4. GREEDY ALGORITHMS II

▸ *Edmonds branching algorithm demo*
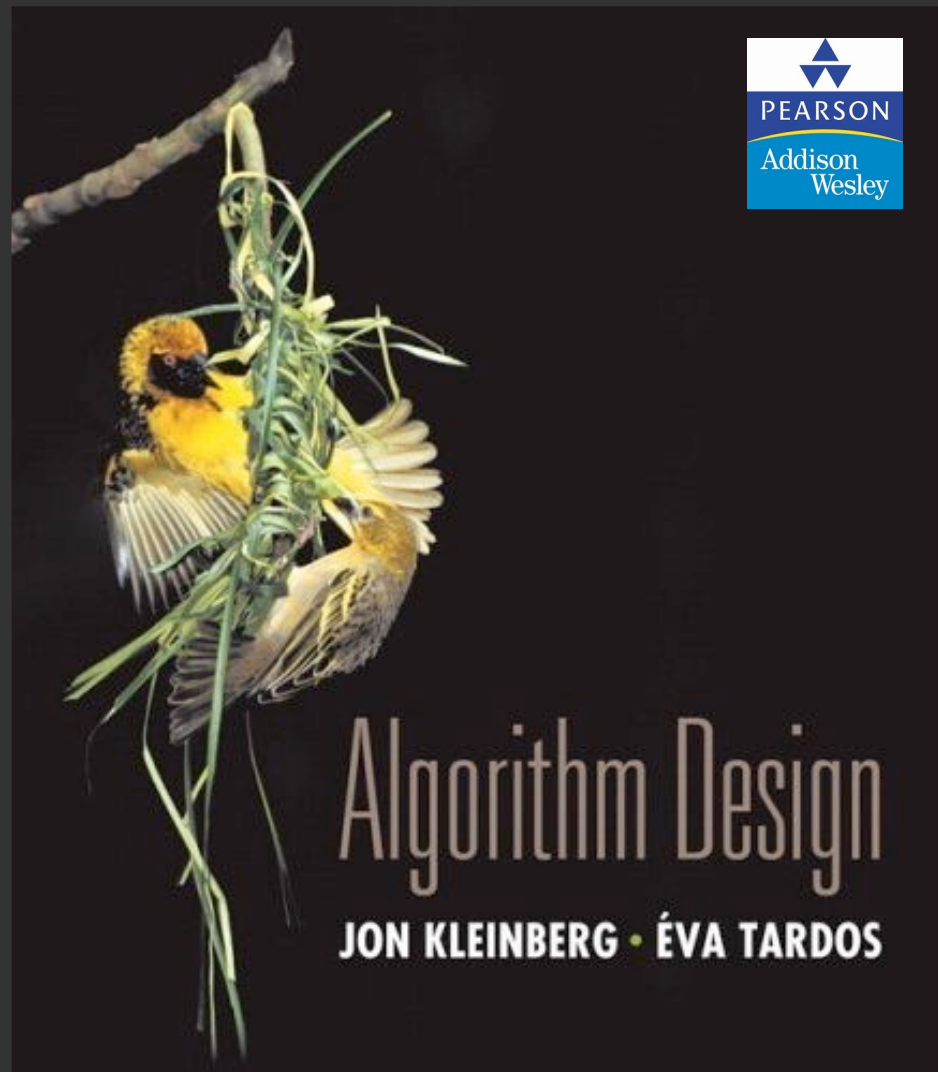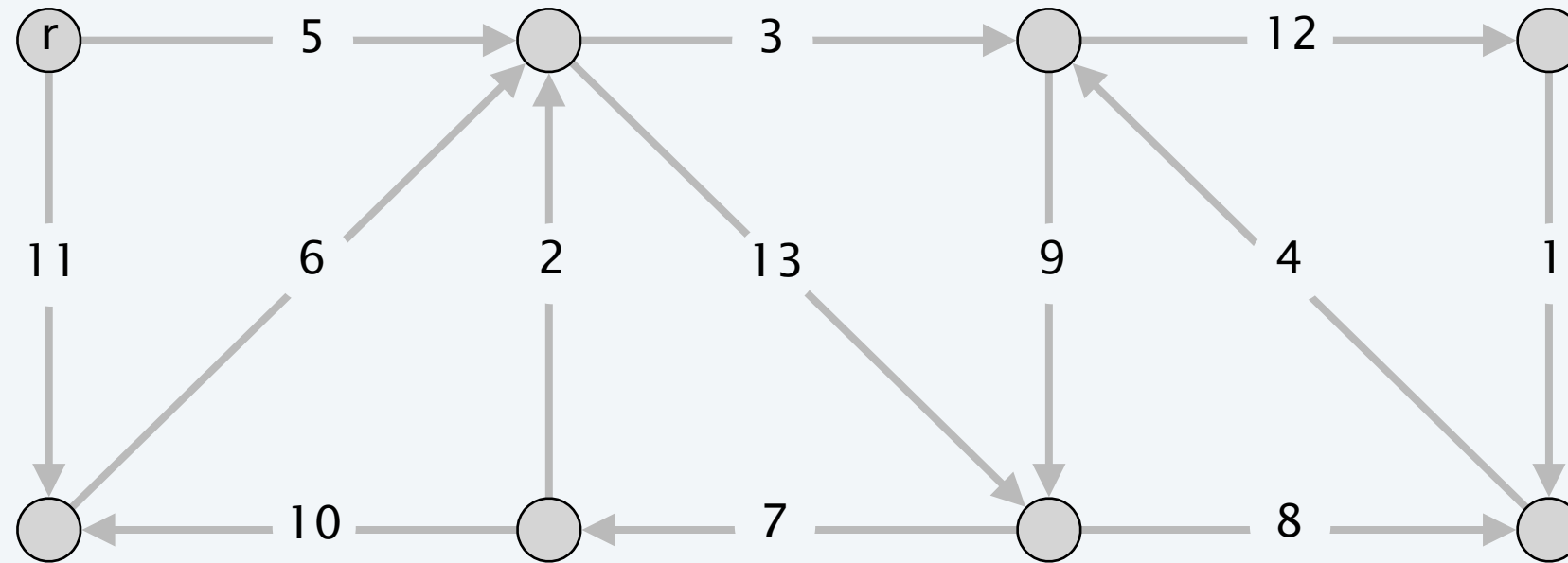