

4. GREEDY ALGORITHMS

- ▶ *Red-rule blue-rule algorithm demo*

Lecture slides by Kevin Wayne

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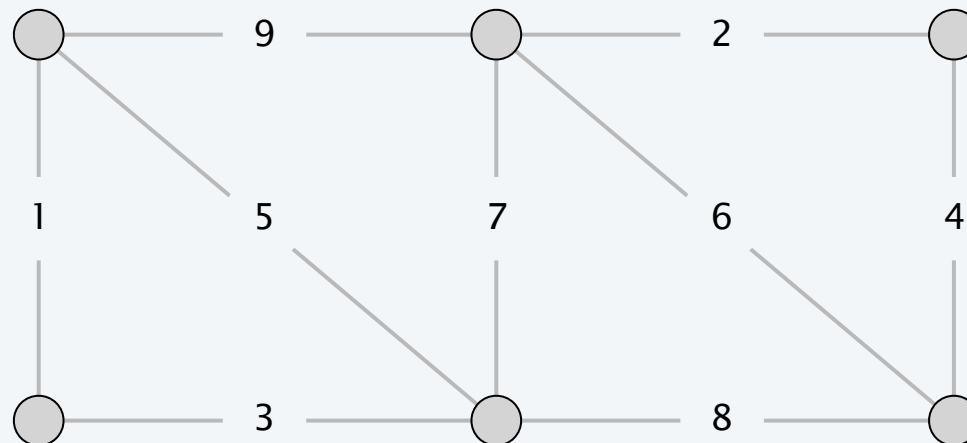
<http://www.cs.princeton.edu/~wayne/kleinberg-tardos>

Greedy algorithm demo

Red rule. Let C be a cycle with no red edges. Select an uncolored edge of C of max weight and color it red.

Blue rule. Let D be a cutset with no blue edges. Select an uncolored edge in D of min weight and color it blue.

