

4. GREEDY ALGORITHMS II

► Edmonds branching algorithm demo

Lecture slides by Kevin Wayne

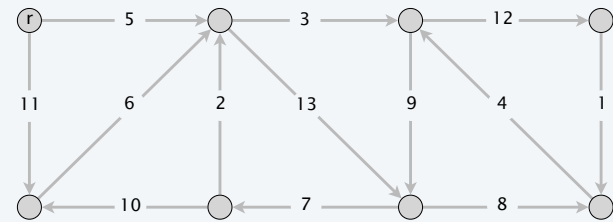
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<http://www.cs.princeton.edu/~wayne/kleinberg-tardos>

Last updated on 2/28/18 9:06 AM

Edmonds branching algorithm demo

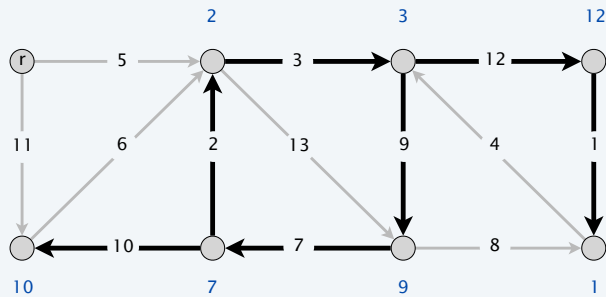
input digraph $G = (V, E)$



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Edmonds branching algorithm demo

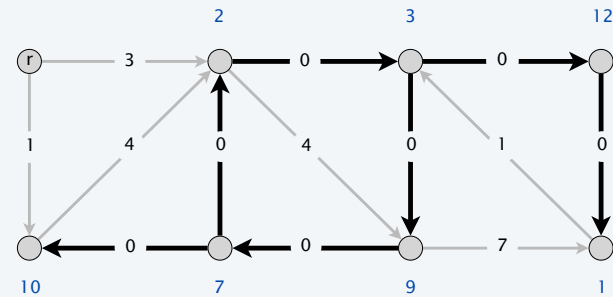
Phase 1: find cheapest edge entering each node



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Edmonds branching algorithm demo

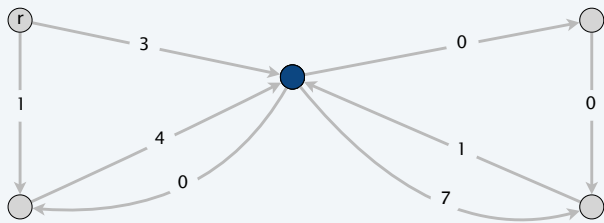
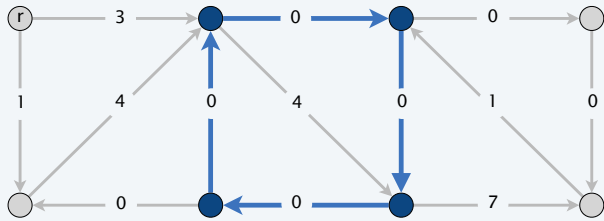
Phase 1: replace costs with reduced costs



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Edmonds branching algorithm demo

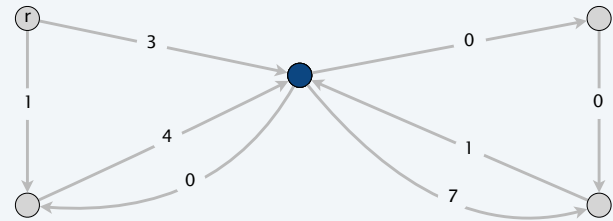
Phase 1: find 0-cost directed cycle C and contract



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Edmonds branching algorithm demo

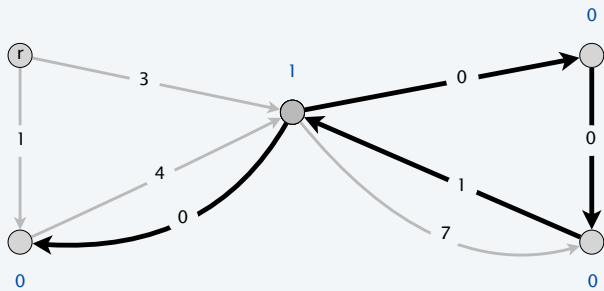
Phase 2: digraph G'



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Edmonds branching algorithm demo

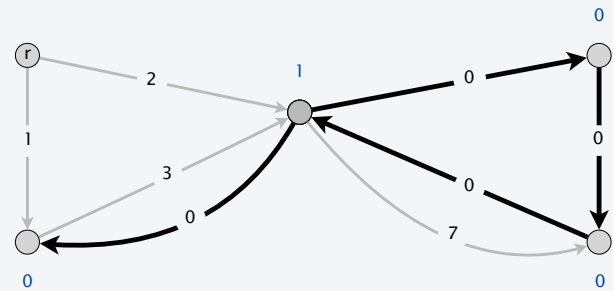
Phase 2: find cheapest edge entering each node



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Edmonds branching algorithm demo