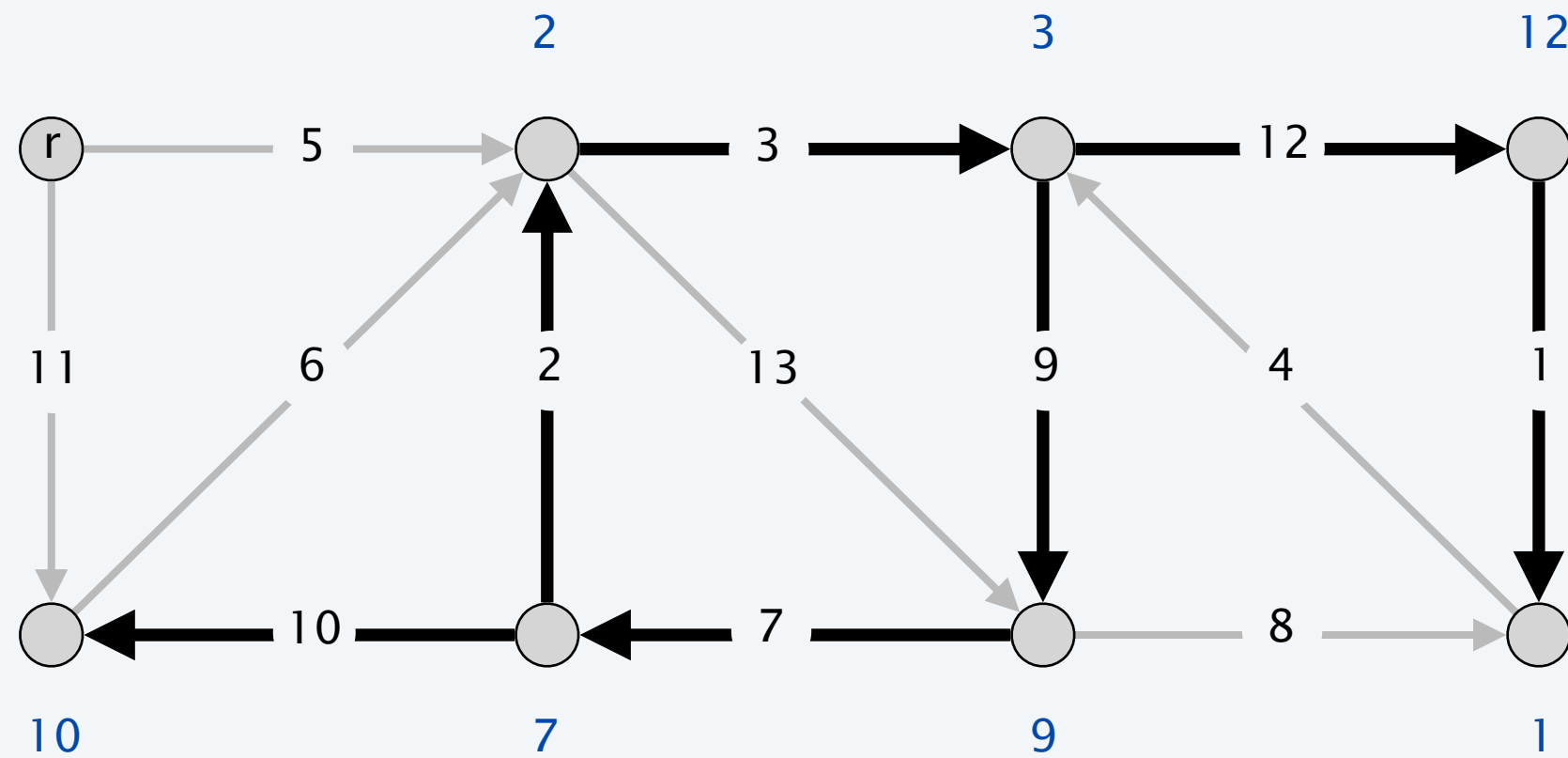
Edmonds branching algorithm demo
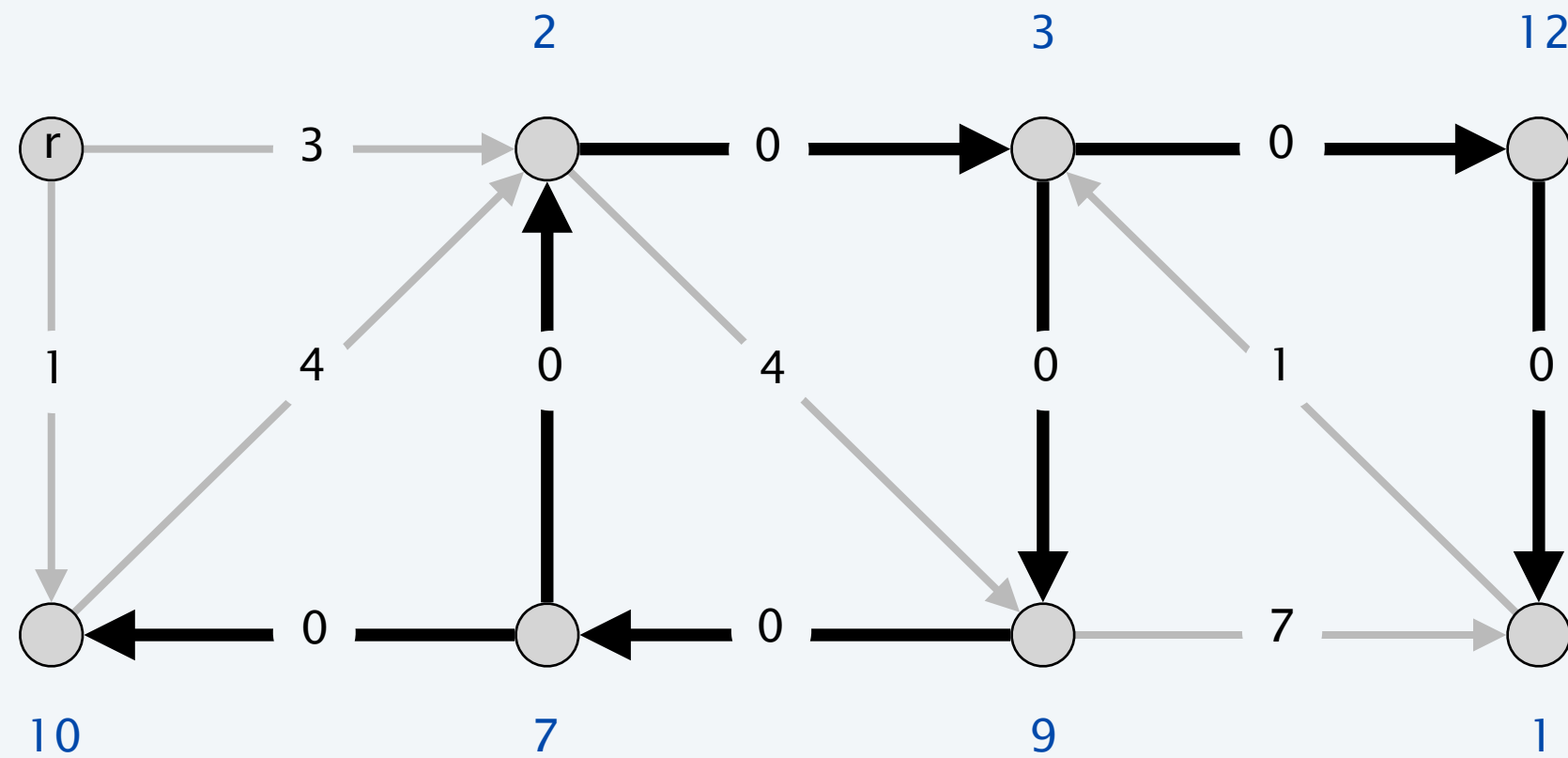
input digraph G = (V, E)