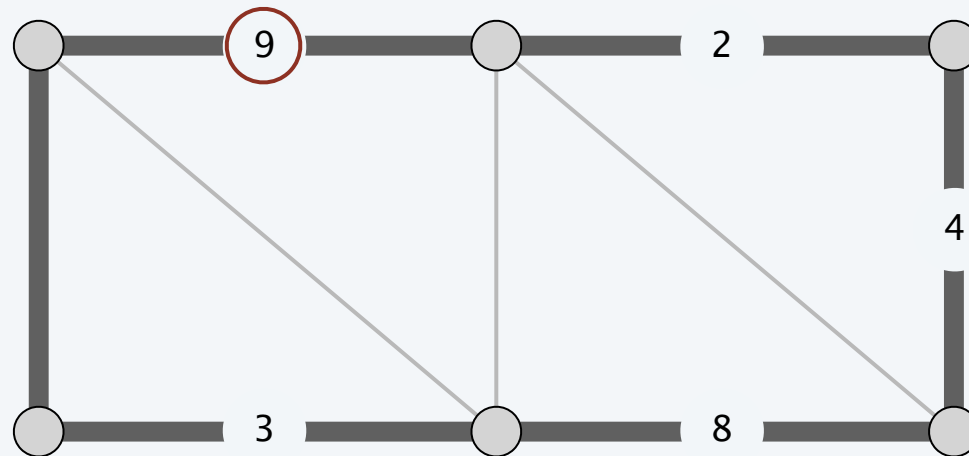
the input graph



Greedy algorithm demo

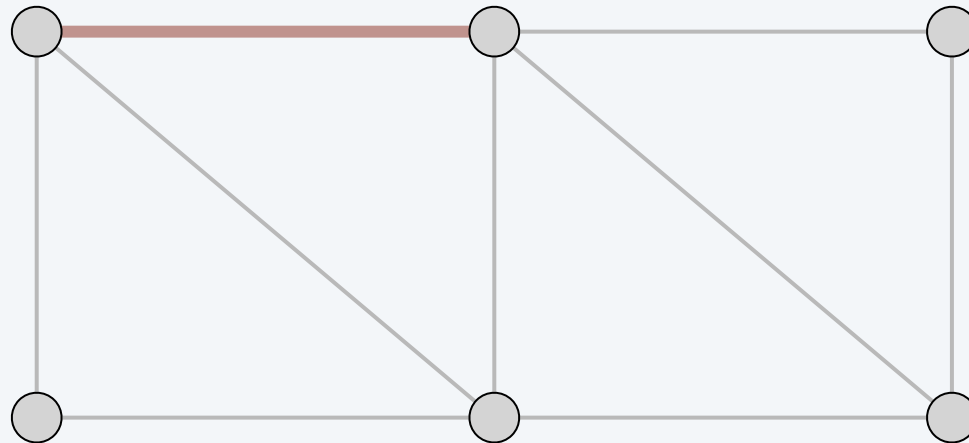
Red rule. Let C be a cycle with no red edges. Select an uncolored edge of C of max weight and color it red.

apply the red rule to the cycle



Greedy algorithm demo

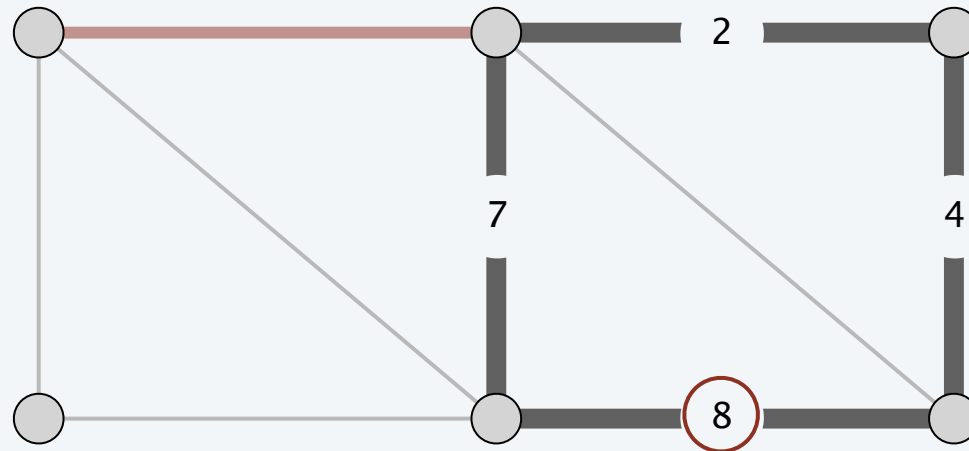
current set of red and blue edges



Greedy algorithm demo

Red rule. Let C be a cycle with no red edges. Select an uncolored edge of C of max weight and color it red.

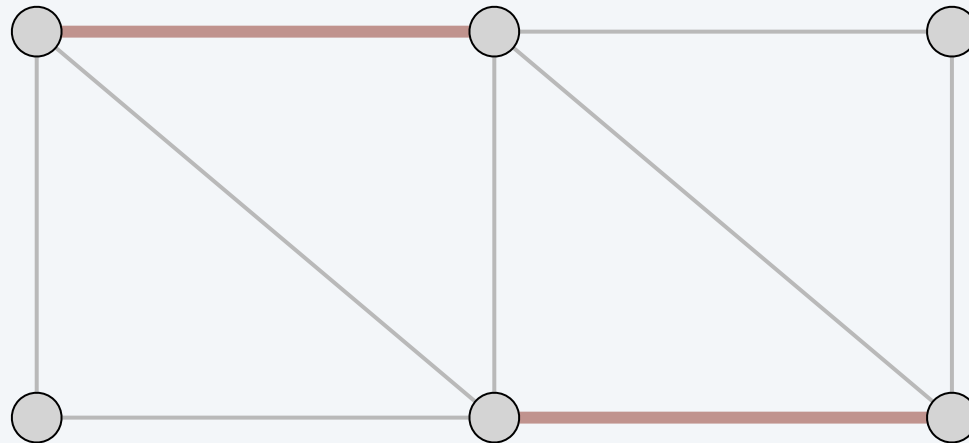
apply the red rule to the cycle



Greedy algorithm demo

Red rule. Let C be a cycle with no red edges. Select an uncolored edge of C of max weight and color it red.

