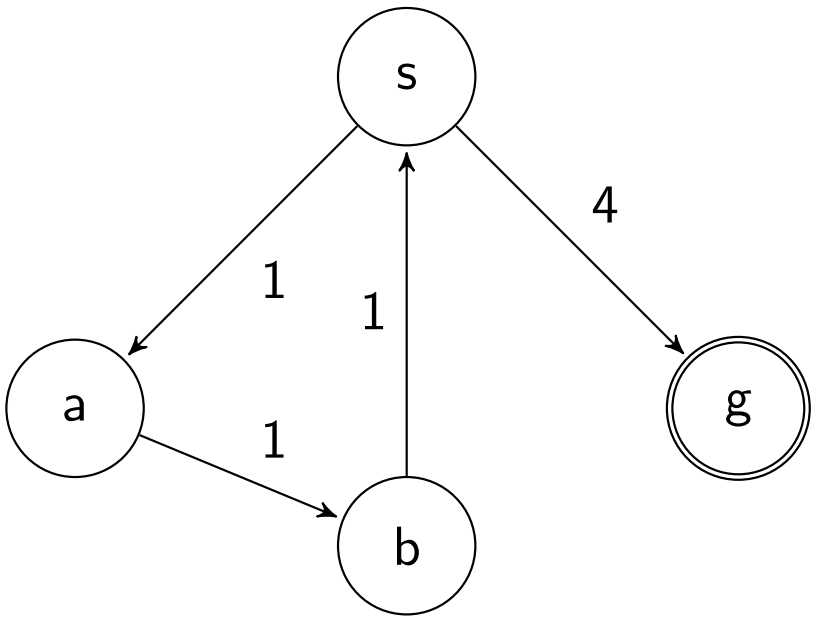
$$Q(s,s') := Q_0(s,s') + \frac{1}{2}\max\{Q(s',s'') \mid arc_=(s',s'')\}$$

$$Q_0(s,s') := \begin{cases} 1 & \text{if } s = s' \in G \\ -\text{cost}(s,s') & \text{else if } arc(s,s') \end{cases}$$



Q(s,g) $= -3$
Q(s,a) $= -2$
$= Q$(a,b) $= Q$(b,s)

$$Q(s,s') := Q_0(s,s') + \frac{1}{2}\max\{Q(s',s'') \mid arc_=(s',s'')\}$$

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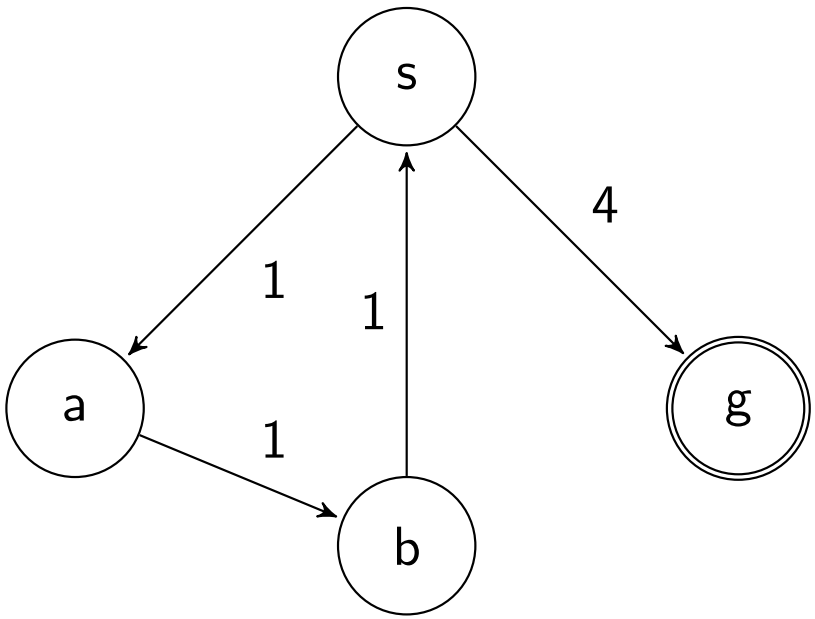