Edmonds branching algorithm demo

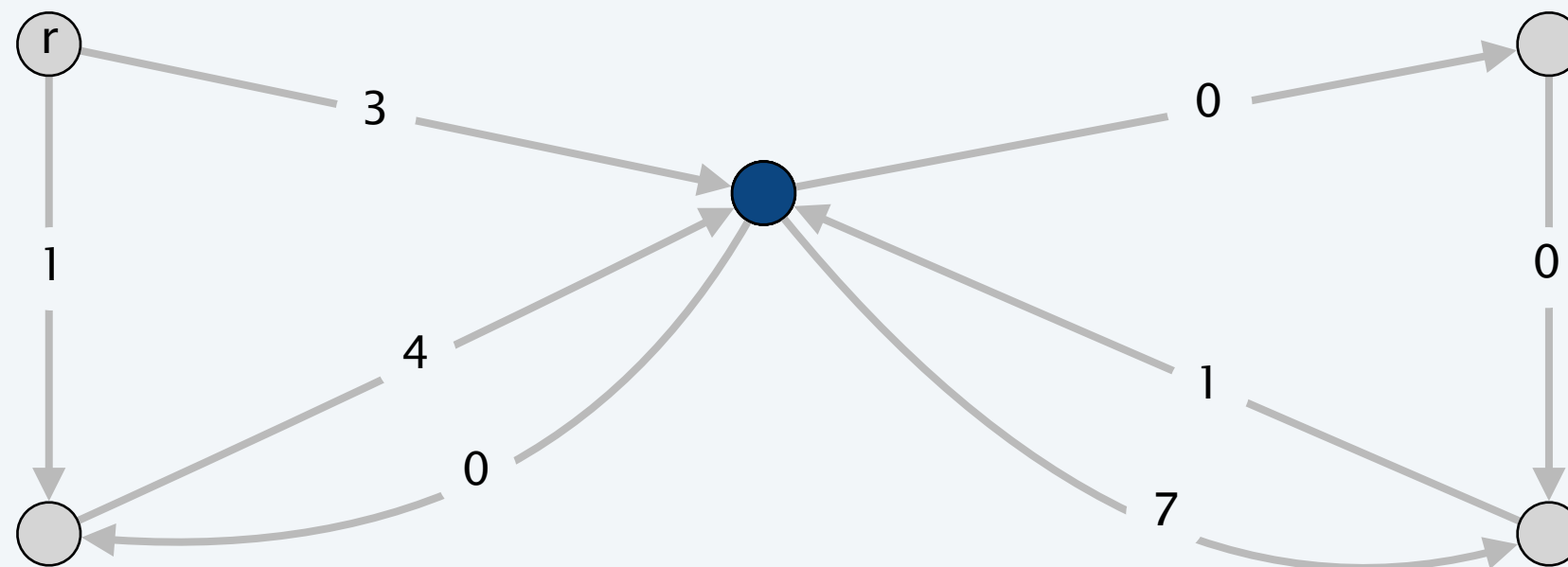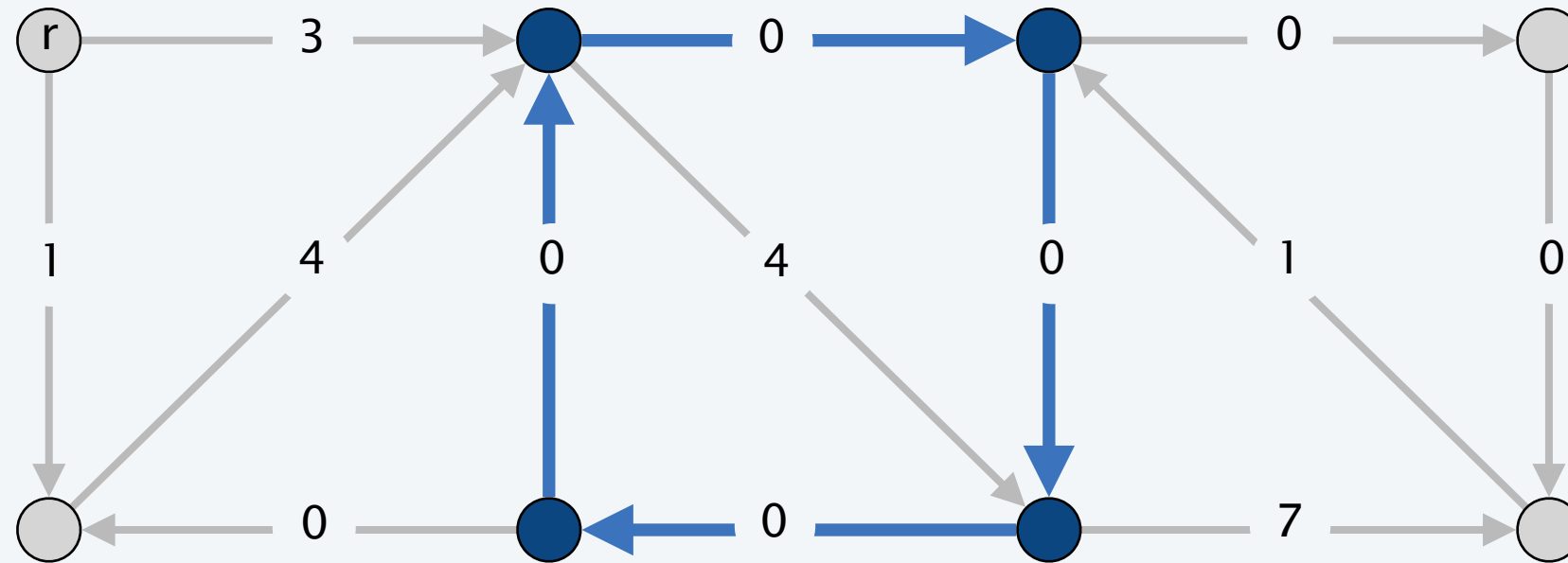**Phase 1: find cheapest edge entering each node**

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

Edmonds branching algorithm demo

Phase 2: digraph G'