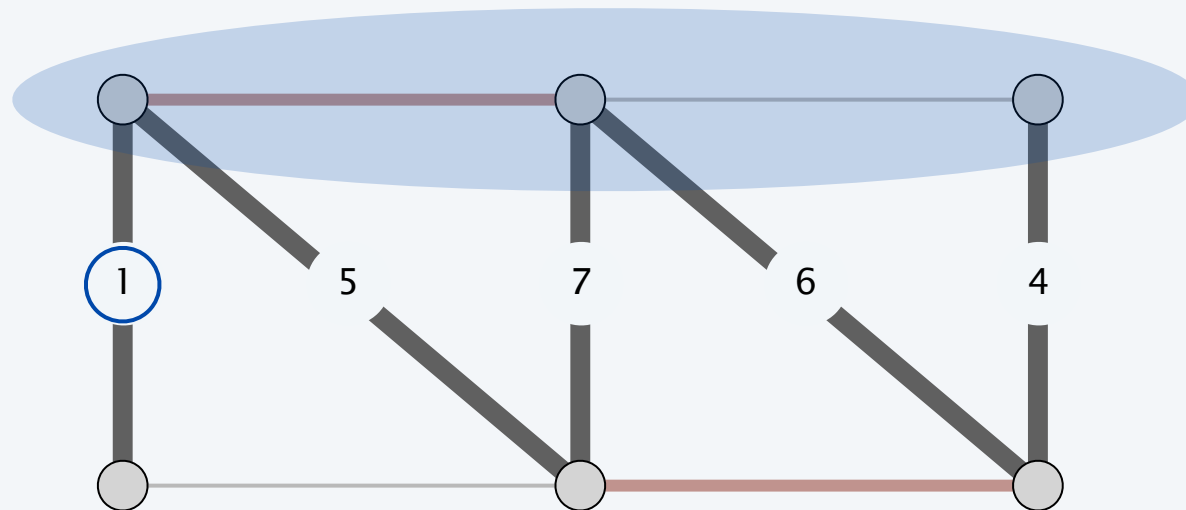
current set of red and blue edges



Greedy algorithm demo

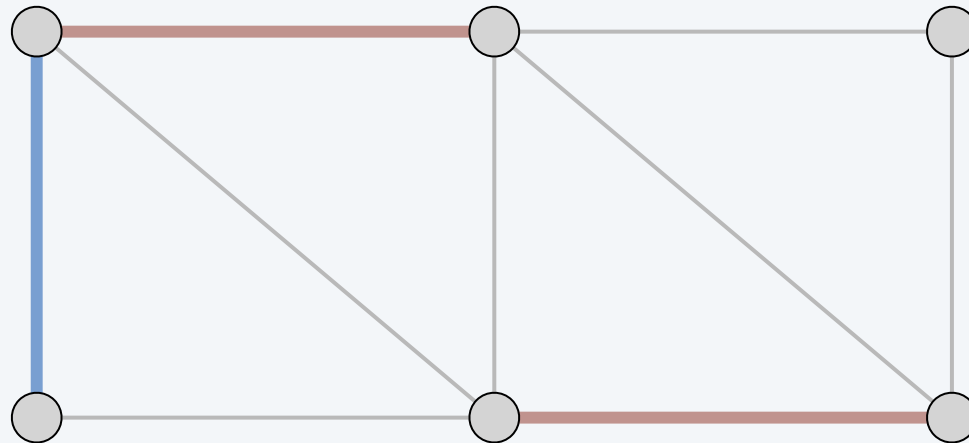
Blue rule. Let D be a cutset with no blue edges. Select an uncolored edge in D of min weight and color it blue.

