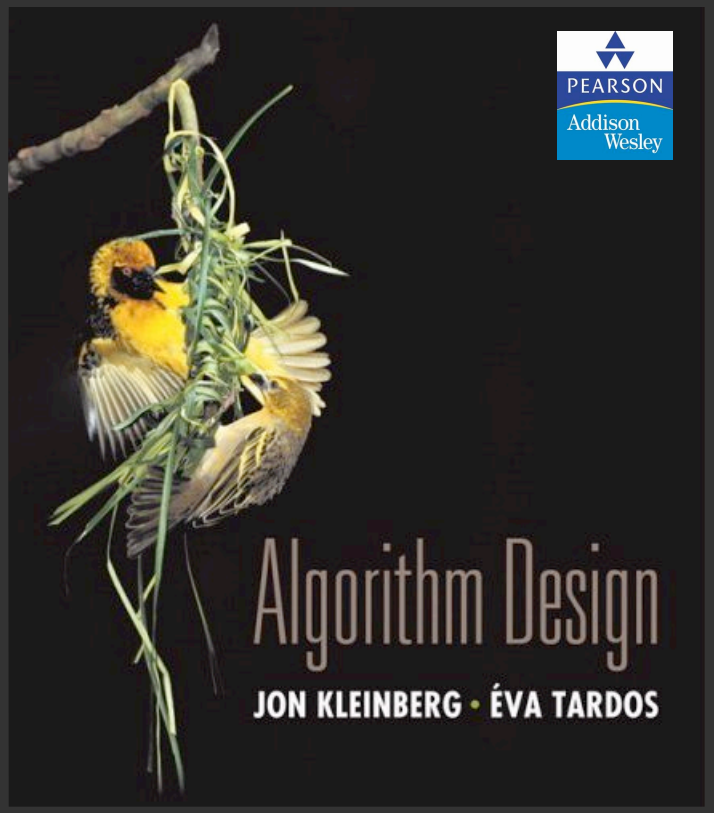


4. Greedy Algorithms

- *Edmonds branching algorithm demo*

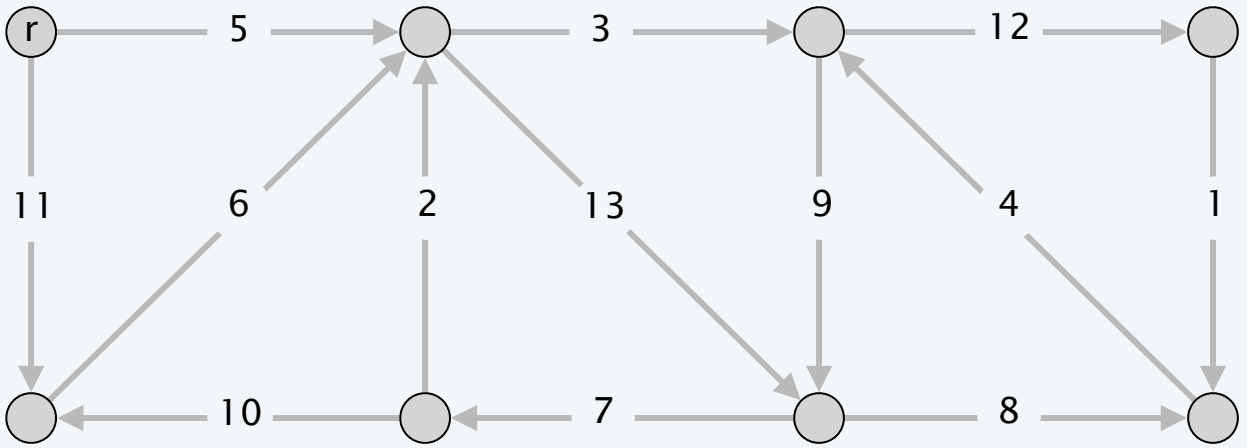
Lecture slides by Kevin Wayne