Edmonds branching algorithm demo

Phase 2: find cheapest edge entering each node

Edmonds branching algorithm demo
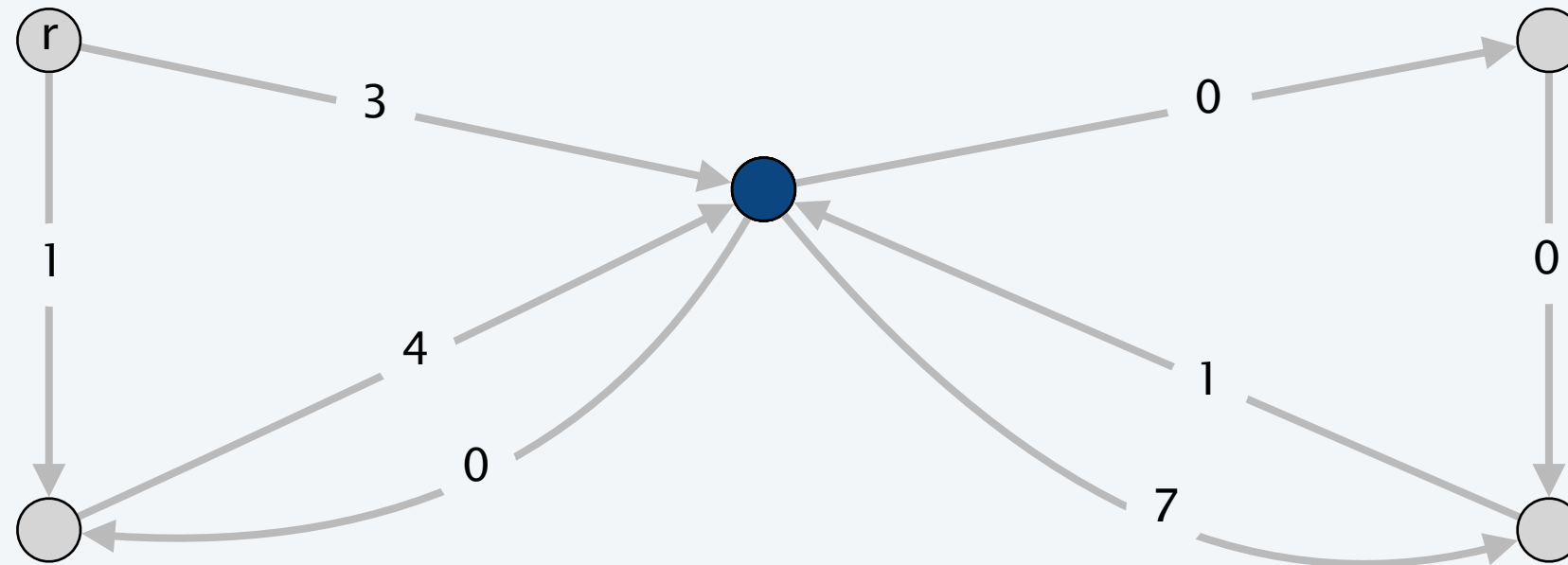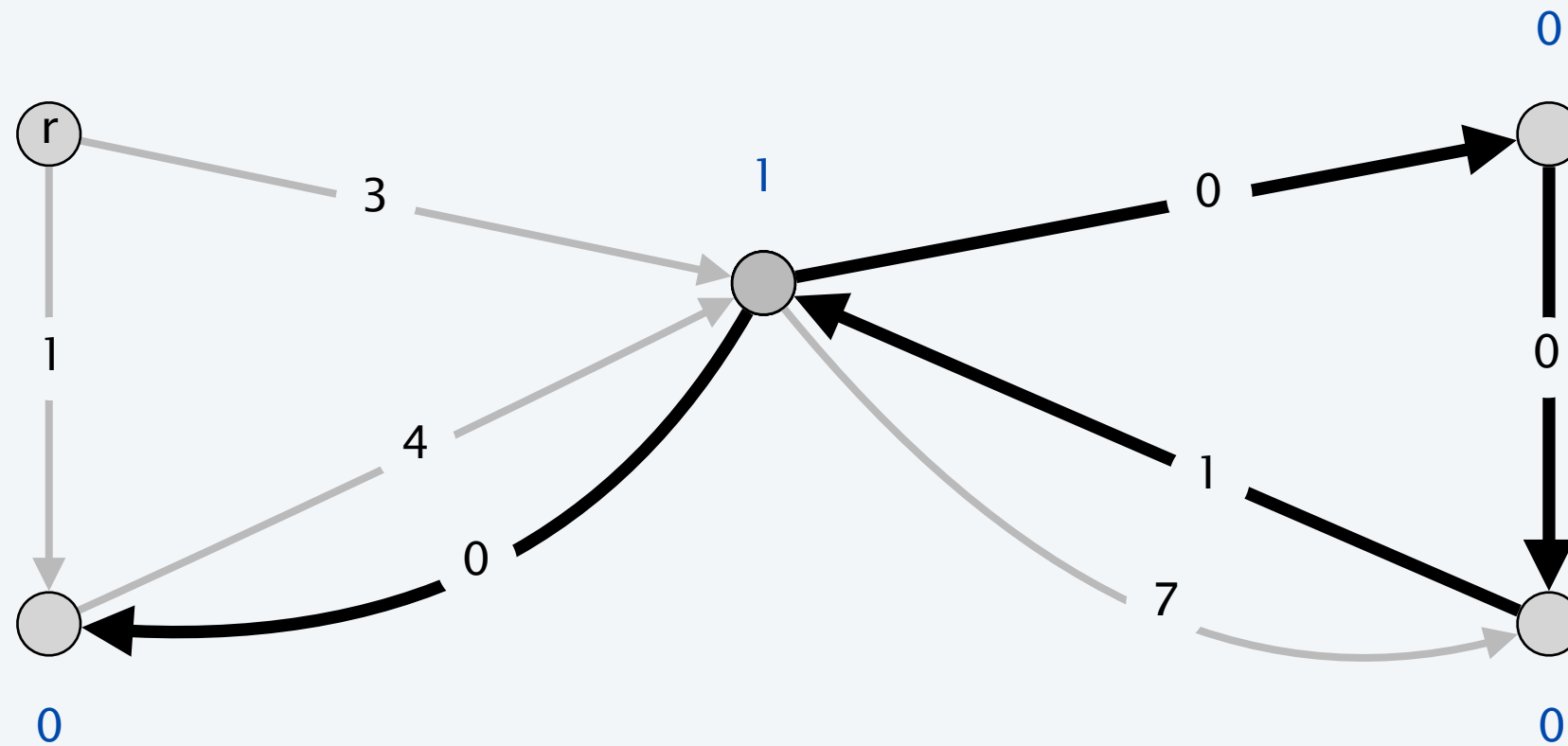