apply the blue rule to the cutset



Greedy algorithm demo

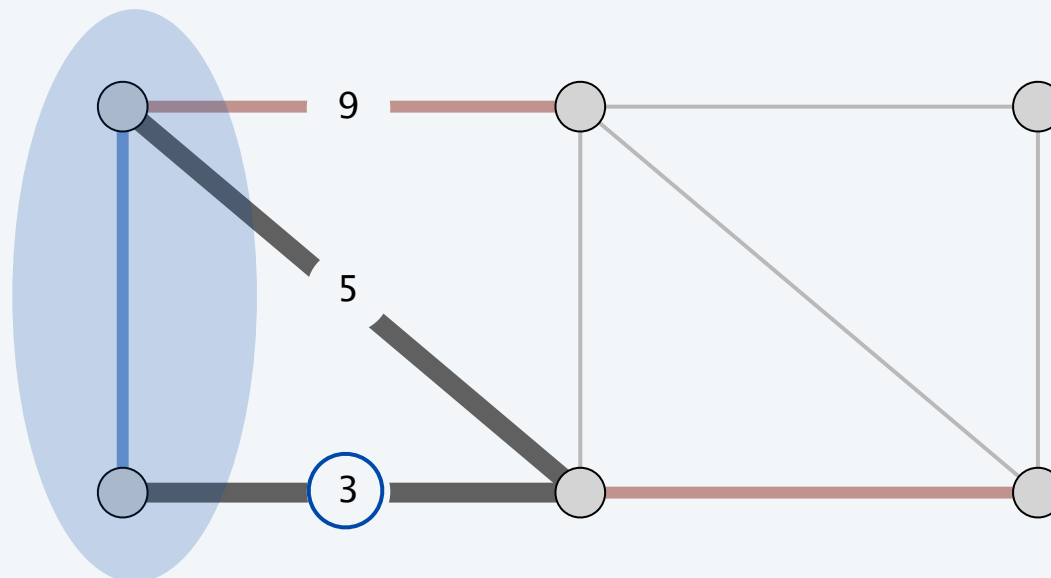
current set of red and blue edges



Greedy algorithm demo

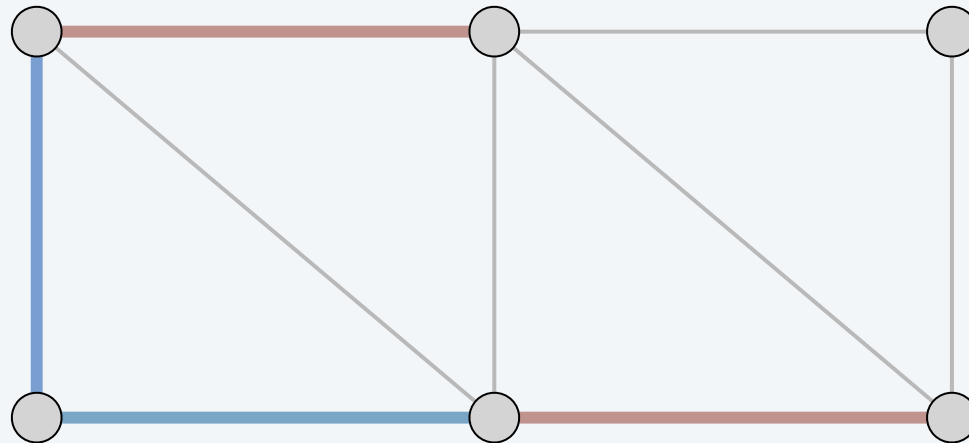
Blue rule. Let D be a cutset with no blue edges. Select an uncolored edge in D of min weight and color it blue.