http://www.cs.princeton.edu/~wayne/kleinberg-tardos

Last updated on Feb 18, 2013 12:26 PM

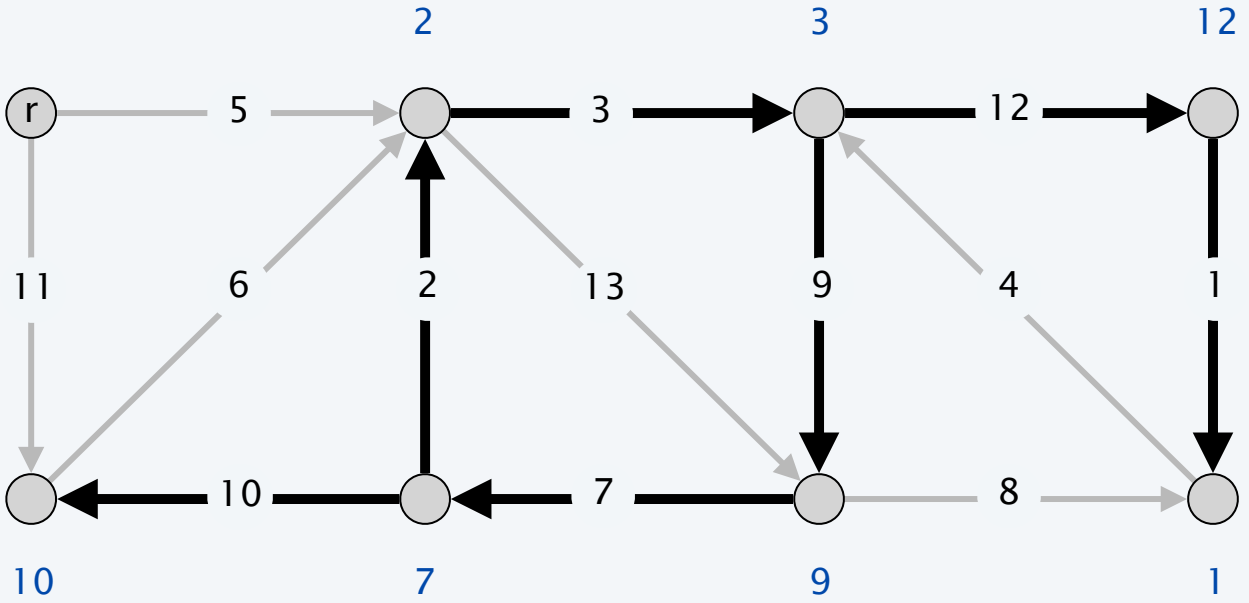
Edmonds branching algorithm demo

input digraph G = (V, E)



