

4. GREEDY ALGORITHMS II

► Edmonds branching algorithm demo

Lecture slides by Kevin Wayne

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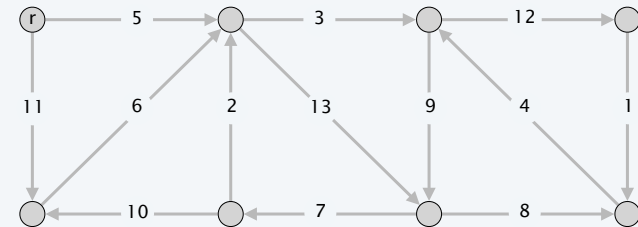
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<http://www.cs.princeton.edu/~wayne/kleinberg-tardos>

Last updated on Sep 8, 2013 6:19 AM

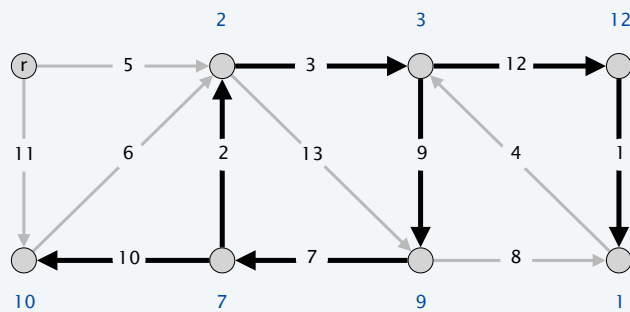
Edmonds branching algorithm demo

input digraph $G = (V, E)$



Edmonds branching algorithm demo

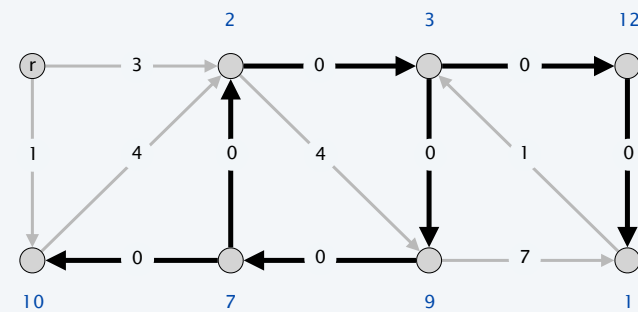
Phase 1: find cheapest edge entering each node



3

Edmonds branching algorithm demo

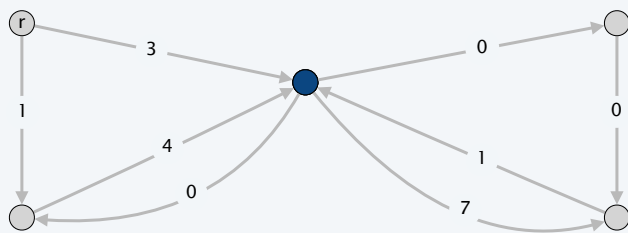
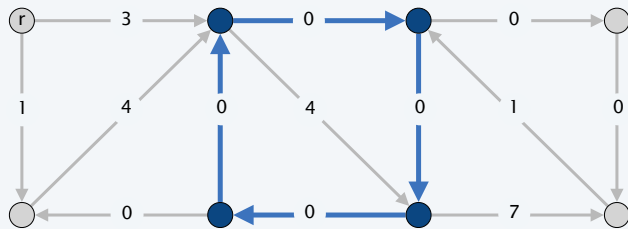
Phase 1: replace costs with reduced costs



4

Edmonds branching algorithm demo

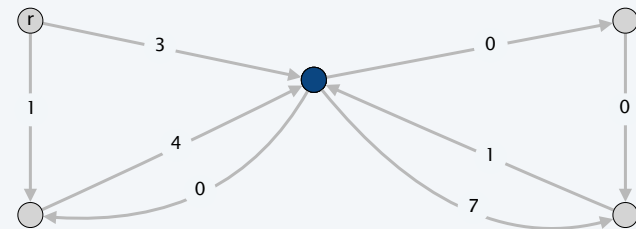
Phase 1: find 0-cost directed cycle C and contract



5

Edmonds branching algorithm demo

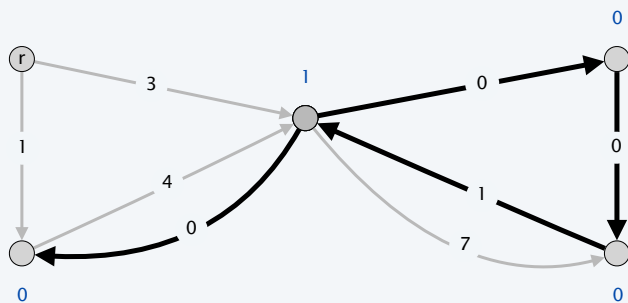
Phase 2: digraph G'



6

Edmonds branching algorithm demo

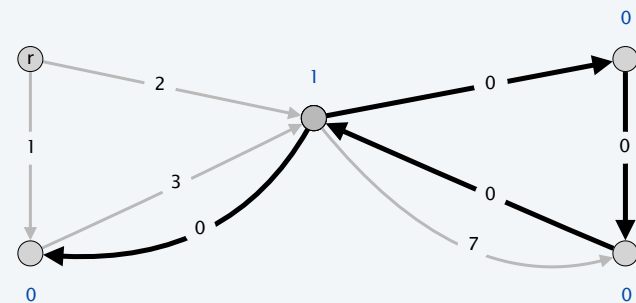
Phase 2: find cheapest edge entering each node