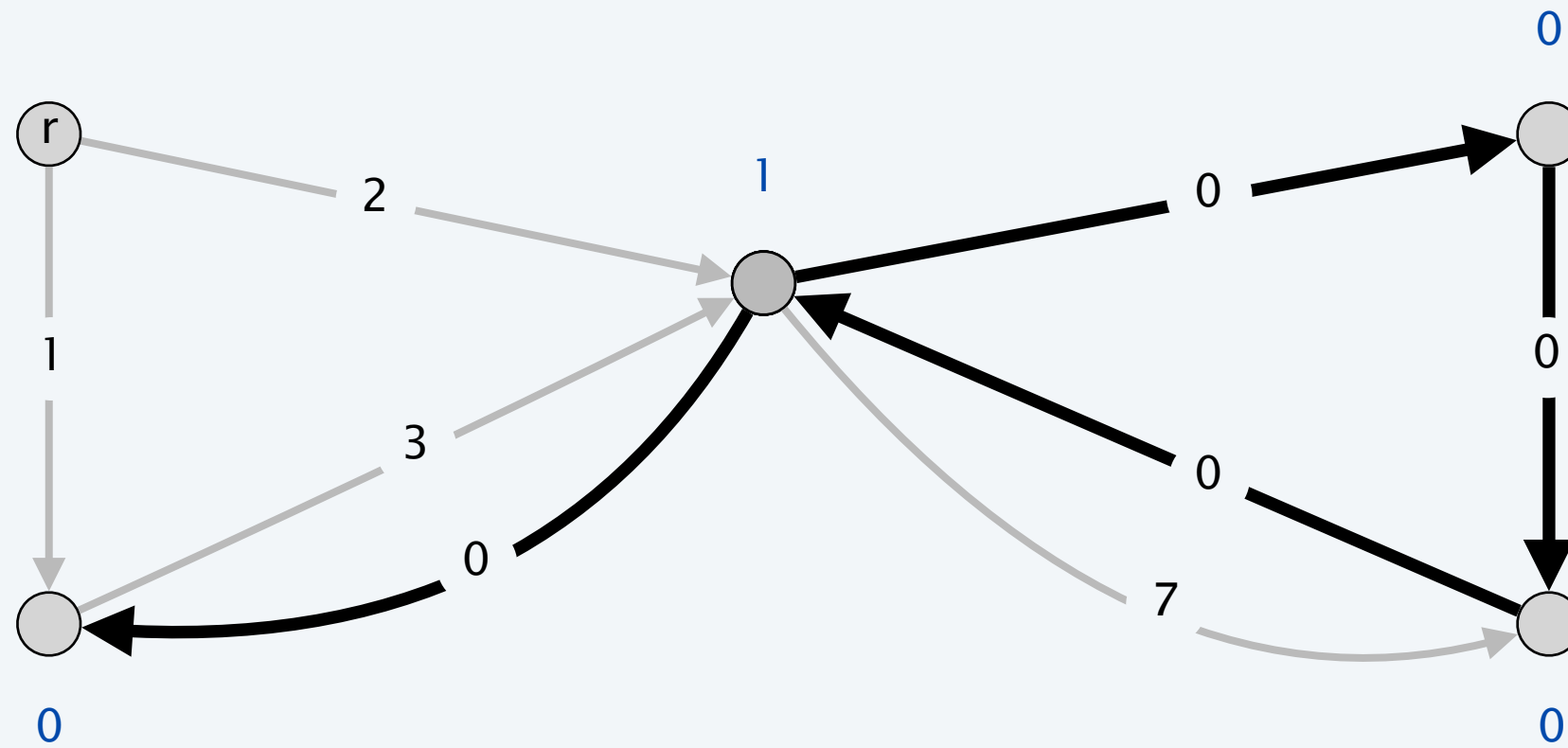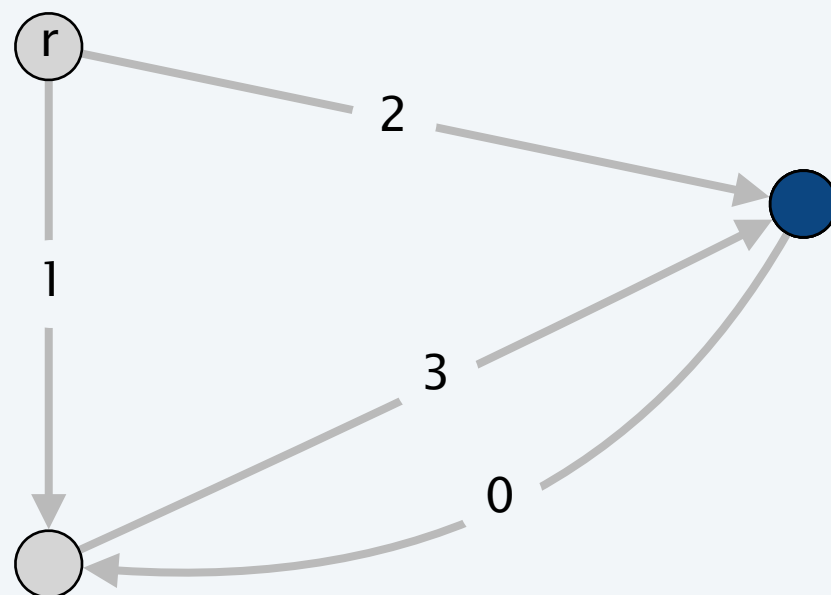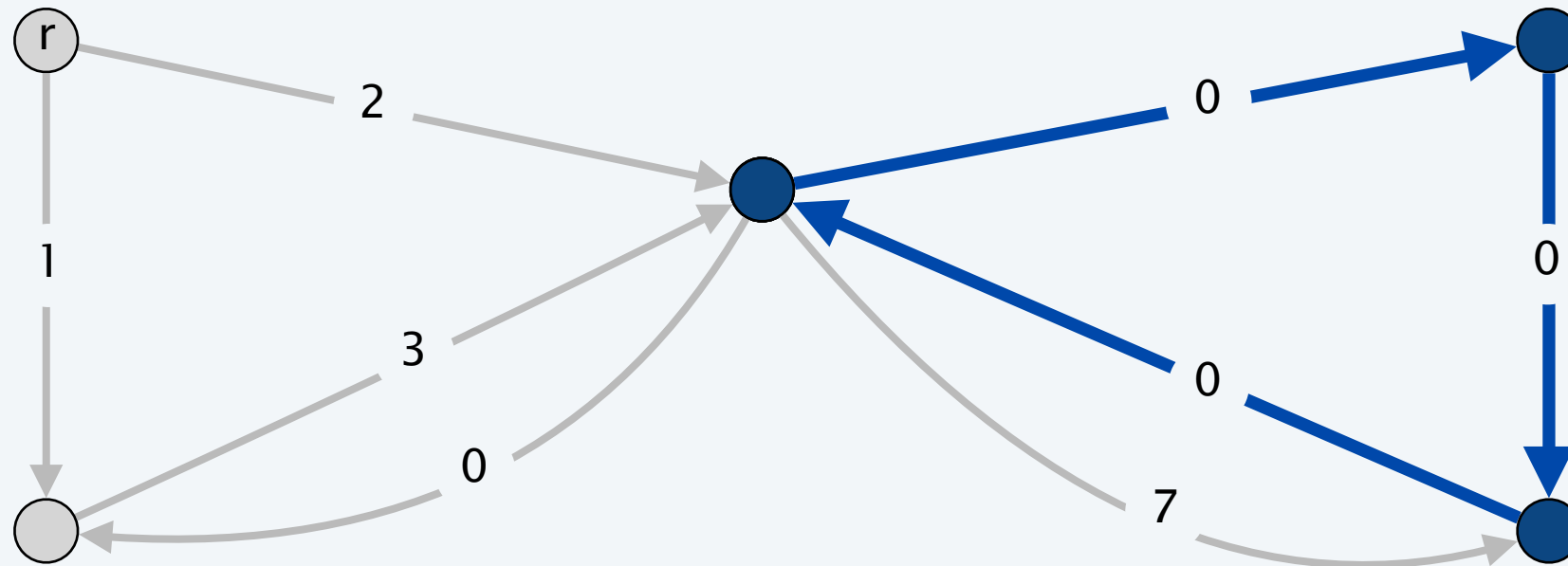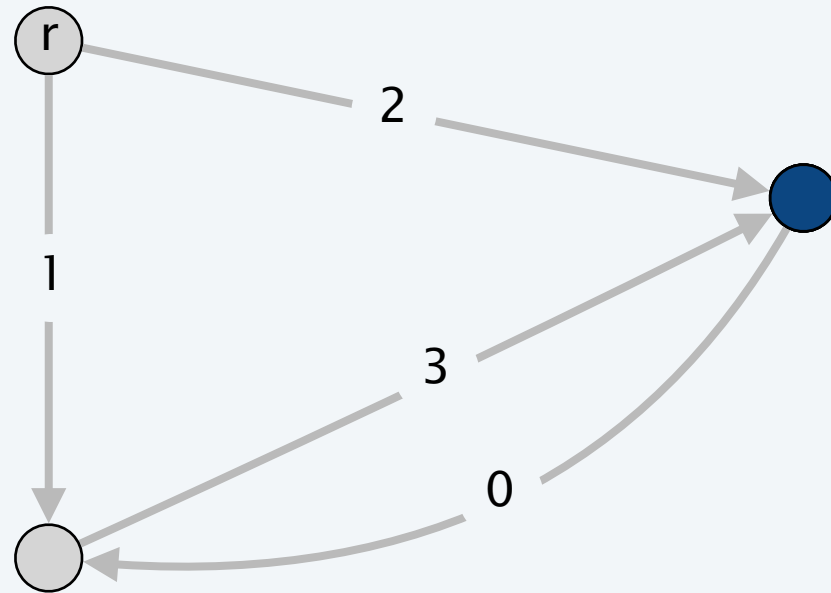
Phase 2: replace cost with reduced costs