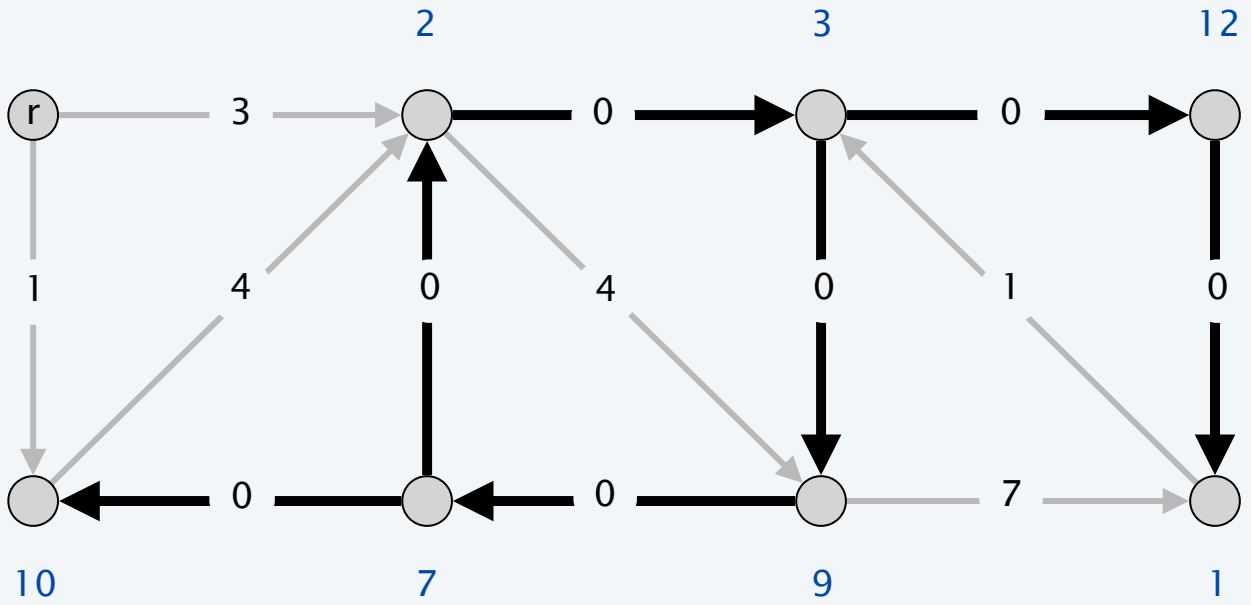
Edmonds branching algorithm demo

Phase 1: find cheapest edge entering each node



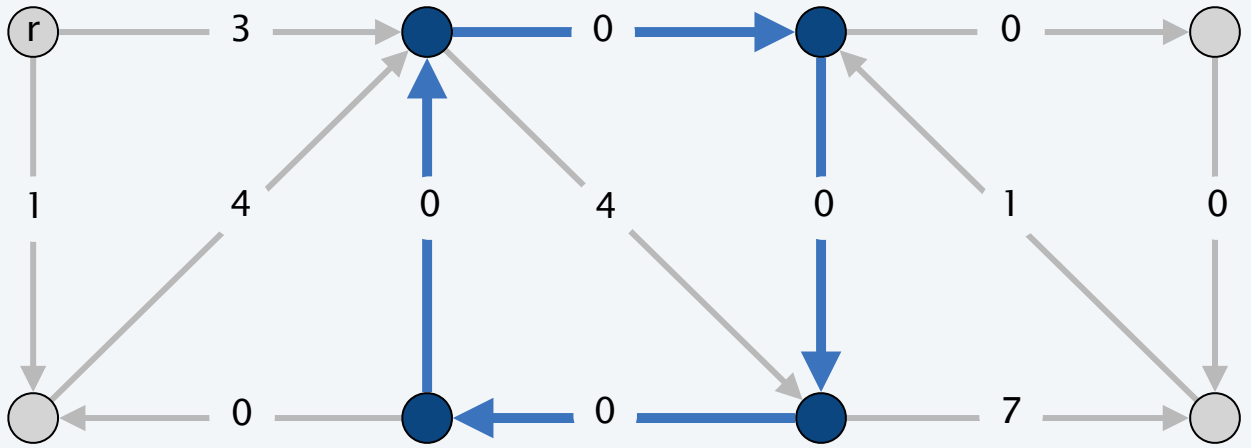
Edmonds branching algorithm demo

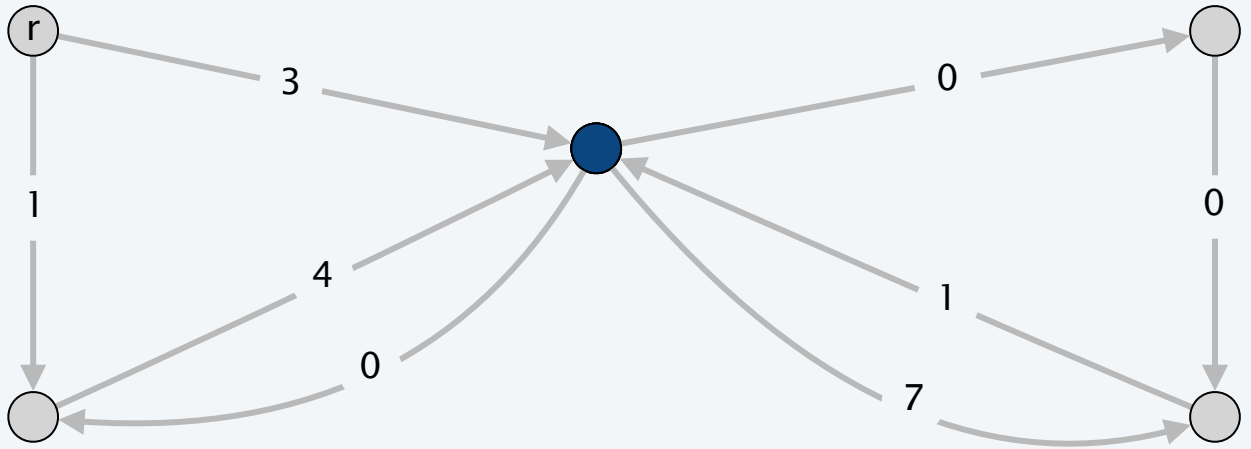
Phase 1: replace costs with reduced costs