$Q(\text{g,g}) = 1 + \frac{1}{2}Q(\text{g,g})$
$\therefore Q(\text{g,g}) = 2$

$Q(\text{s,g}) = -3$
$Q(\text{s,a}) = -2$
$= Q(\text{a,b}) = Q(\text{b,s})$

$$Q(s,s') := Q_0(s,s') + \frac{1}{2}\max\{Q(s',s'') \mid arc_=(s',s'')\}$$

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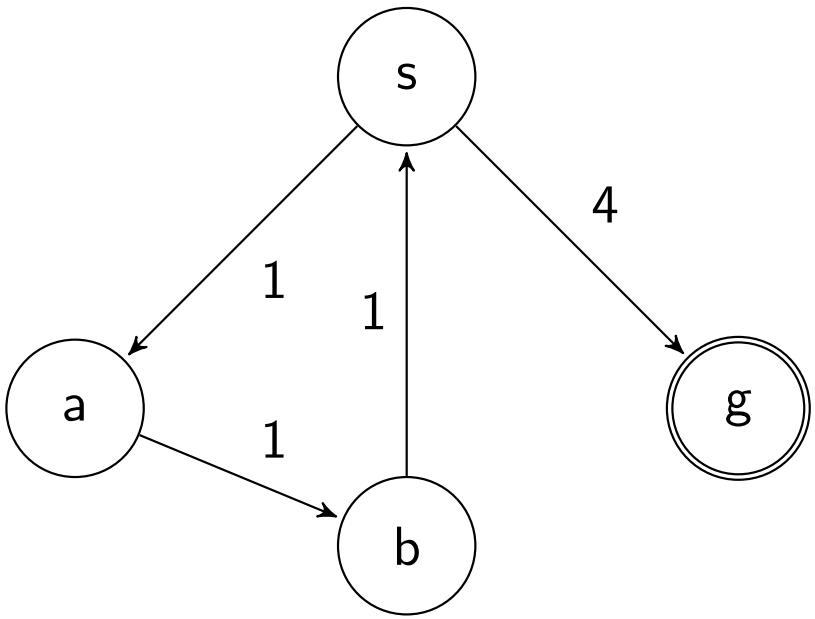


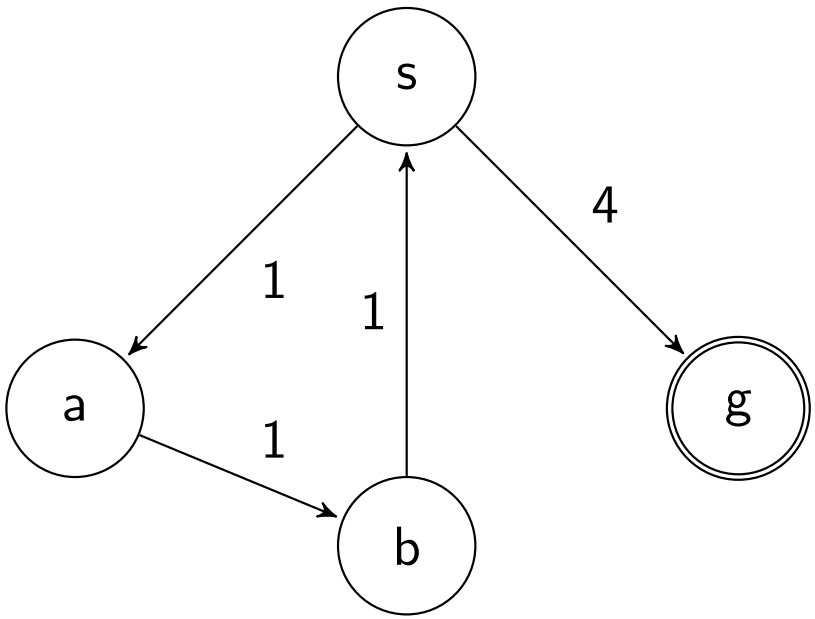
Q(g,g) $= 1 + \frac{1}{2}Q$(g,g)
$\therefore Q$(g,g) $= 2$

Q(s,g) $= -4 + \frac{1}{2}Q$(g,g) $= -3$

Q(s,g) $= -3$
Q(s,a) $= -2$
$= Q$(a,b) $= Q$(b,s)

$$Q(s,s') := Q_0(s,s') + \frac{1}{2}\max\{Q(s',s'') \mid arc_=(s',s'')\}$$

$$Q_0(s,s') := \begin{cases} 1 & \text{if } s = s' \in G \\ -\text{cost}(s,s') & \text{else if } arc(s,s') \end{cases}$$