7

Edmonds branching algorithm demo

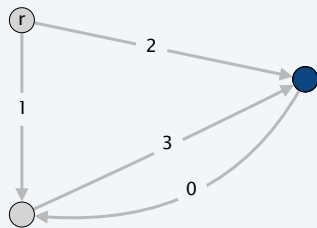
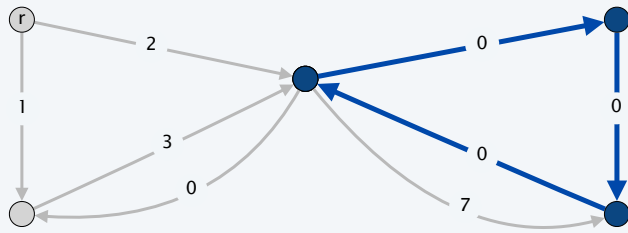
Phase 2: replace cost with reduced costs



8

Edmonds branching algorithm demo

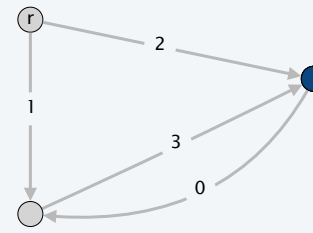
Phase 2: find 0-cost directed cycle and contract



9

Edmonds branching algorithm demo

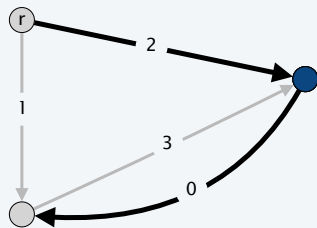
Phase 3: digraph G''



10

Edmonds branching algorithm demo

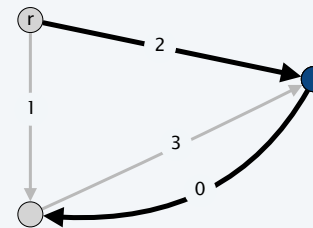
Phase 3: find cheapest edge entering each node



11

Edmonds branching algorithm demo

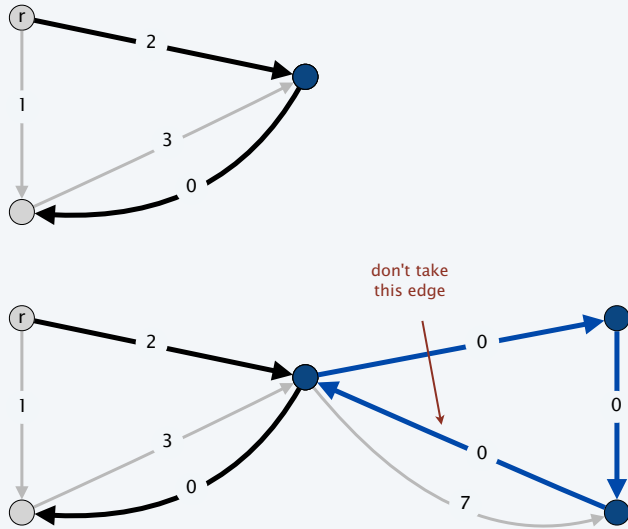
Phase 3: it's an arborescence!



12

Edmonds branching algorithm demo

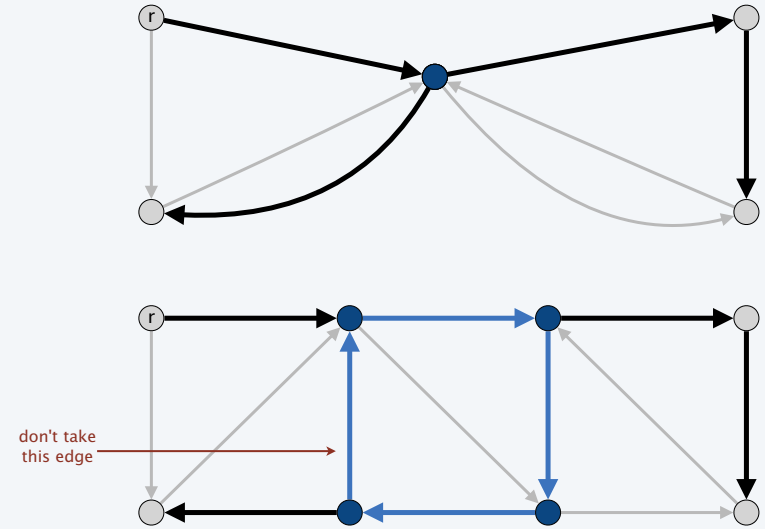
Phase 2': uncontract node and take all but one edge of cycle



13

Edmonds branching algorithm demo

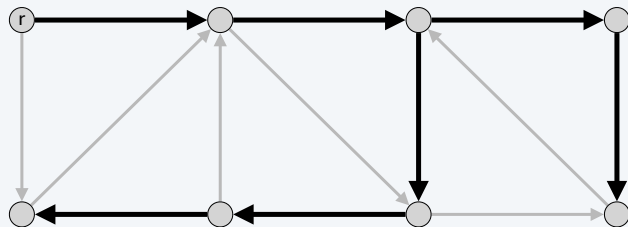
Phase 1': uncontract node and take all but one edge of cycle



14

Edmonds branching algorithm demo

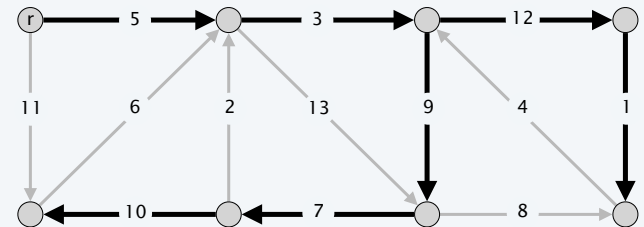
stop: no more nodes to uncontract



15

Edmonds branching algorithm demo

min-cost arborescence



16