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
```
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

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

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Red-rule blue-rule demo

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![Current set of red and blue edges](image-url)
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.
Red-rule blue-rule demo

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

apply the red rule to the cycle
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
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
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Greedy algorithm. Upon termination, the blue edges form a MST.