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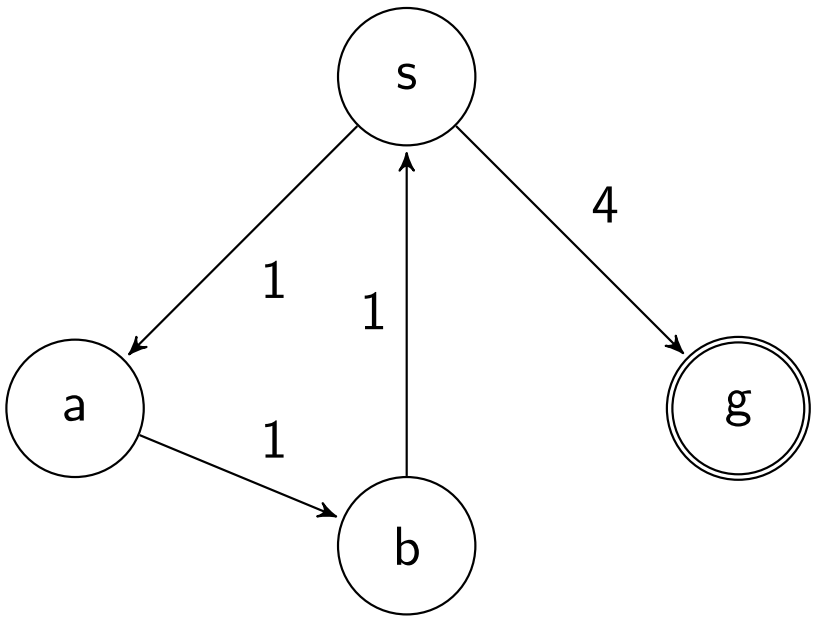
$Q(\text{s,g}) = -4 + \frac{1}{2}Q(\text{g,g}) = -3$

$Q(\text{s,a}) = -1 + \frac{1}{2}Q(\text{a,b})$
$Q(\text{a,b}) = -1 + \frac{1}{2}Q(\text{b,s})$
$Q(\text{b,s}) = -1 + \frac{1}{2}max\{Q(\text{s,a}),-3\}$

$Q(\text{s,g}) = -3$
$Q(\text{s,a}) = -2$
$\quad = Q(\text{a,b}) = Q(\text{b,s})$

$$Q(s,s') := Q_0(s,s') + \frac{1}{2}\max\{Q(s',s'') \mid arc_=(s',s'')\}$$

$$Q_0(s,s') := \begin{cases} 1 & \text{if } s = s' \in G \\ -\text{cost}(s,s') & \text{else if } arc(s,s') \end{cases}$$



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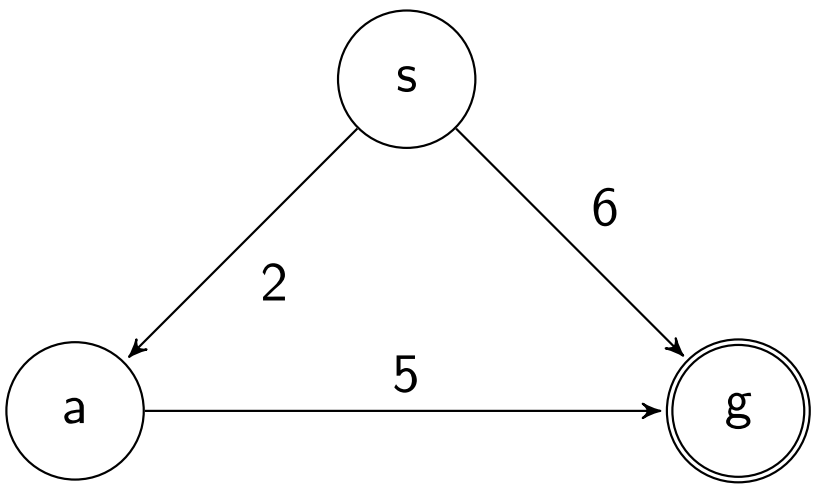
$Q(\text{s,a}) = -1 + \frac{1}{2}Q(\text{a,b})$
$Q(\text{a,b}) = -1 + \frac{1}{2}Q(\text{b,s})$
$Q(\text{b,s}) = -1 + \frac{1}{2}max\{Q(\text{s,a}),-3\}$

$Q(\text{s,g}) = -3$
$Q(\text{s,a}) = -2$
$\quad = Q(\text{a,b}) = Q(\text{b,s})$

