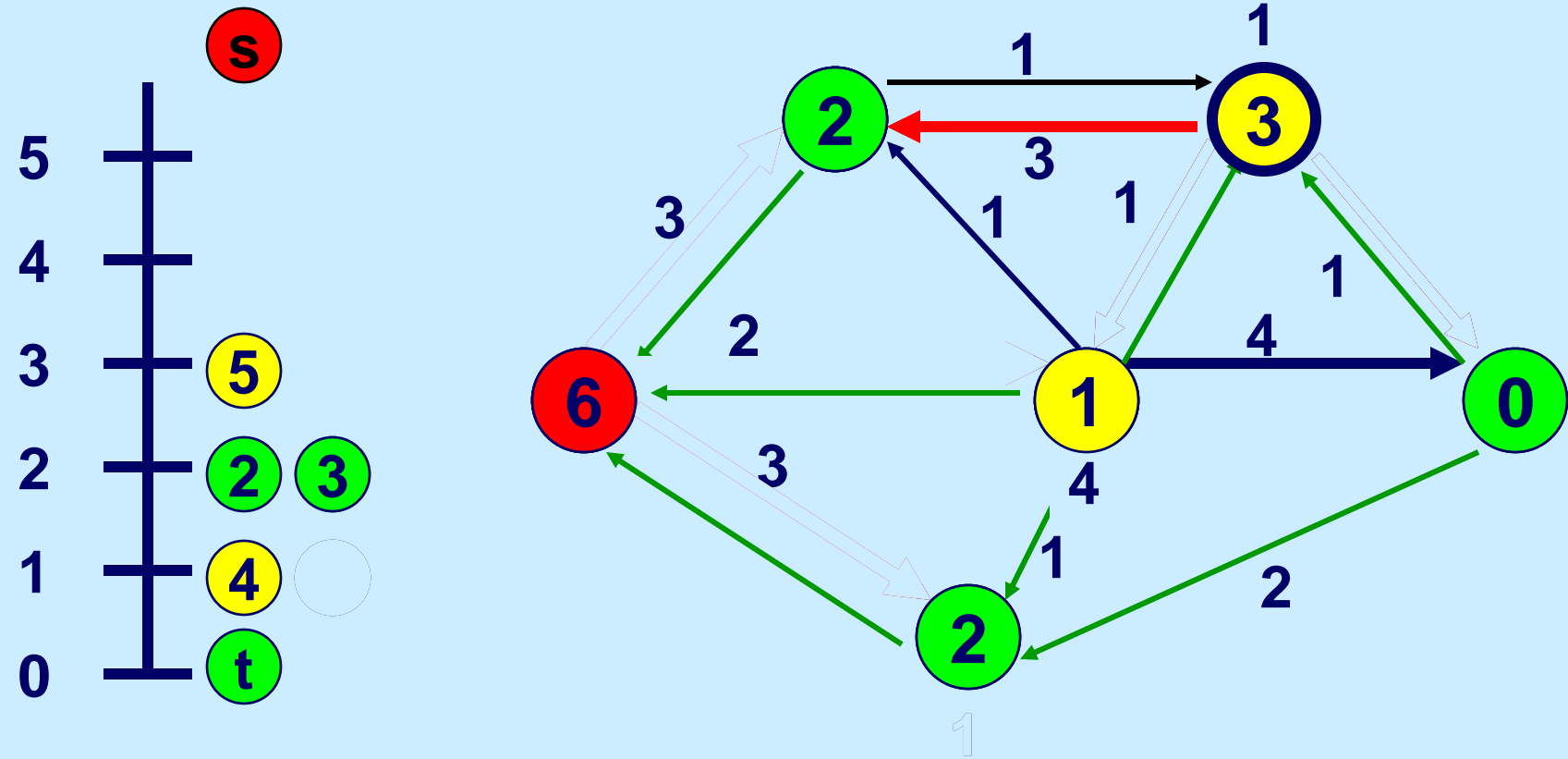


Select an active node.

There is no incident admissible arc. So relabel.

