

**In the name of God**

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# **Network Flows**

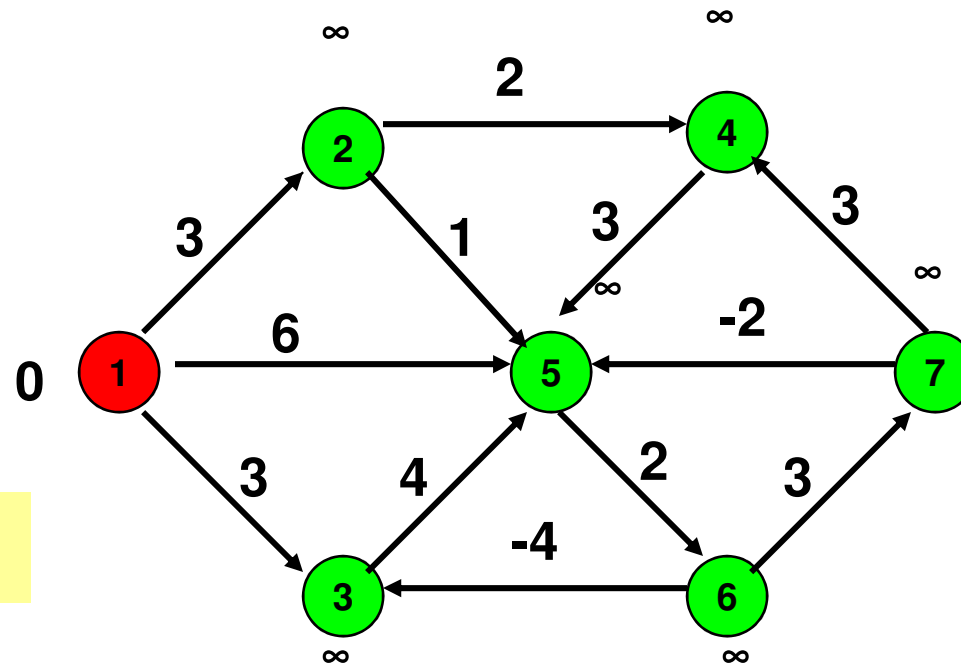
## **3. Shortest Path Problems**

### **3.6. Label-Correcting Algorithm – An Example**

**Fall 2010**

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# Label-Correcting Algorithm



Initialize

$d(1) := 0;$   
 $d(j) := \infty$  for  $j \neq 1$

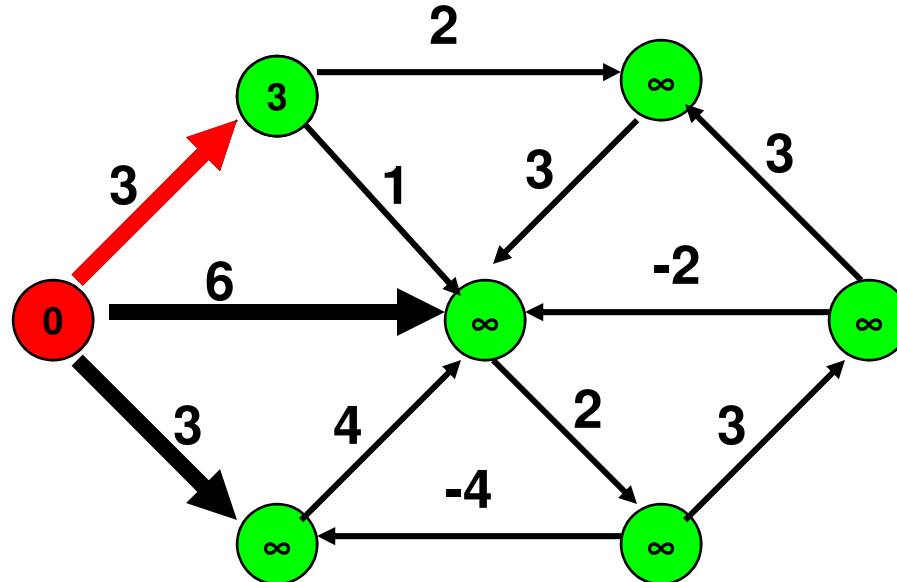
In next slides: the number inside the node will be  $d(j)$ .

Violating arcs will be in thick lines.

# Label-Correcting Algorithm

Generic Step

An arc  $(i,j)$  is violating if  $d(j) > d(i) + c_{ij}$ .