Case 1: $Q(\text{s,a}) \geq -3$
Case 2: $Q(\text{s,a}) < -3$
contradiction

$$Q(s,s') := Q_0(s,s') + \frac{1}{2}\max\{Q(s',s'') \mid arc_=(s',s'')\}$$

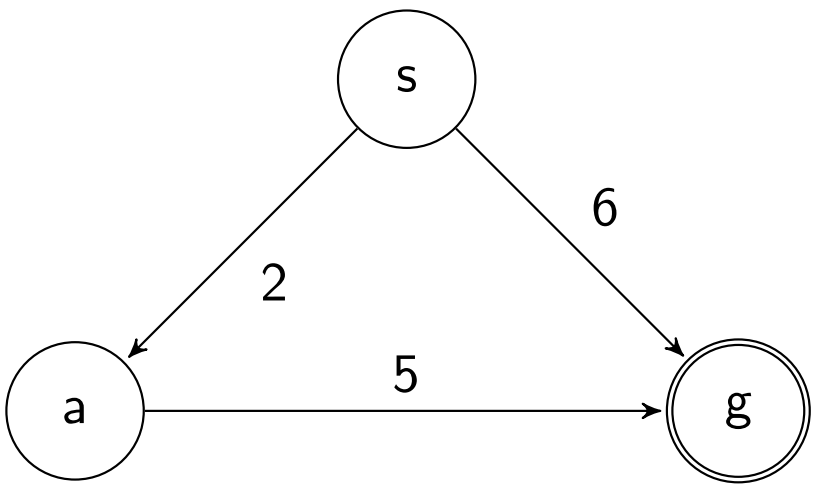
$$Q_0(s,s') := \begin{cases} 1 & \text{if } s = s' \in G \\ -\text{cost}(s,s') & \text{else if } arc(s,s') \end{cases}$$



Q(s,g) $= -5$
Q(a,g) $= -4$
$= Q$(s,a)

$$Q(s,s') := Q_0(s,s') + \frac{1}{2}\max\{Q(s',s'') \mid arc_=(s',s'')\}$$

$$Q_0(s,s') := \begin{cases} 1 & \text{if } s = s' \in G \\ -\text{cost}(s,s') & \text{else if } arc(s,s') \end{cases}$$



Q(g,g) $= 1 + \frac{1}{2}Q$(g,g)
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Q(s,g) $= -5$
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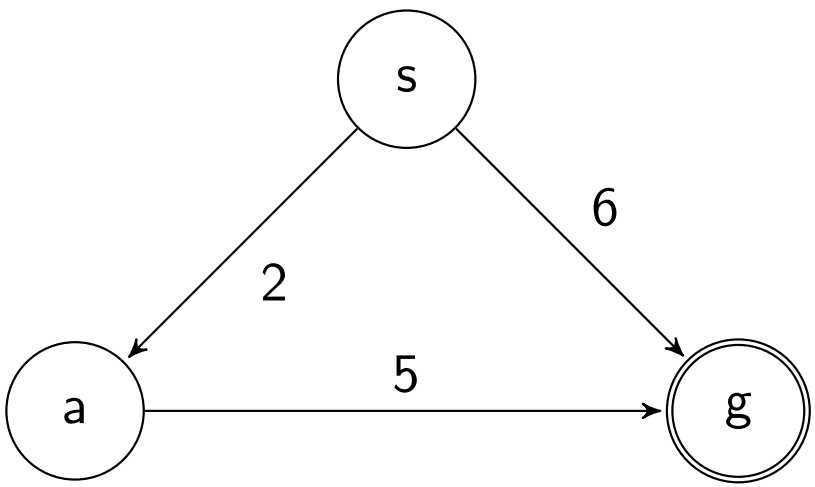
$$Q(s,s') := Q_0(s,s') + \frac{1}{2}\max\{Q(s',s'') \mid arc_=(s',s'')\}$$

$$Q_0(s,s') := \begin{cases} 1 & \text{if } s = s' \in G \\ -\text{cost}(s,s') & \text{else if } arc(s,s') \end{cases}$$