Edmonds branching algorithm demo

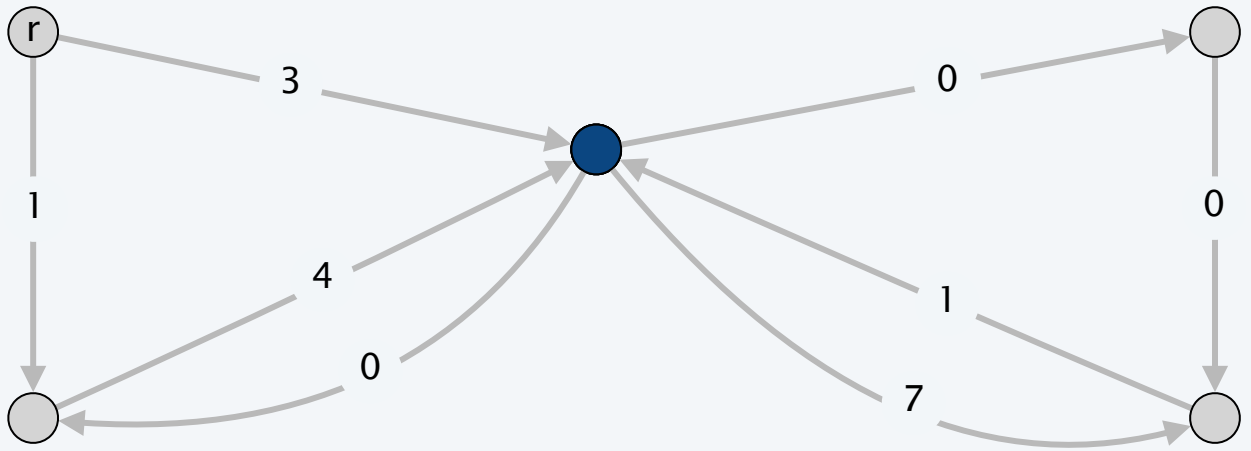
Phase 1: find 0-cost directed cycle C and contract





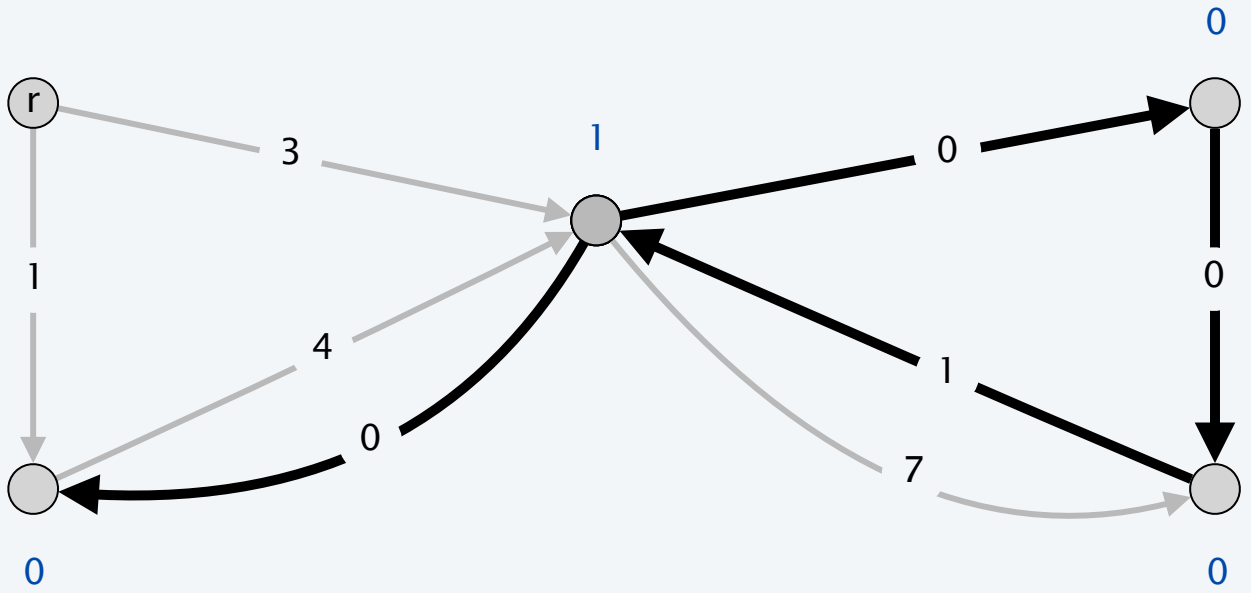
Edmonds branching algorithm demo

Phase 2: digraph G'



