Global Min Cut

The min cut with the smallest value among n-1 min cuts.

In BFS, the next labeled node is a neighbor of the oldest labeled node.

In DFS, the next labeled node is a neighbor of the youngest labeled node.
New rule: Choose the node which has max connections with all labeled nodes.

Max Adjacency Algorithm
Nagamochi & Ibaraki
Shrink the edge 5-6

Shrink edge 4-5
Shrink 3-4

Shrink 2-3
The global Min cut is the smallest cut in all phases.
Step 0. Arb label a vertex I.

Step 1. \{V_1, V_2, \ldots, V_k\} = I

The vertex has max connection with I is labeled \(V_{k+1}\).

Repeat until all vertices are labeled

Step 2. Record \([V_n]\) as a candidate.

Shrink the edge \(V_{n-1} - V_n\)

Step 3. Form the new network of \((n-1)\) nodes

Repeat 0 \rightarrow 3.
EX of 9 vertices.

Let global min cut:
\[
\begin{align*}
1, 2, 3, & \quad 6, 7, 8 \\
4, 5, & \quad 9 \\
\end{align*}
\]

\[
\begin{align*}
1, 2, 3, & \quad 4, 5, \quad 6, 7, 8 \\
\end{align*}
\]

If the above is true, then we record [9] as a candidate.

If the global min cut has 8 and 9 on one side:
\[
\begin{align*}
1 & \quad 2 & \quad 4 & \quad 5 & \quad 7 & \quad 8 & \quad 9 \\
3 & \quad 6
\end{align*}
\]

then shrink 8-9 does not do anything.

To global min cut.
\[
\frac{123}{45} + \frac{45}{678} + \frac{678}{9} + \frac{123}{9} \\
> \frac{123}{45} + \frac{45}{678} + \frac{678}{9} \\
> \frac{123}{4} + \frac{45}{678} + \frac{678}{9} \\
> \frac{123}{6} + \frac{45}{678} + \frac{678}{9} \\
> \frac{123}{6} + \frac{45}{6} + \frac{45}{78} + \frac{678}{9} \\
> \frac{123}{6} + \frac{45}{6} + \frac{678}{9} \\
> \frac{123}{6} + \frac{45}{9} + \frac{678}{9} \\
= \frac{12345}{6} + \frac{678}{9} \\
= [9] \\
\]
\[
\frac{aA}{bB} + \frac{bB}{cC} + \frac{cC}{dD} + \frac{dD}{eE} + \ldots
\]

\[
\frac{aA}{b} + \frac{bB}{cC} + \frac{cC}{dD} + \frac{dD}{eE} + \ldots
\]

\[
\frac{aA}{c} + \frac{bB}{c} + \frac{cC}{dD} + \frac{dD}{eE} + \ldots
\]

\[
\frac{aA}{bB} + \frac{cC}{dD} + \frac{dD}{eE} + \ldots
\]

\[
\frac{aA}{bB} + \frac{cC}{dd} + \frac{dd}{eE} + \ldots
\]

\[
\frac{aA}{bB} + \frac{cC}{dd} + \frac{dd}{eE} + \ldots
\]
We throw lots of terms away

We can start anywhere

Max adjacency algorithm

Min separation algorithm?

Algorithm looking for problems!!!