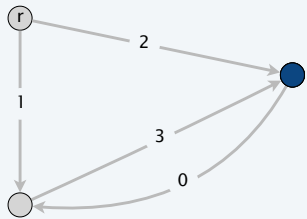
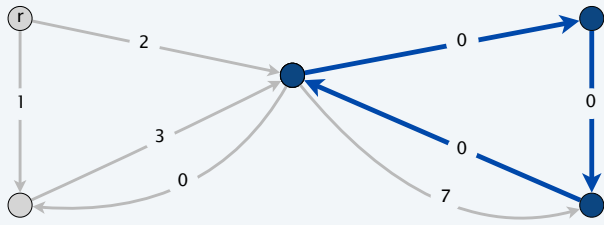
Phase 2: replace cost with reduced costs



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Edmonds branching algorithm demo

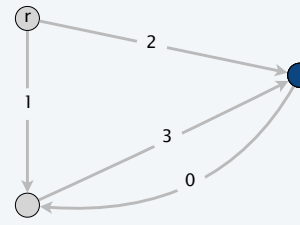
Phase 2: find 0-cost directed cycle and contract



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Edmonds branching algorithm demo

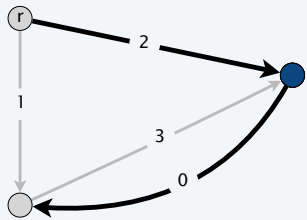
Phase 3: digraph G''



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Edmonds branching algorithm demo

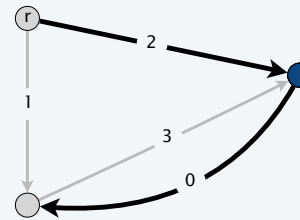
Phase 3: find cheapest edge entering each node



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Edmonds branching algorithm demo

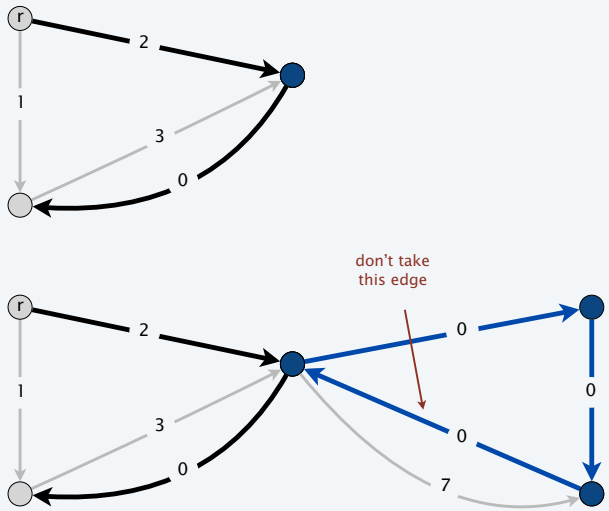
Phase 3: it's an arborescence!



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Edmonds branching algorithm demo

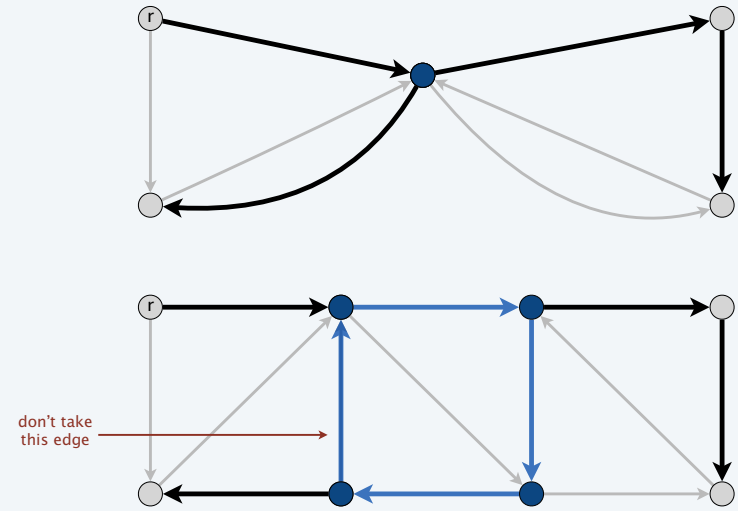
Phase 2: uncontract node and take all but one edge of cycle



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Edmonds branching algorithm demo

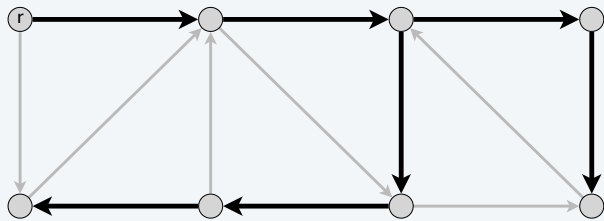
Phase 1: uncontract node and take all but one edge of cycle



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Edmonds branching algorithm demo

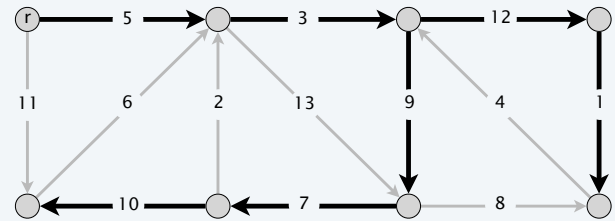
Stop: no more nodes to uncontract



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Edmonds branching algorithm demo

min-cost arborescence



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