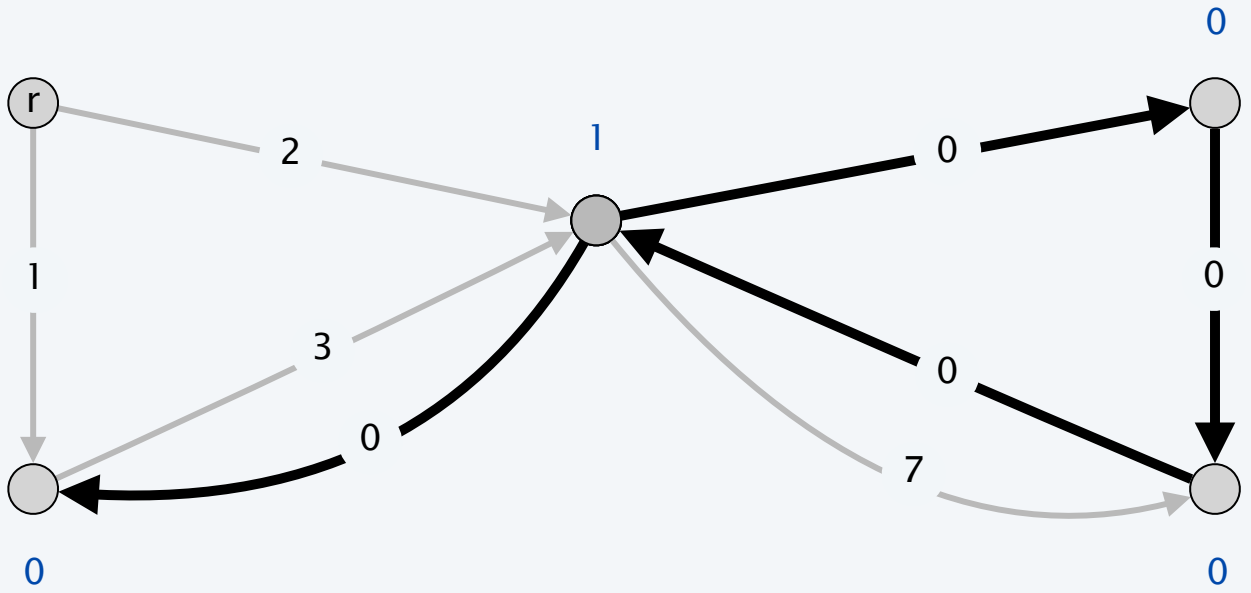
Edmonds branching algorithm demo

Phase 2: find cheapest edge entering each node



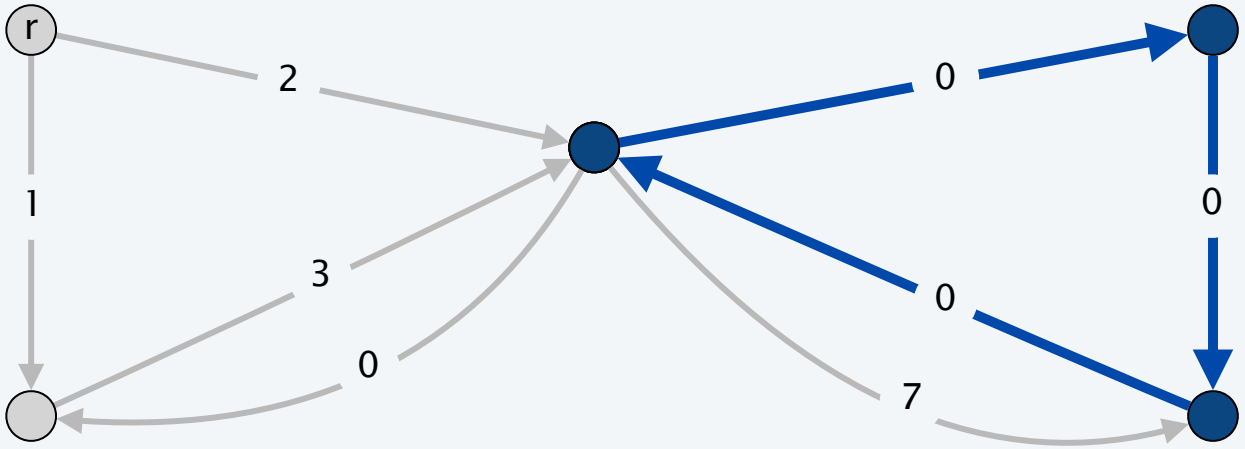
Edmonds branching algorithm demo

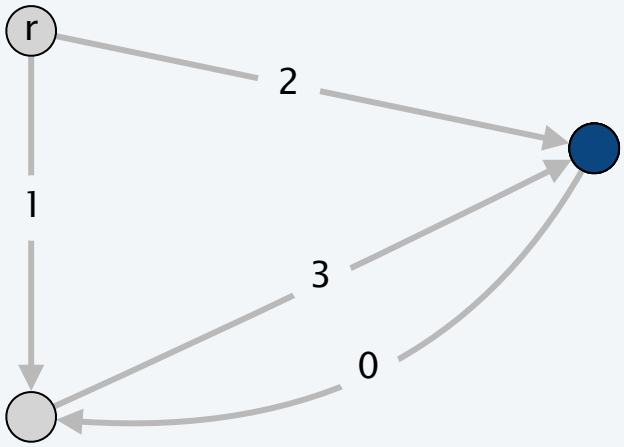