Edmonds branching algorithm demo
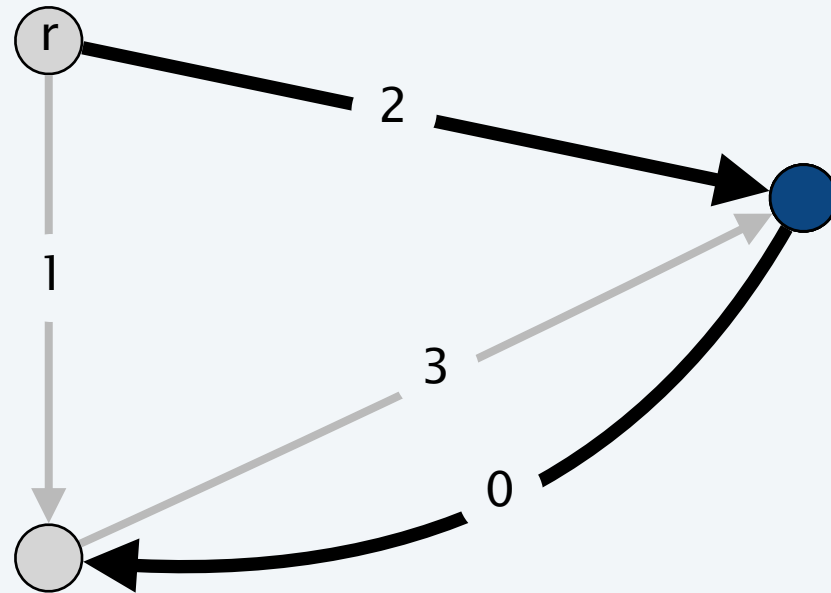
Phase 2: find 0-cost directed cycle and contract

Edmonds branching algorithm demo
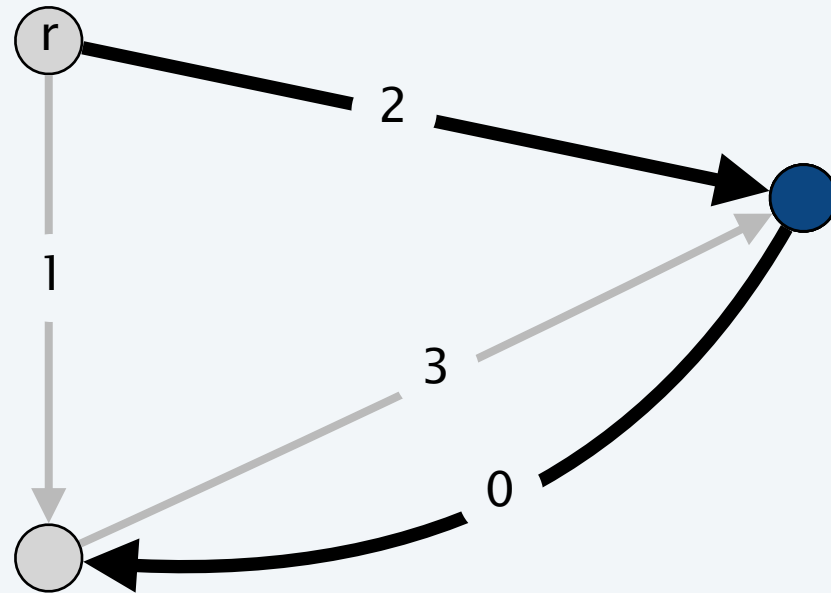
Phase 3: digraph G"