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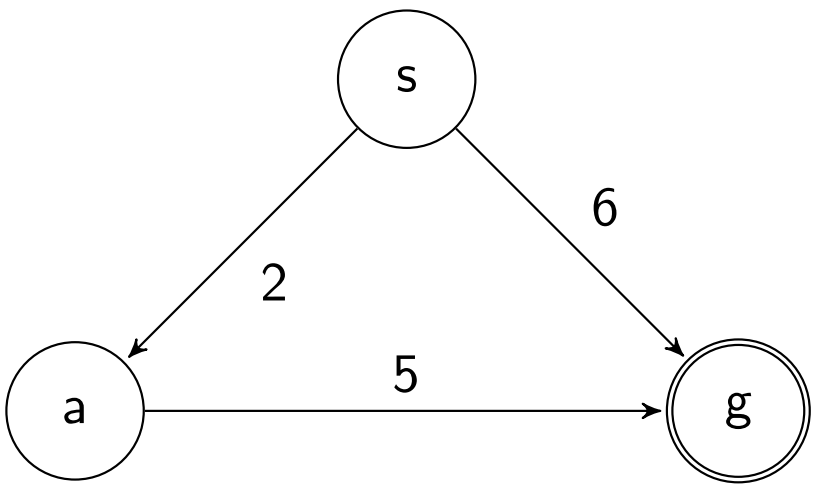
Q(g,g) $= 1 + \frac{1}{2}Q$(g,g)
$\therefore Q$(g,g) $= 2$

Q(s,g) $= -6 + \frac{1}{2}Q$(g,g) $= -5$

$$Q(s,s') := Q_0(s,s') + \frac{1}{2}\max\{Q(s',s'') \mid arc_=(s',s'')\}$$

$$Q_0(s,s') := \begin{cases} 1 & \text{if } s = s' \in G \\ -\text{cost}(s,s') & \text{else if } arc(s,s') \end{cases}$$



Q(s,g) $= -5$
Q(a,g) $= -4$
$= Q$(s,a)

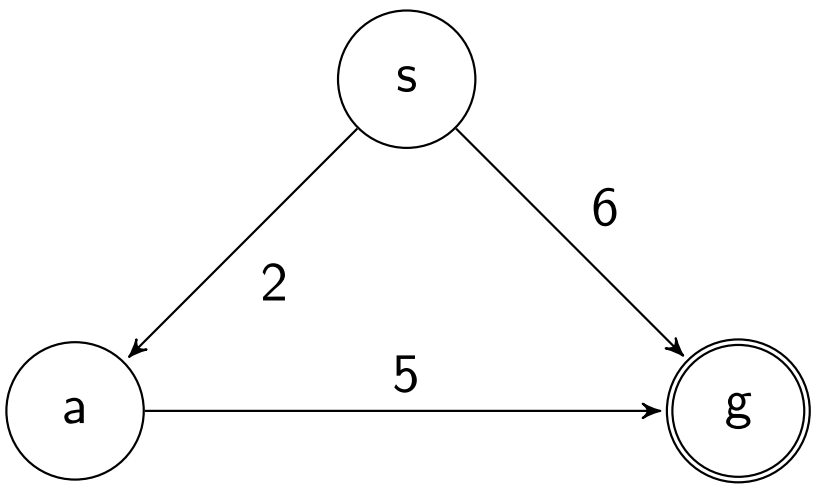
Q(g,g) $= 1 + \frac{1}{2}Q$(g,g)
$\therefore Q$(g,g) $= 2$

Q(s,g) $= -6 + \frac{1}{2}Q$(g,g) $= -5$

Q(s,a) $= -2 + \frac{1}{2}Q$(a,g)
Q(a,g) $= -5 + \frac{1}{2}Q$(g,g)

$$Q(s,s') := Q_0(s,s') + \frac{1}{2}\max\{Q(s',s'') \mid arc_=(s',s'')\}$$

$$Q_0(s,s') := \begin{cases} 1 & \text{if } s = s' \in G \\ -\text{cost}(s,s') & \text{else if } arc(s,s') \end{cases}$$



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$Q(\text{s,g}) = -6 + \frac{1}{2}Q(\text{g,g}) = -5$

$Q(\text{s,a}) = -2 + \frac{1}{2}Q(\text{a,g})$
$Q(\text{a,g}) = -5 + \frac{1}{2}Q(\text{g,g})$

$Q(\text{s,g}) = -5$
$Q(\text{a,g}) = -4$
$\quad = Q(\text{s,a})$

Compare to iterates

$$Q_{n+1}(s,s') := Q_0(s,s') + \frac{1}{2}\max\{Q_n(s',s'') \mid arc_=(s',s'')\}$$