Phase 2: replace cost with reduced costs



Edmonds branching algorithm demo

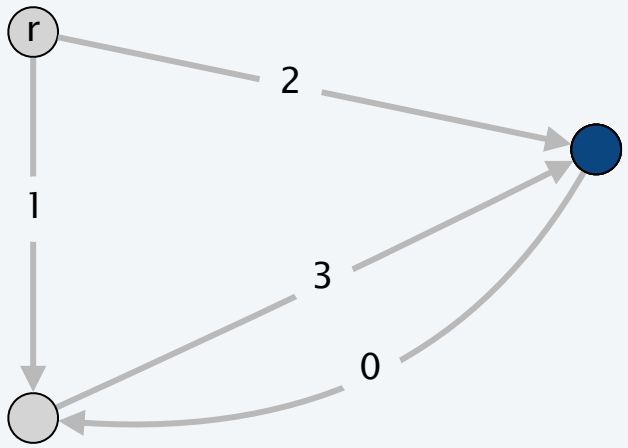
Phase 2: find 0-cost directed cycle and contract





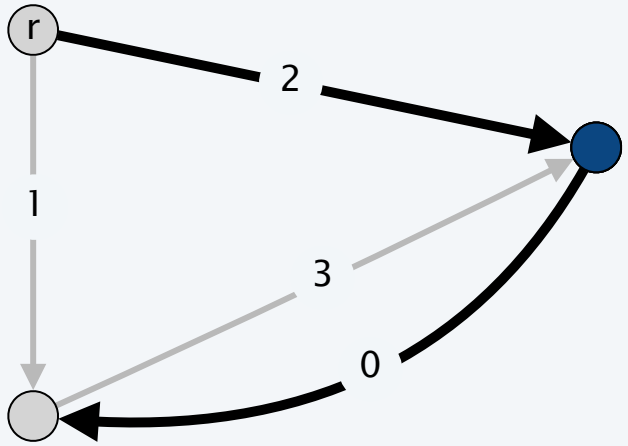
Edmonds branching algorithm demo

Phase 3: digraph G"