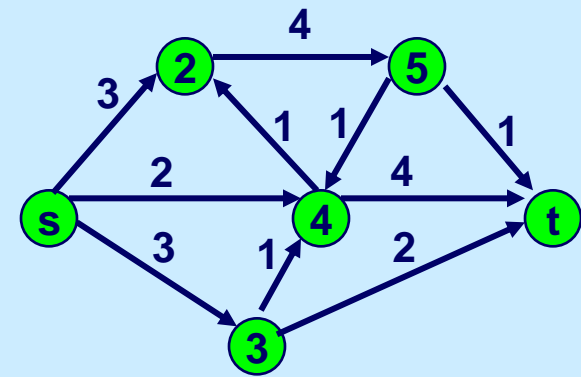


Select, then relabel/push

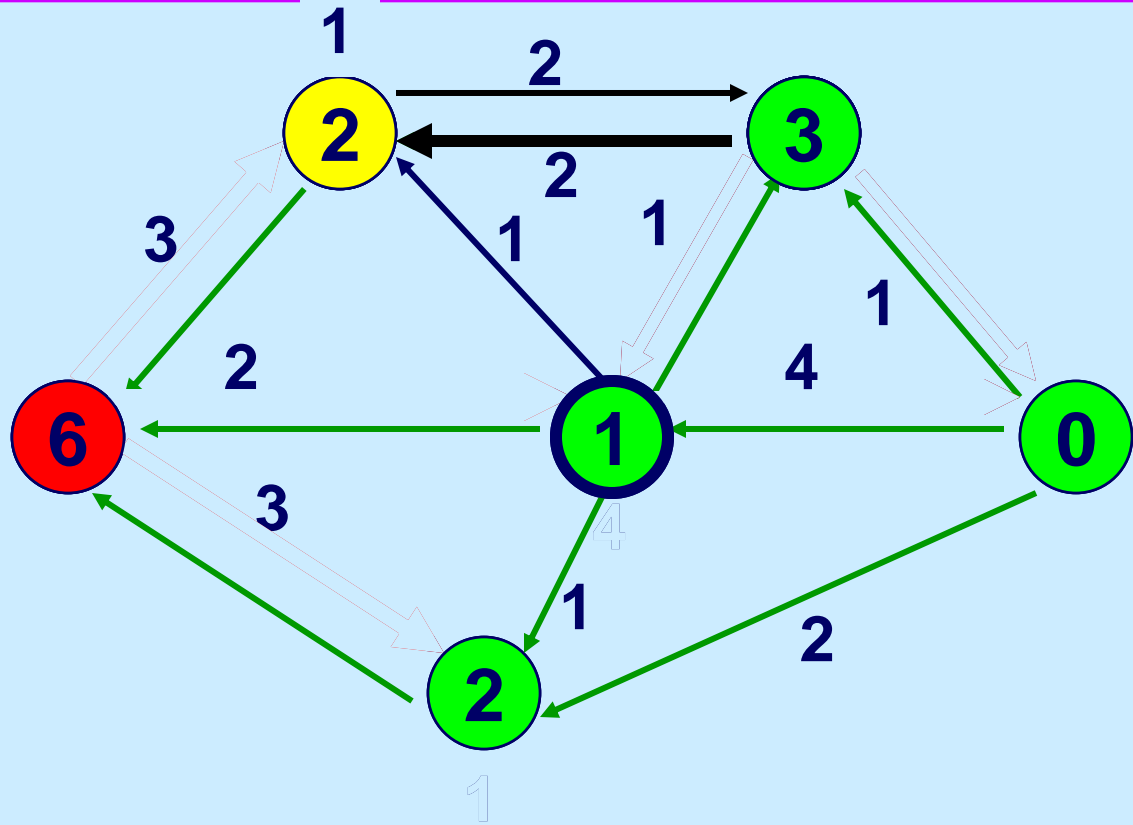
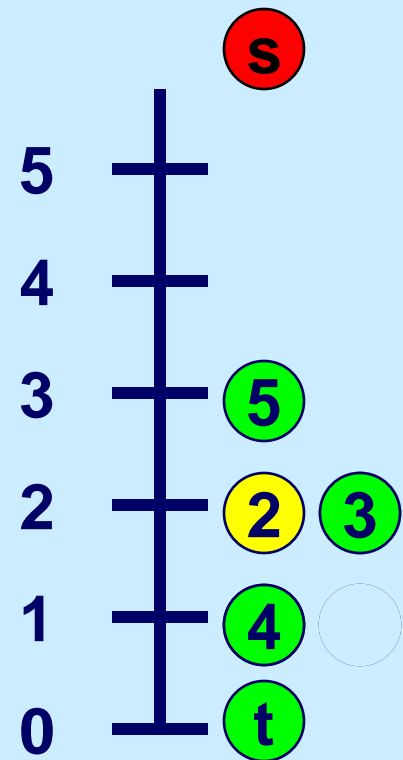


Select an active node.