apply the blue rule to the cutset



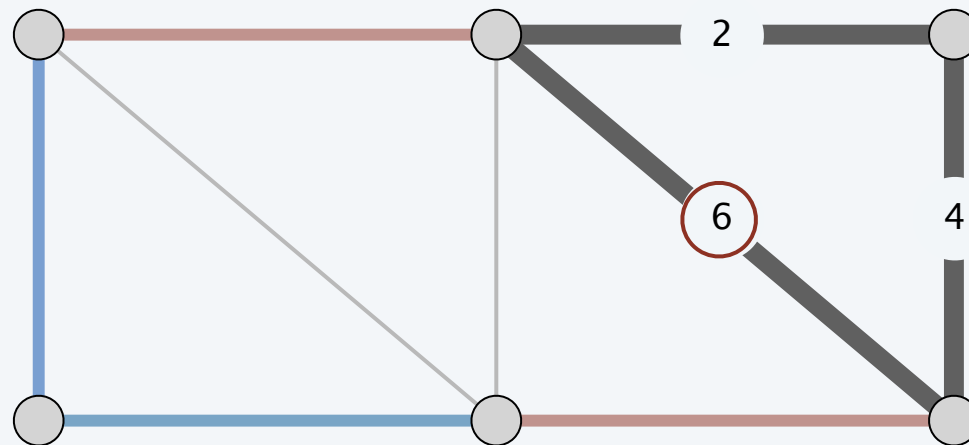
Greedy algorithm demo

current set of red and blue edges



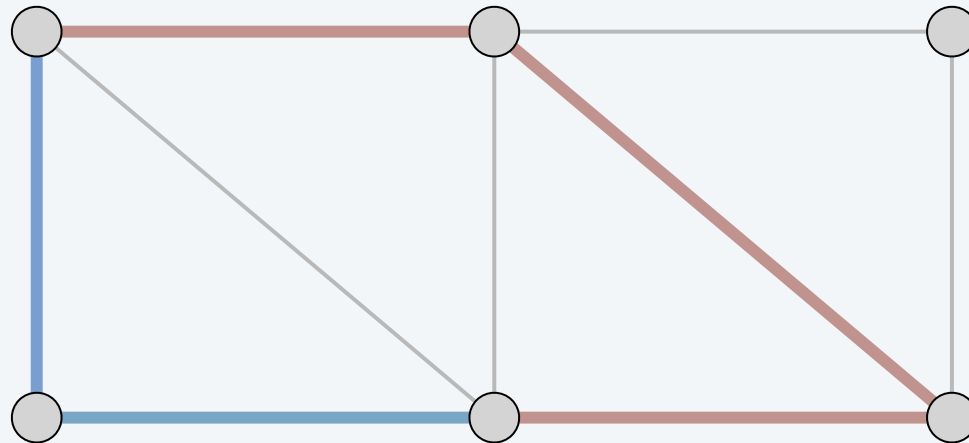
Greedy algorithm demo

apply the red rule to the cycle



Greedy algorithm demo

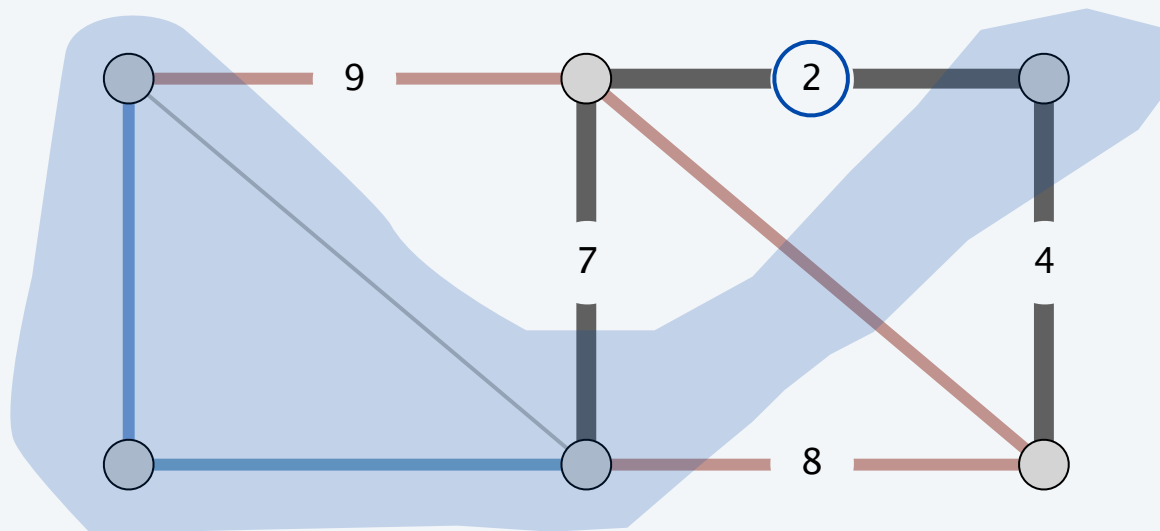
current set of red and blue edges



Greedy algorithm demo

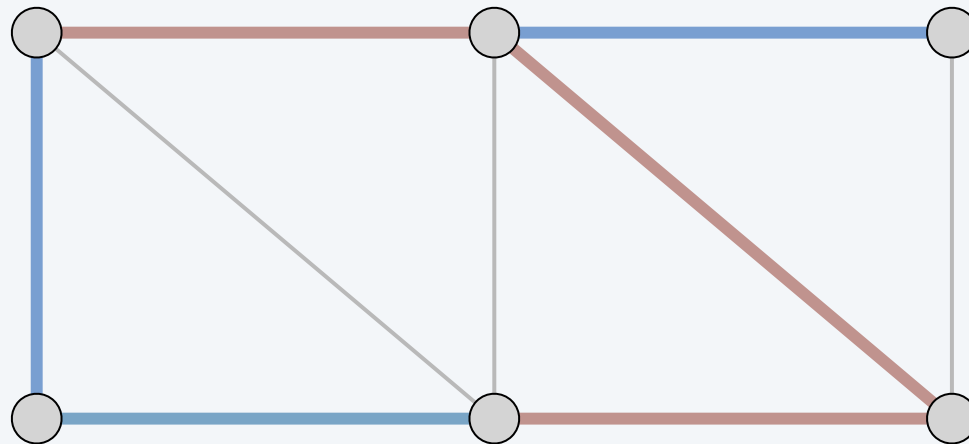
Blue rule. Let D be a cutset with no blue edges. Select an uncolored edge in D of min weight and color it blue.

