

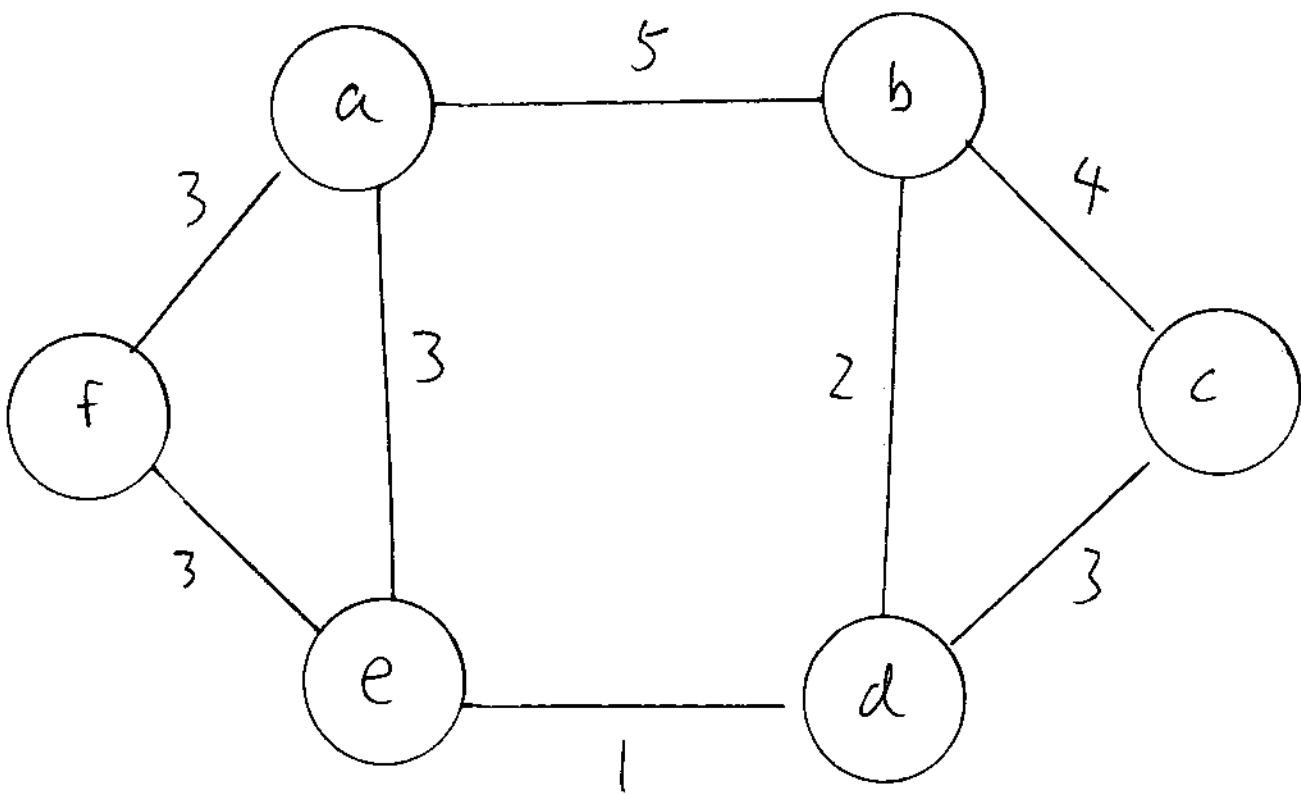
# Global Min Cut

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

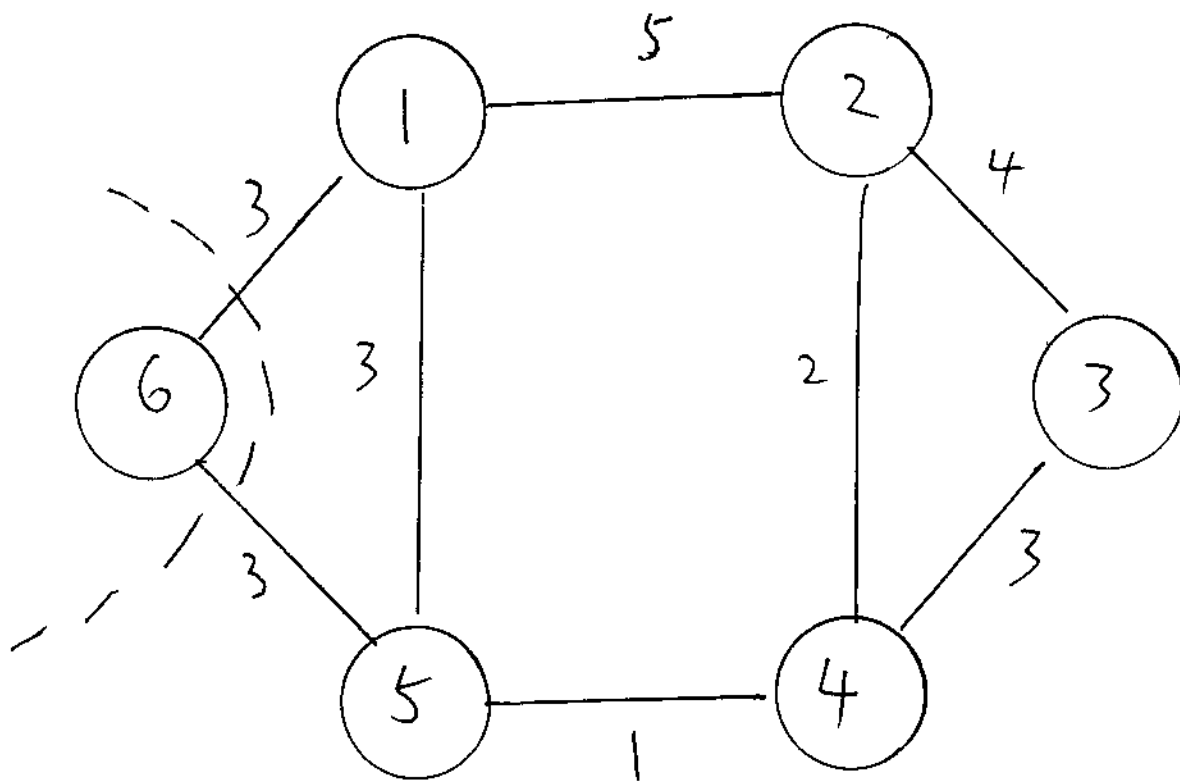
New rule: Choose the node which  
has max connections with all labeled  
nodes