Push/Relabel

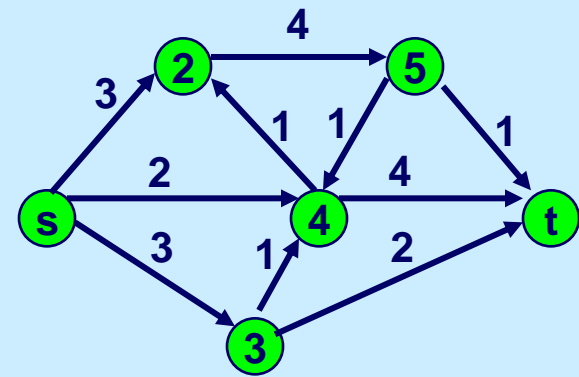


Select, then relabel/push

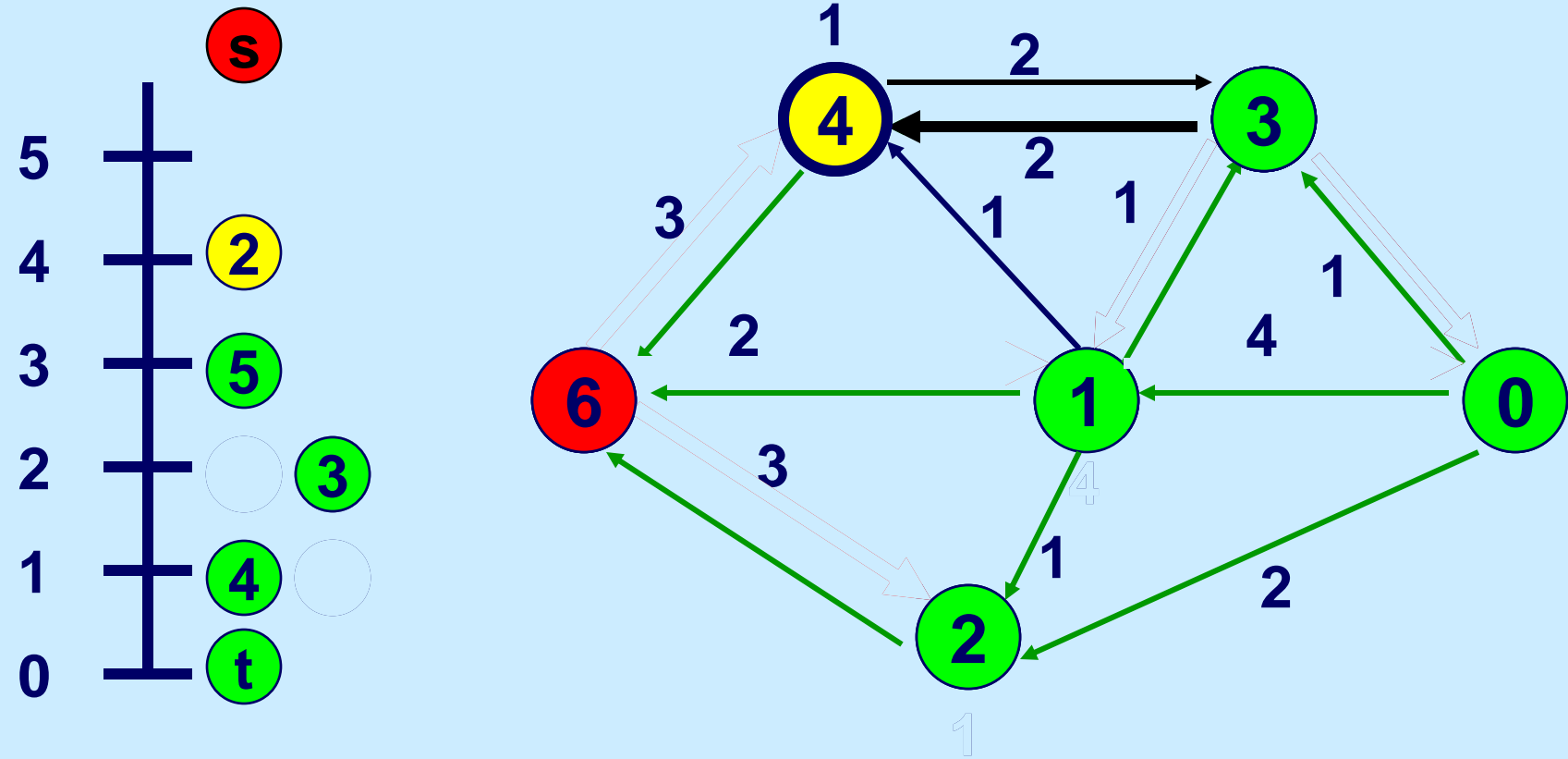


Select an active node.

Push/Relabel