Edmonds branching algorithm demo

Phase 3: find cheapest edge entering each node
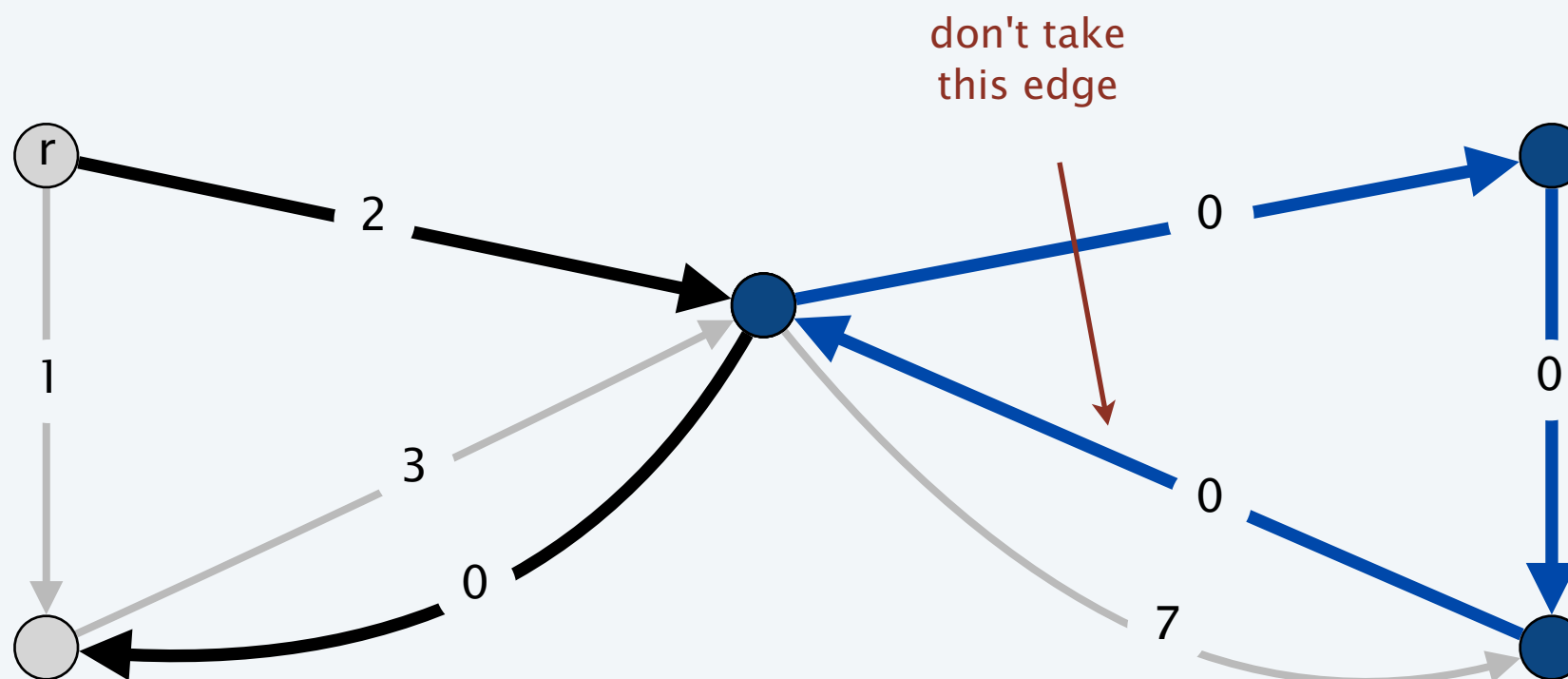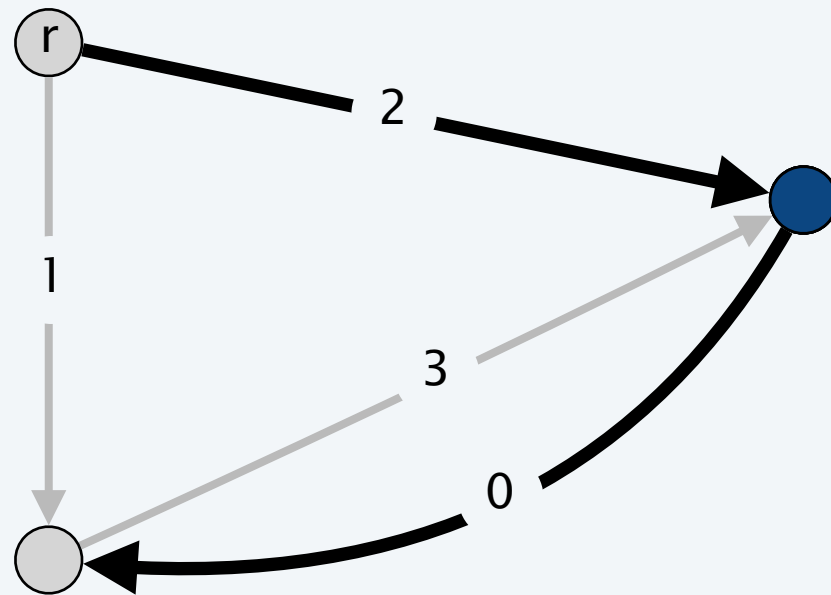
Edmonds branching algorithm demo

