4. Greedy Algorithms II

- Edmonds branching algorithm demo
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

Diagram of the graph with edges and nodes labeled with weights.
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

don't take this edge
Edmonds branching algorithm demo

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

don't take this edge
Edmonds branching algorithm demo

stop: no more nodes to uncontract
Edmonds branching algorithm demo

min-cost arborescence