apply the blue rule to the cutset



Greedy algorithm demo

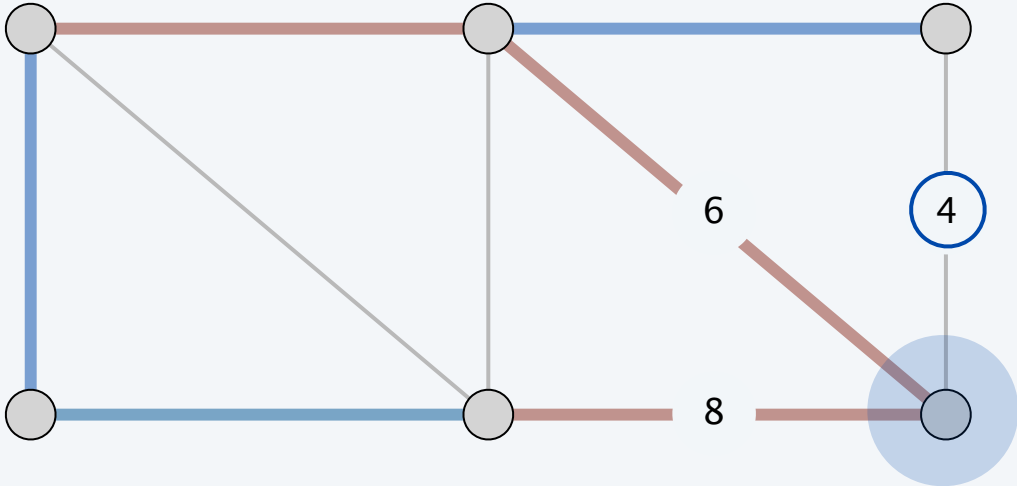
current set of red and blue edges



Greedy algorithm demo

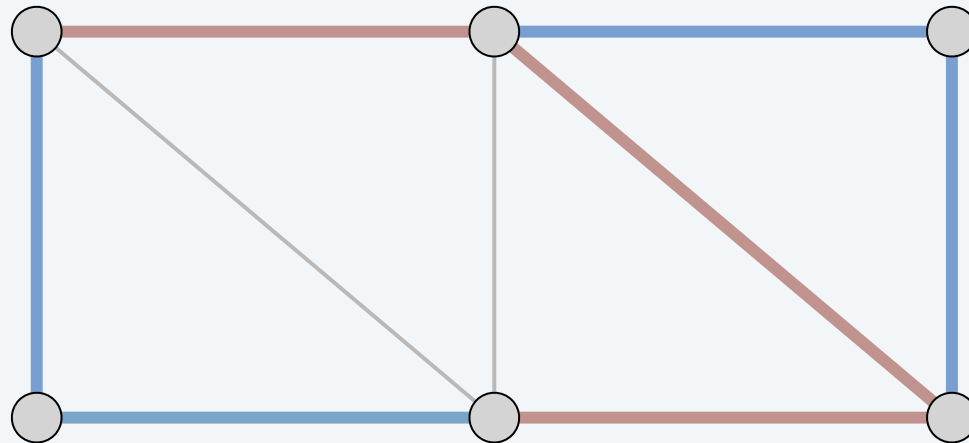
Blue rule. Let D be a cutset with no blue edges. Select an uncolored edge in D of min weight and color it blue.