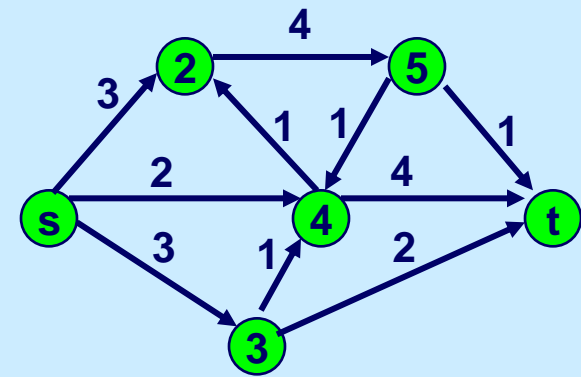


Select, then relabel/push

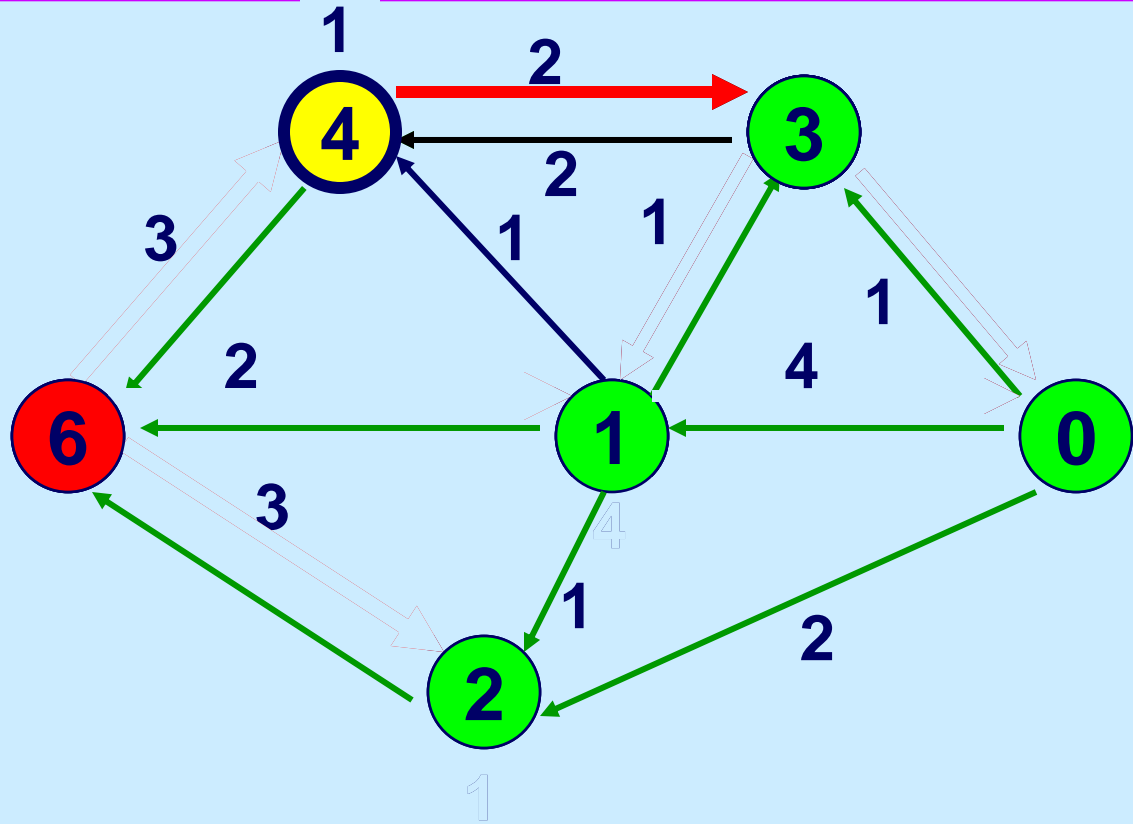
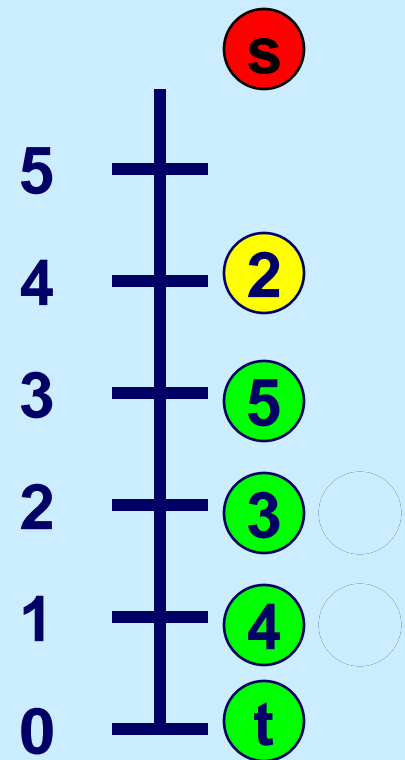