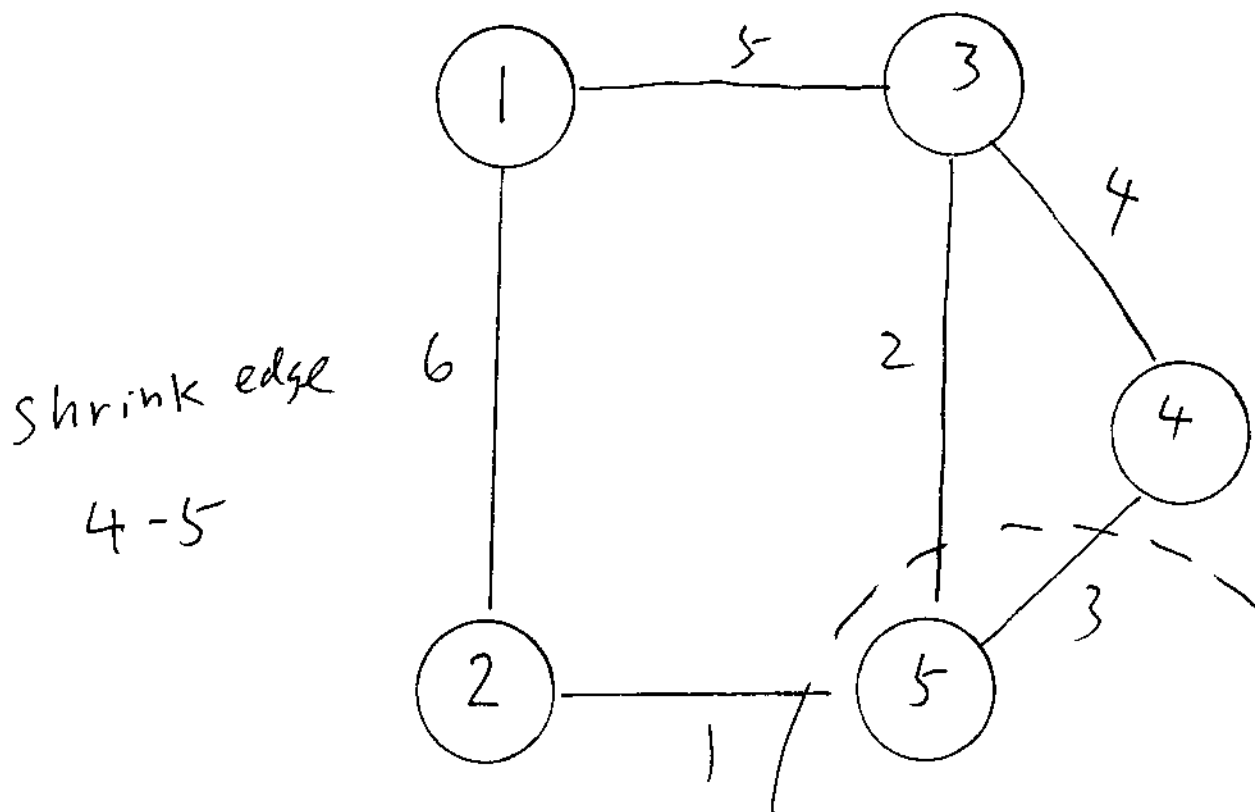
Max Adjacency Algorithm

Nagamochi & Ibaraki

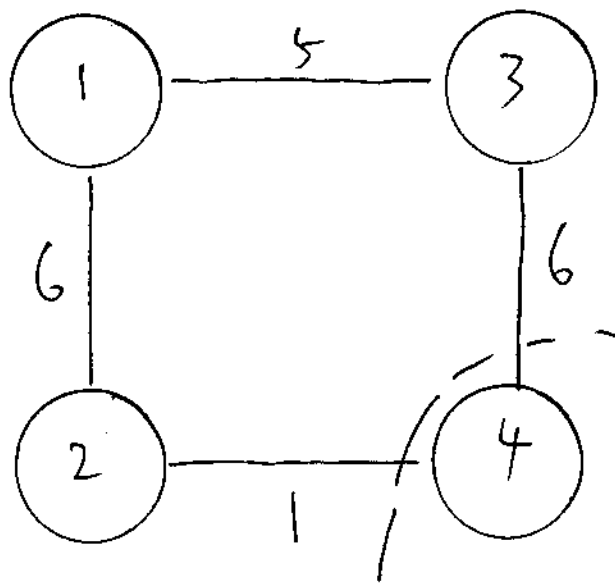
2/10



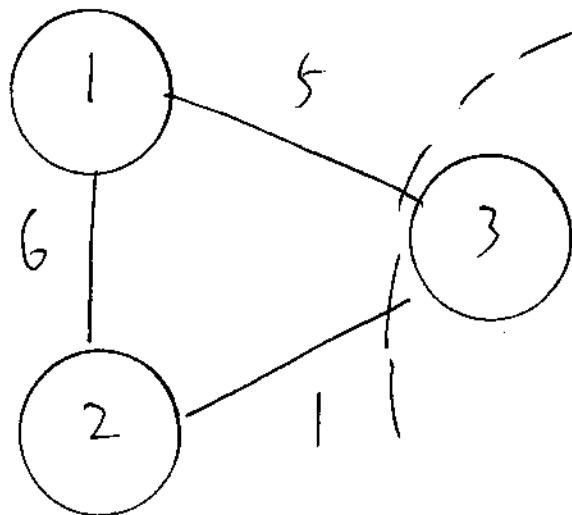
Shrink the edge 5-6



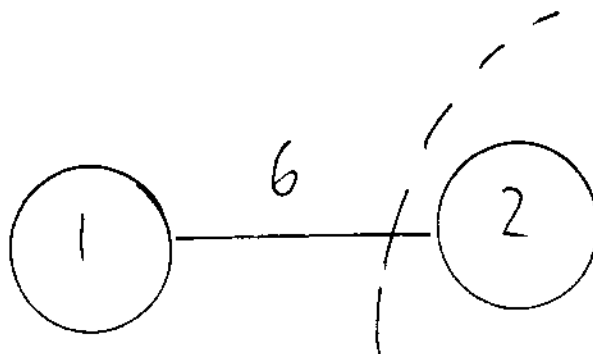
Shrink edge  
4-5



Shrink ~~3-4~~

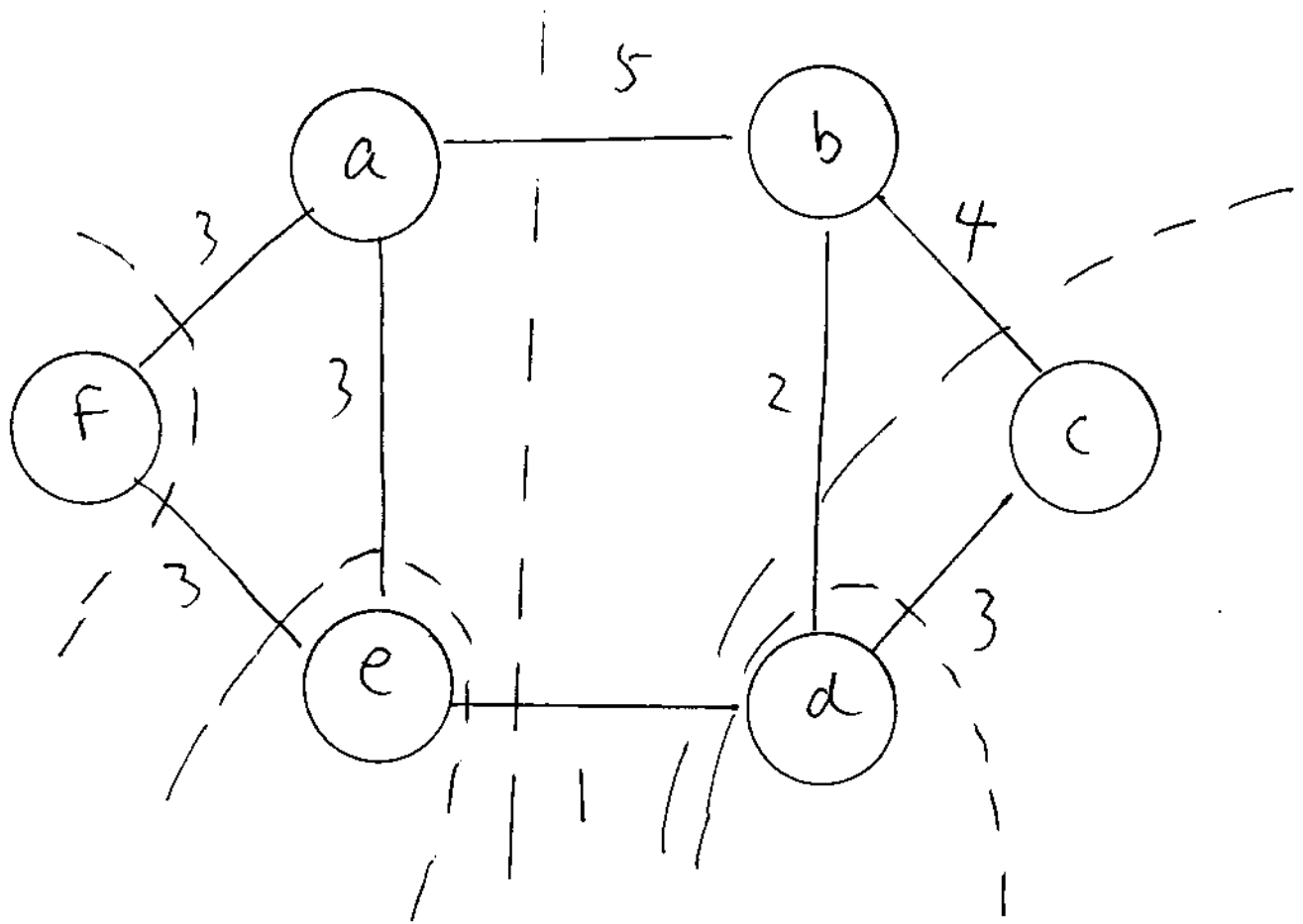


Shrink 2-3



4/10

The global Min cut is the  
smallest cut in all phases



Step 0. Arb label a vertex  $l$ .

Step 1.  $\{v_1, v_2, \dots, v_k\} = I$

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 ~ 3.