apply the blue rule to the cutset



Greedy algorithm demo

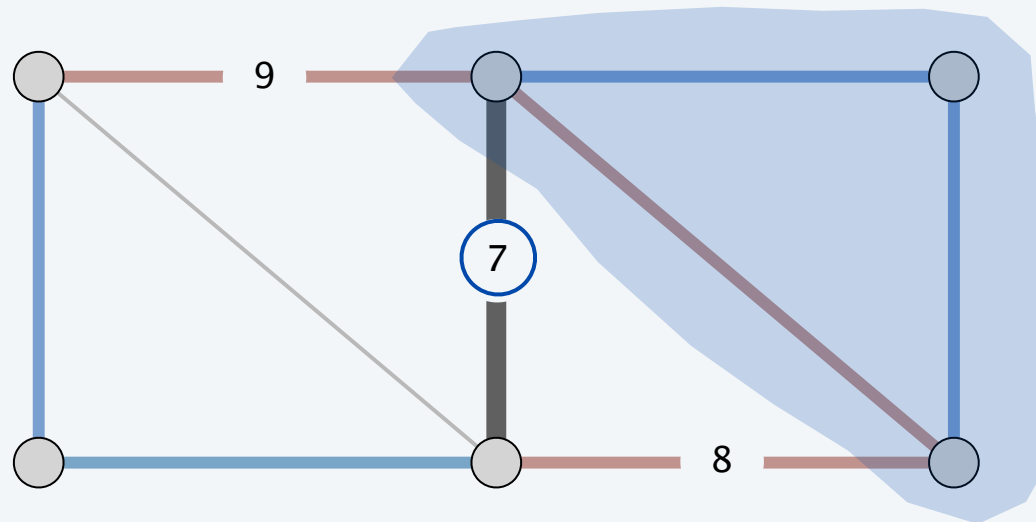
current set of red and blue edges



Greedy algorithm demo

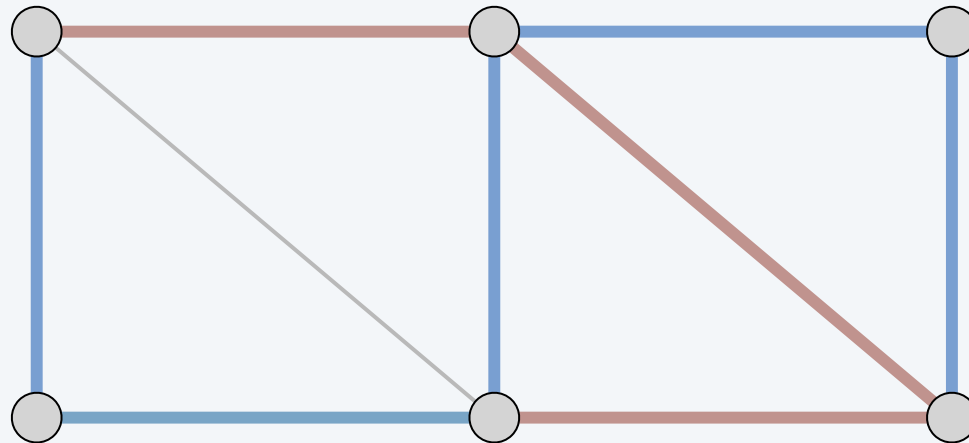
Blue rule. Let D be a cutset with no blue edges. Select an uncolored edge in D of min weight and color it blue.

