4. Greedy Algorithms II

- red-rule blue-rule demo
Red-rule blue-rule 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

```
  1 -- 5 -- 7 -- 6 -- 4
     |             |
  3     8
     |             |
  9 -- 2
```
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
Red-rule blue-rule demo

current set of red and blue edges
Red-rule blue-rule 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
Red-rule blue-rule 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.
Red-rule blue-rule 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
Red-rule blue-rule demo

current set of red and blue edges
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
Red-rule blue-rule demo

current set of red and blue edges
apply the red rule to the cycle
Red-rule blue-rule demo

current set of red and blue edges
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
Red-rule blue-rule demo

current set of red and blue edges
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
Red-rule blue-rule demo

current set of red and blue edges
Red-rule blue-rule 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
Red-rule blue-rule demo

current set of red and blue edges
Red-rule blue-rule 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
Red-rule blue-rule demo

current set of red and blue edges
Greedy algorithm. Upon termination, the blue edges form a MST.