EX of 9 vertices.

Let global min cut  $\frac{1, 2, 3, \quad 6, 7, 8}{4, 5, \quad 9}$

$\frac{\quad \quad \quad \vee \quad \quad \quad}{1, 2, 3, \quad 4, 5, \quad 6, 7, 8}$   
9

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

If the global min cut has 8 and 9 on one side

$\frac{1 \ 2 \quad 4 \ 5 \quad 7 \ 8 \ 9}{3 \quad 6}$

then shrink 8-9 does not do anything

to Global min cut.

7/10

$$123/45 + 45/678 + 678/9 + 123/9$$

$$\geq 123/45 + 45/678 + 678/9$$

$$\geq 123/4 + 45/678 + 678/9$$

$$\geq 123/6 + 45/678 + 678/9$$

$$\geq 123/6 + 45/6 + 45/78 + 678/9$$

$$\geq 12345/6 + 678/9$$

$$\geq 12345/9 + 678/9$$

$$= 12345678/9$$

$$= [9]$$

$$aA/bB + bB/cC + cC/dD + dD/eE + \dots$$

$$\geq aA/b + bB/c + cC/dD + dD/eE + \dots$$

$$\geq aA/c + bB/c + cC/dD + dD/eE + \dots$$

$$\geq aAbB/c + cC/dD + dD/eE + \dots$$

$$\geq aAbB/d + cC/d + dD/eE + \dots$$

$$\geq aAbBcC/d + dD/eE + \dots$$

We throw lots of terms away

We can start anywhere

Max adjacency algorithm

Min separation algorithm?

Algorithm looking for problems!!!