Algorithm for Max Flow

- Based on the current flow pattern, locate a path from $s$ to $t$.
- Send flow along this path.
Max Flow

\[
\begin{array}{c}
s \quad 3 \quad d \quad 1 \quad j \quad 2 \quad t \\
\quad 3 \quad i \quad \quad \quad 2 \\
\quad 3, s^+ \quad i \quad 1, i^+ \quad 1, j^+ \\
\quad 3, s^+ \\
\quad i \\
\quad d \quad j \quad k \\

\end{array}
\]
Step 1. Labeling Process

(i) Unlabeled
(ii) Labeled and Unscanned
(iii) Labeled and Scanned
Max Flow

\[ x_{i,j} < b_{i,j} \]

\[ \epsilon(i), s^+ \quad \epsilon(j), i^+ \]

\[ \epsilon(i) = \text{amount at } v_i \]

\[ \epsilon(j) = \min[\epsilon(i), b_{i,j} - x_{i,j}] \]
Max Flow

\[ x_{j,i} > 0 \]

\[ \epsilon(i), s^+ \quad \epsilon(j), i^- \]

\[ \epsilon(j) = \min[\epsilon(i), x_{j,i}] \]
Max Flow

\[
\begin{array}{c}
\text{Max Flow} \\

\begin{array}{c}
\begin{array}{c}
\node[scale=0.75](s) at (0,0) {$s$}; \\
\node[scale=0.75](i) at (2,0) {$i$}; \\
\node[scale=0.75](j) at (1,2) {$j$}; \\
\node[scale=0.75](t) at (3,2) {$t$}; \\
\end{array}
\end{array}
\end{array}
\end{array}
\]

\[
\begin{array}{c}
(1,1) \\
(1,0) \\
(1,0) \\
(1,1) \\
(1,1) \\
(1,0) \\
(1,1) \\
(1,0) \\
(1,1) \\
(1,1) \\
(1,0) \\
(1,1) \\
(1,0) \\
(1,1) \\
(1,0) \\
(1,1) \\
(1,1) \\
(1,1) \\
(1,1) \\
\end{array}
\]

\[
\begin{array}{c}
(1, i^-) \\
(1, j^+) \\
(1, s^+) \\
\end{array}
\]
Label the nodes given the current $x_{i,j}$ given here.