Select an active node.

Push/Relabel

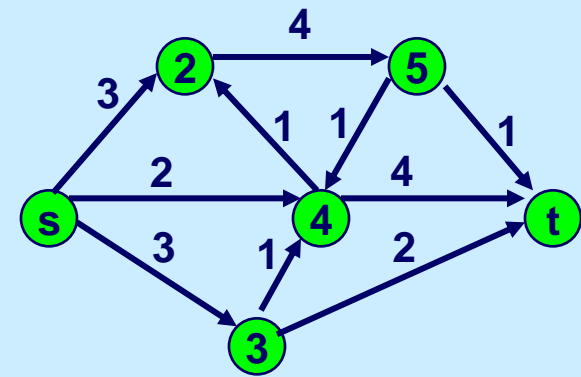


Select, then relabel/push

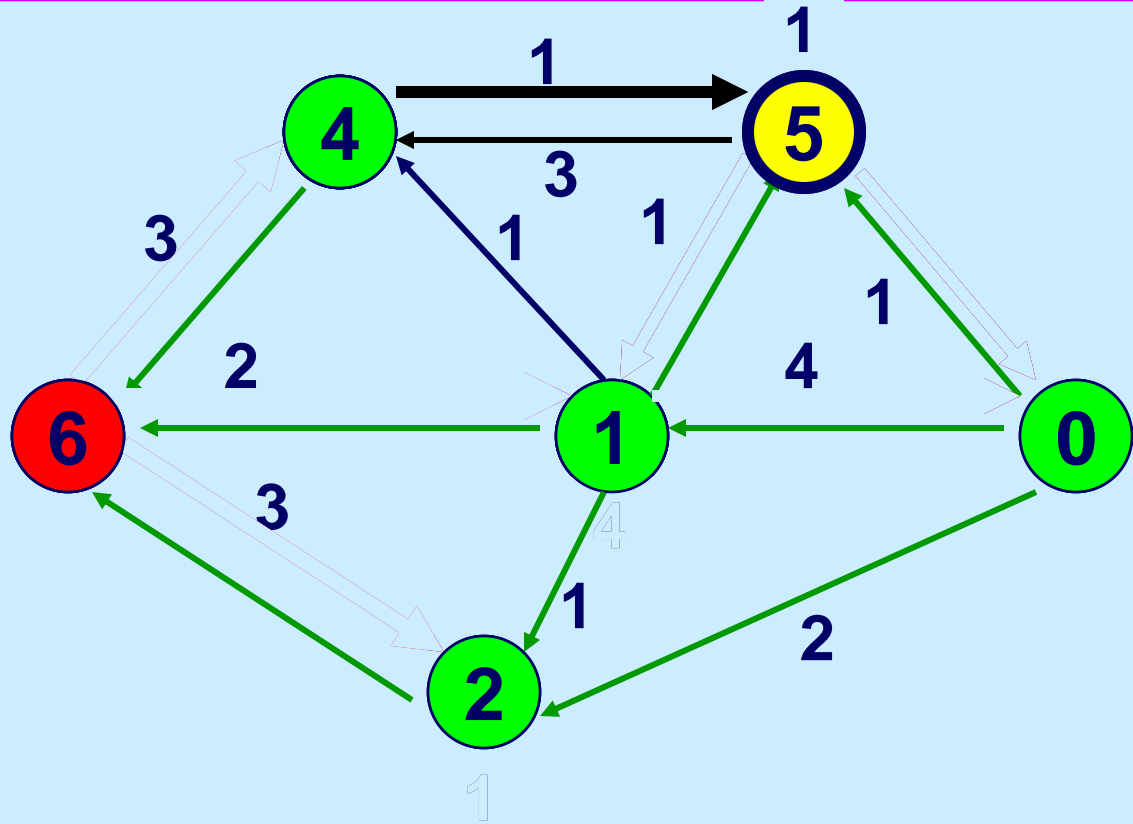
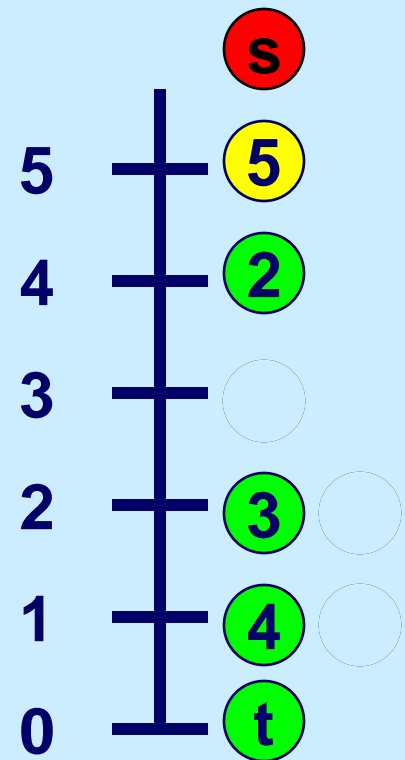


Select an active node.