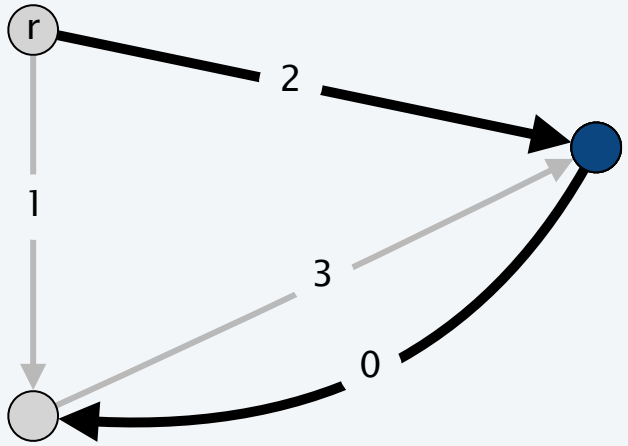
Edmonds branching algorithm demo

Phase 3: find cheapest edge entering each node



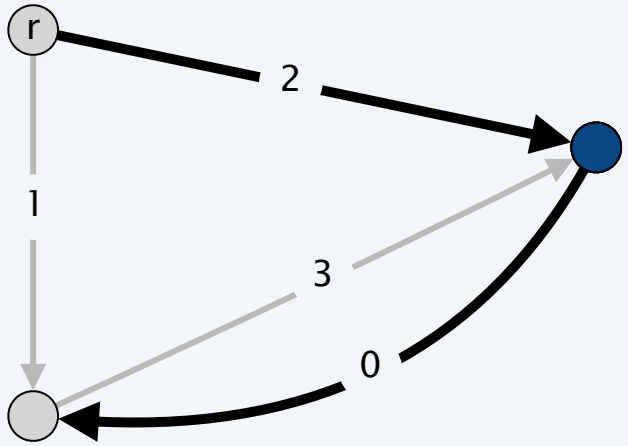
Edmonds branching algorithm demo

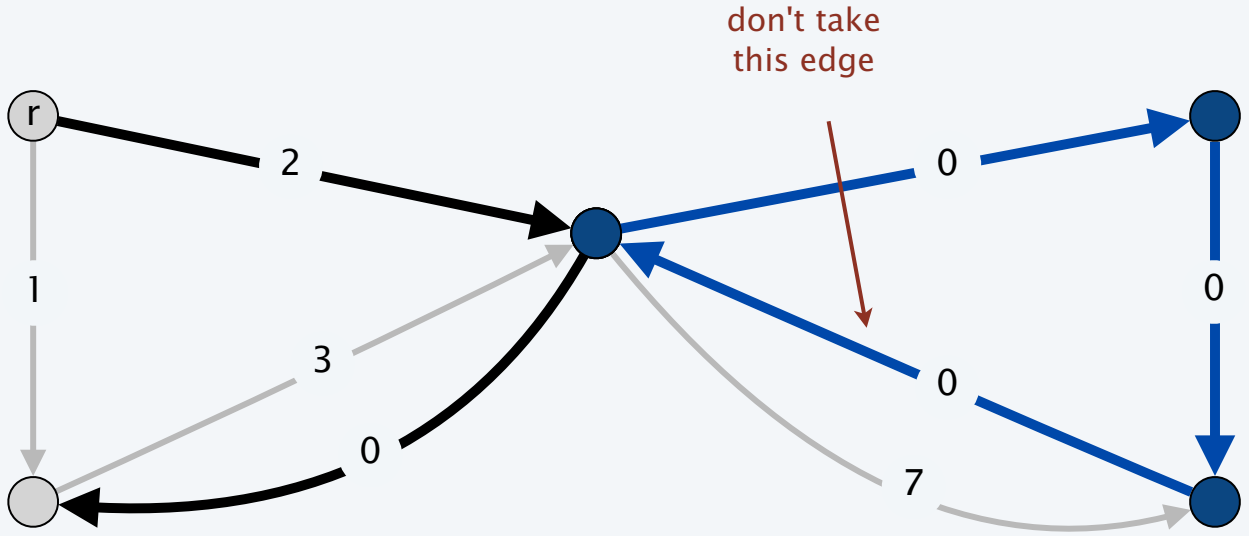
Phase 3: it's an arborescence!