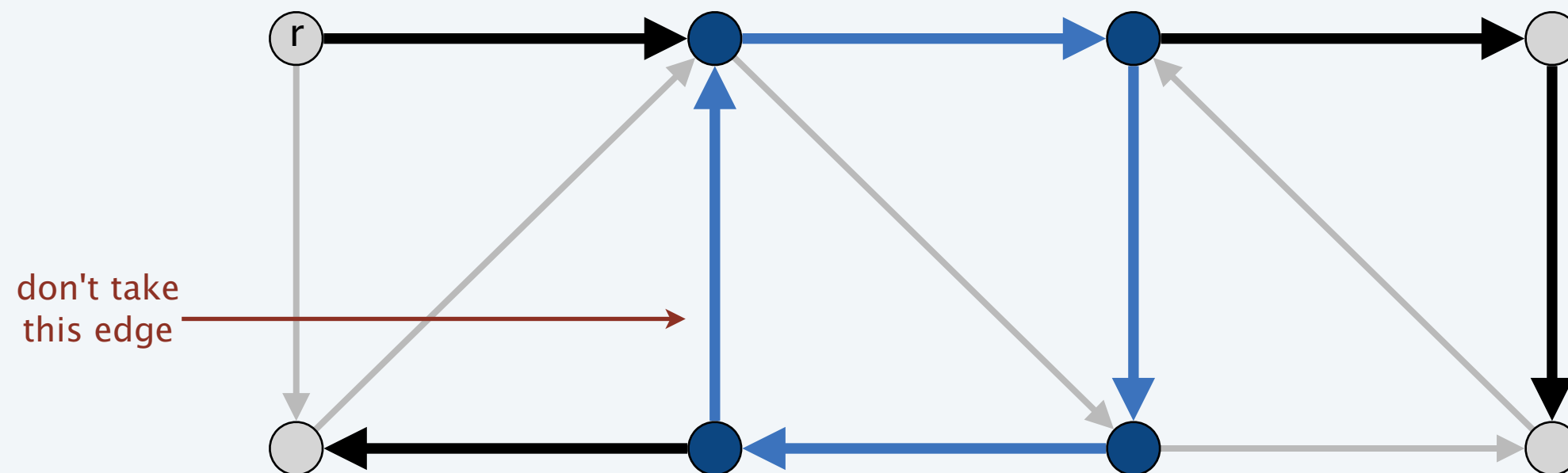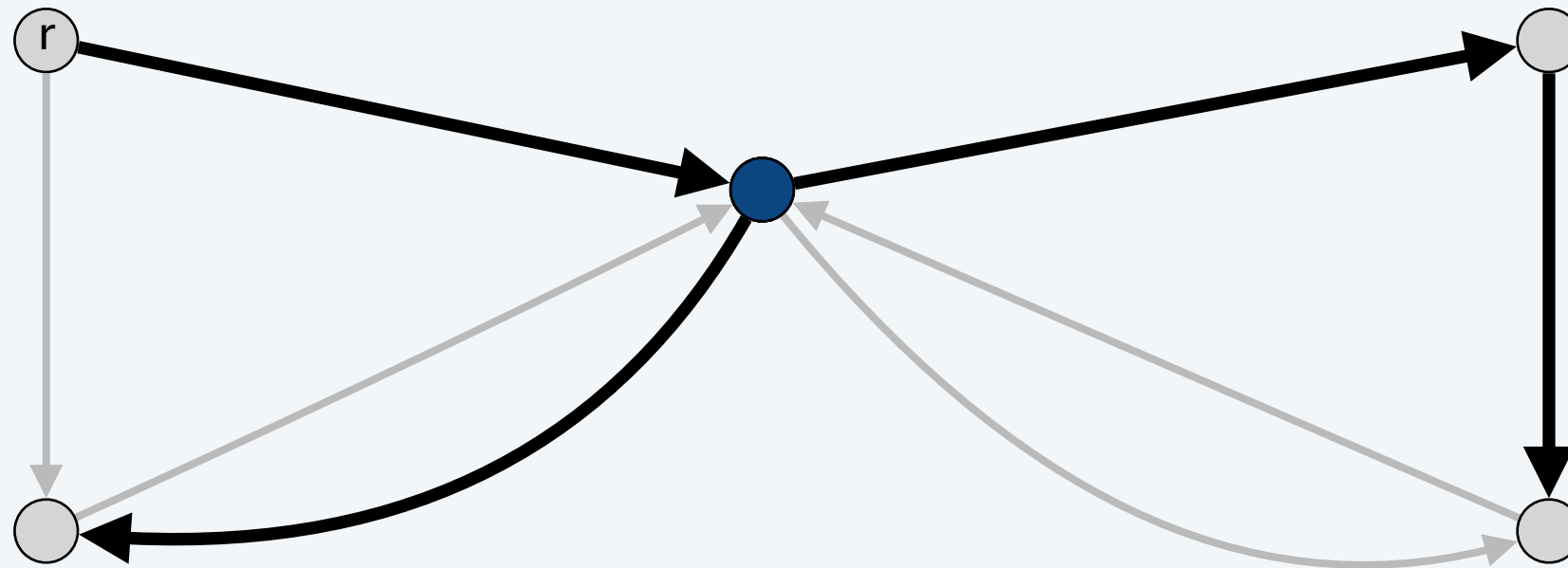**Phase 3: it's an arborescence!**

Edmonds branching algorithm demo

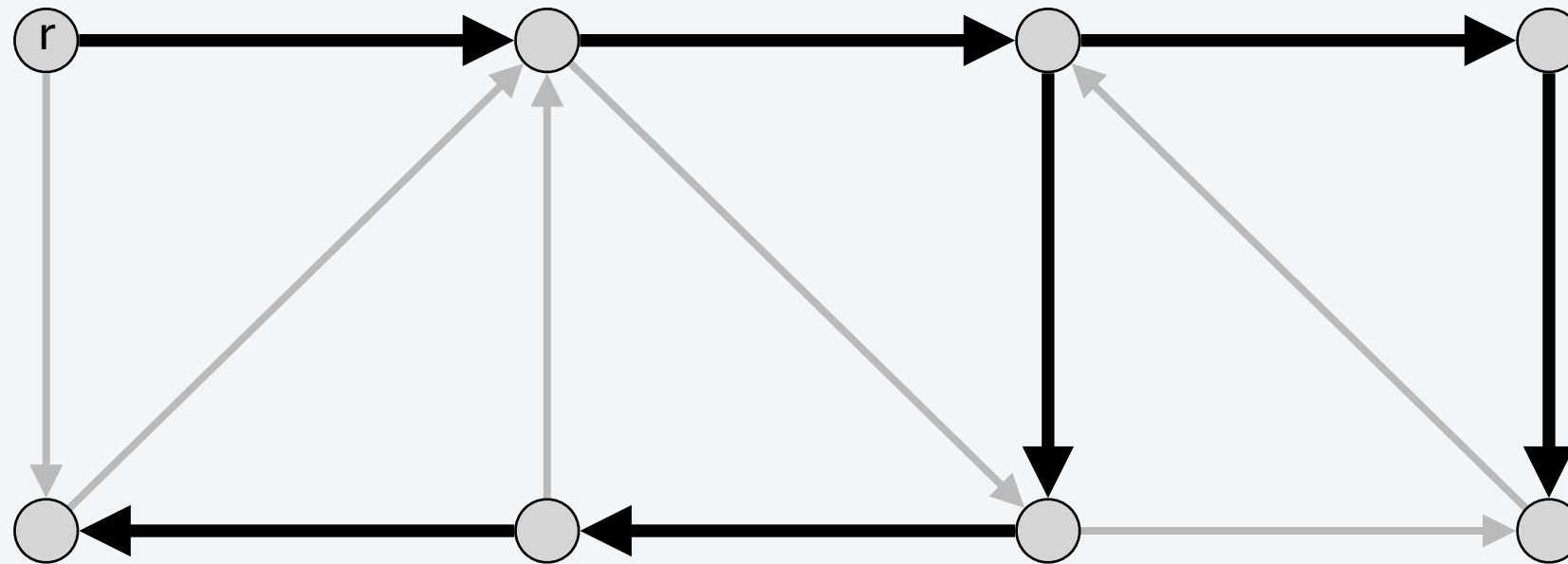**Phase 2': uncontract node and take all but one edge of cycle**

Edmonds branching algorithm demo

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

don't take
this edge

Edmonds branching algorithm demo

stop: no more nodes to uncontract

Edmonds branching algorithm demo

min-cost arborescence