Push/Relabel

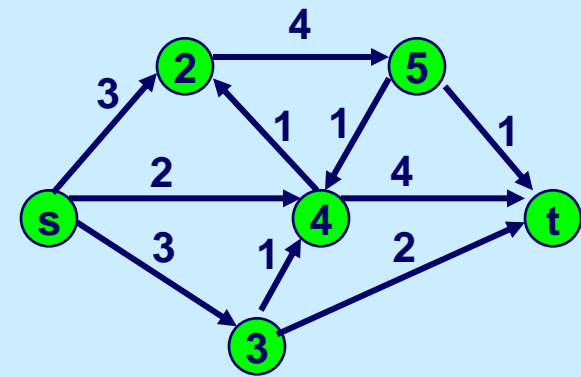


Select, then relabel/push

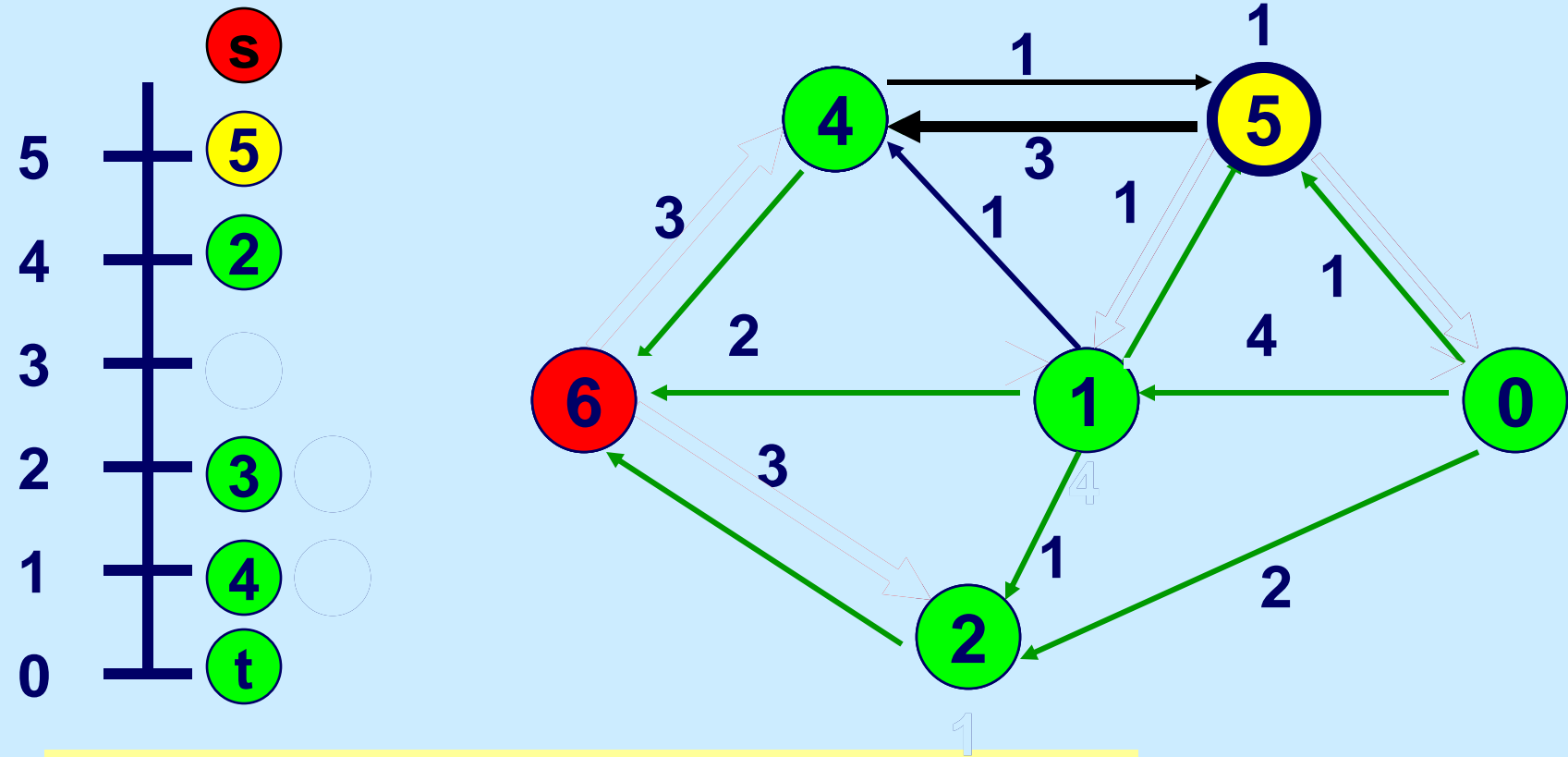


Select an active node.

Push/Relabel

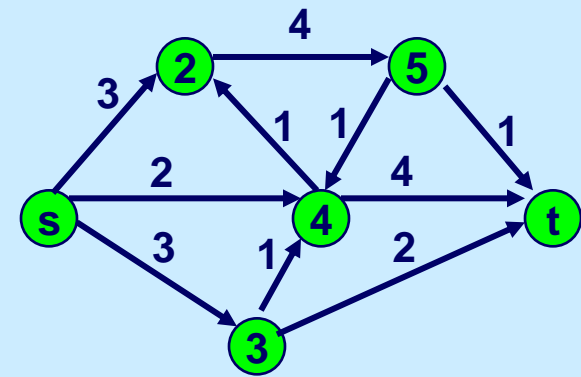


Select, then relabel/push



One can keep pushing flow between nodes 2 and 5 until eventually all flow returns to node s.

There are ways to speed up the last iterations.



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15.082J / 6.855J / ESD.78J Network Optimization
Fall 2010

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