Edmonds branching algorithm demo

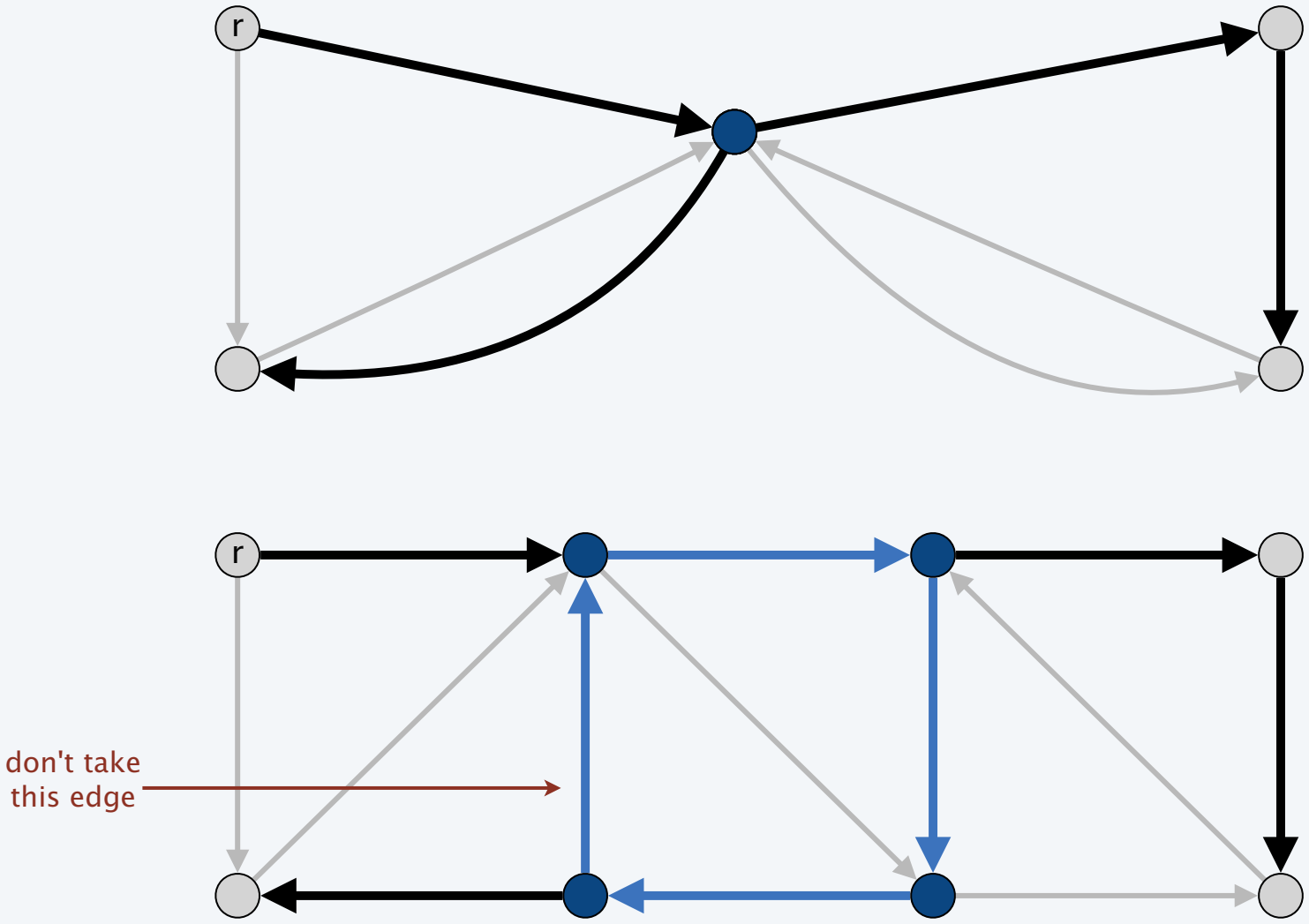
Phase 2': uncontract node and take all but one edge of cycle





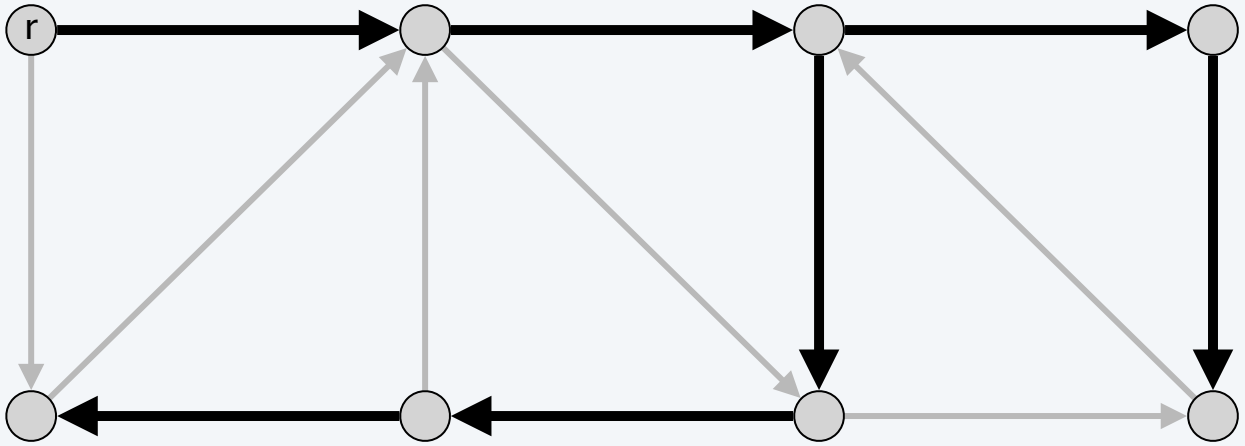
Edmonds branching algorithm demo

Phase 1': uncontract node and take all but one edge of cycle



Edmonds branching algorithm demo

stop: no more nodes to uncontract



Edmonds branching algorithm demo

min-cost arborescence