apply the blue rule to the cutset



Greedy algorithm demo

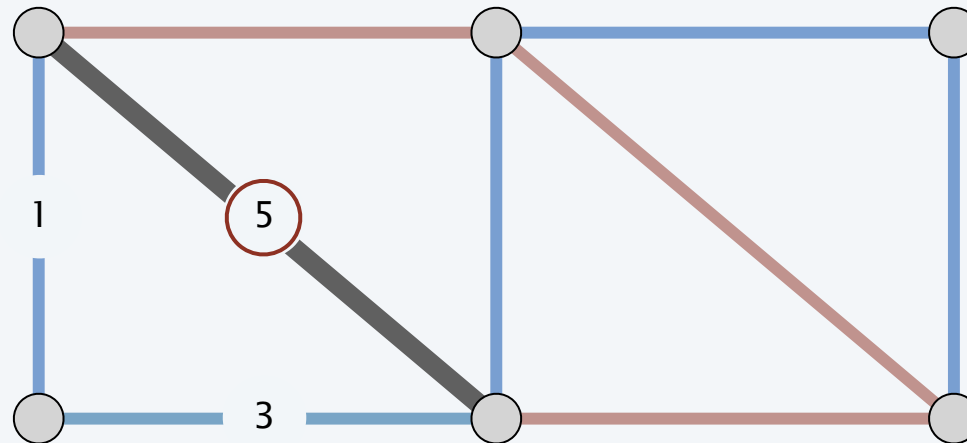
current set of red and blue edges



Greedy algorithm demo

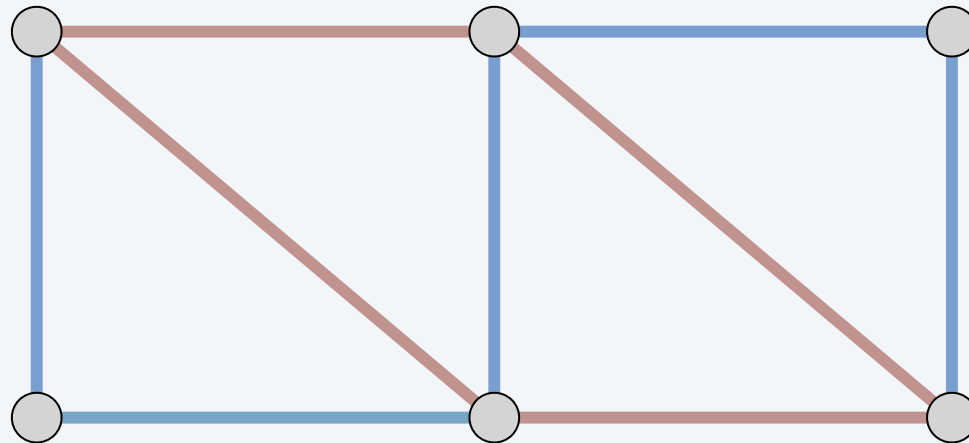
Blue rule. Let D be a cutset with no blue edges. Select an uncolored edge in D of min weight and color it blue.

apply the red rule to the cycle



Greedy algorithm demo

current set of red and blue edges



Greedy algorithm demo

Greedy algorithm. Upon termination, the blue edges form a MST.

a minimum spanning tree