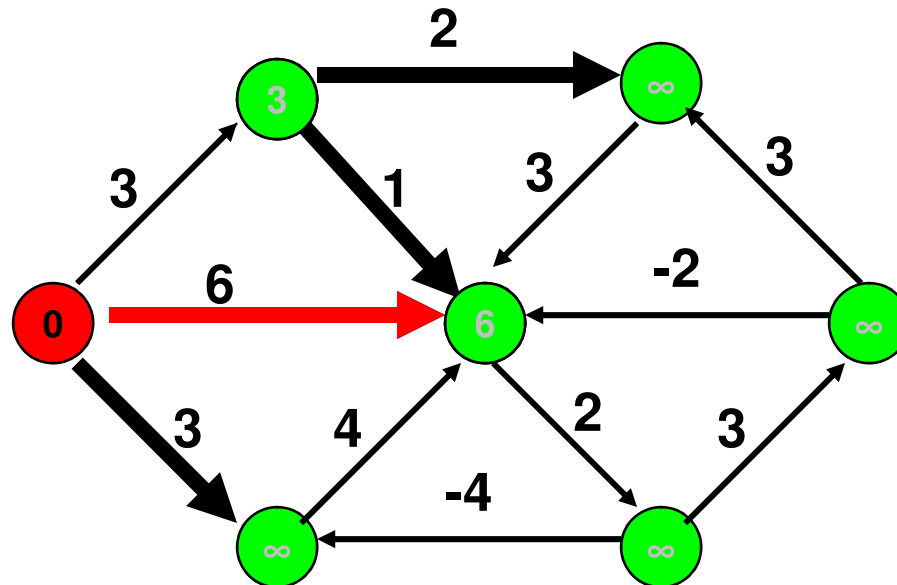


Pick a violating arc  $(i,j)$  and replace  $d(j)$  by  $d(i) + c_{ij}$ .

# Label-Correcting Algorithm

Generic Step

An arc  $(i,j)$  is **violating** if  $d(j) > d(i) + c_{ij}$ .

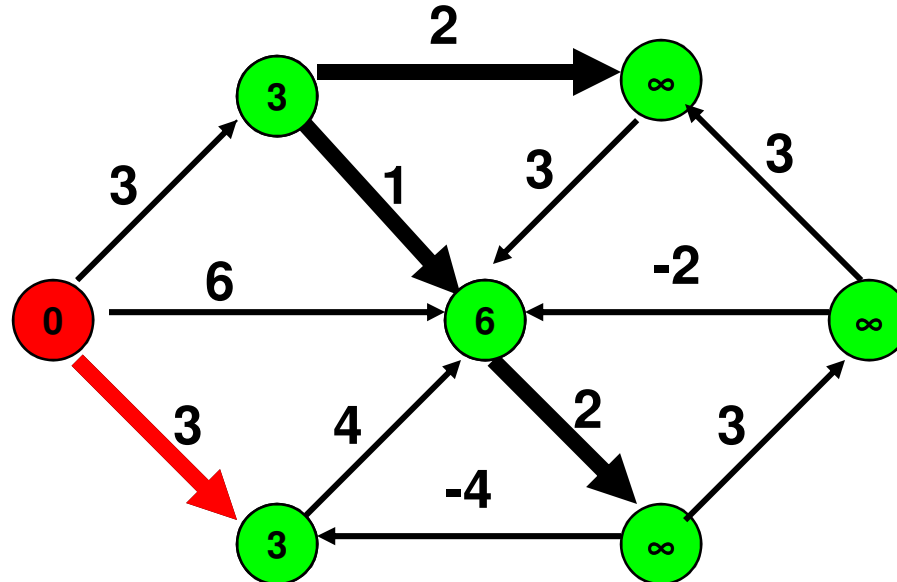


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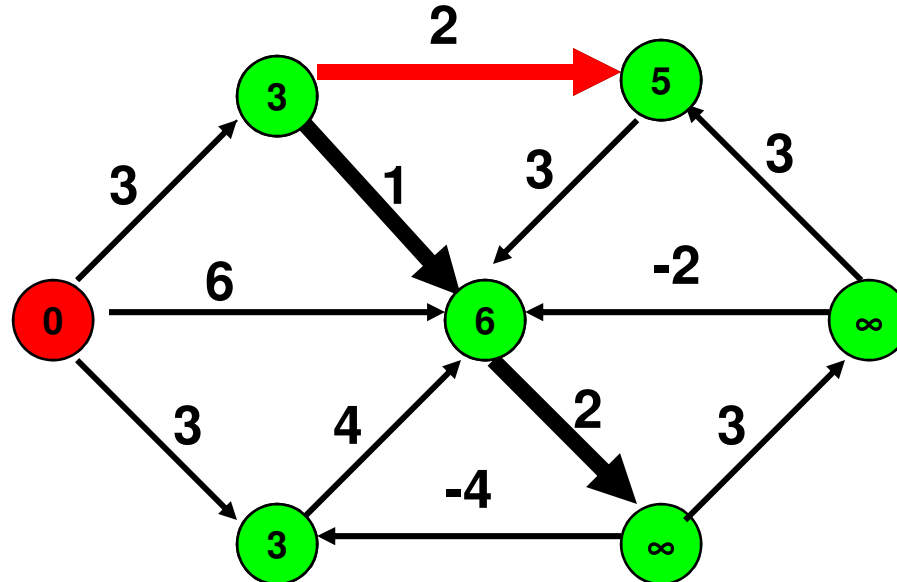


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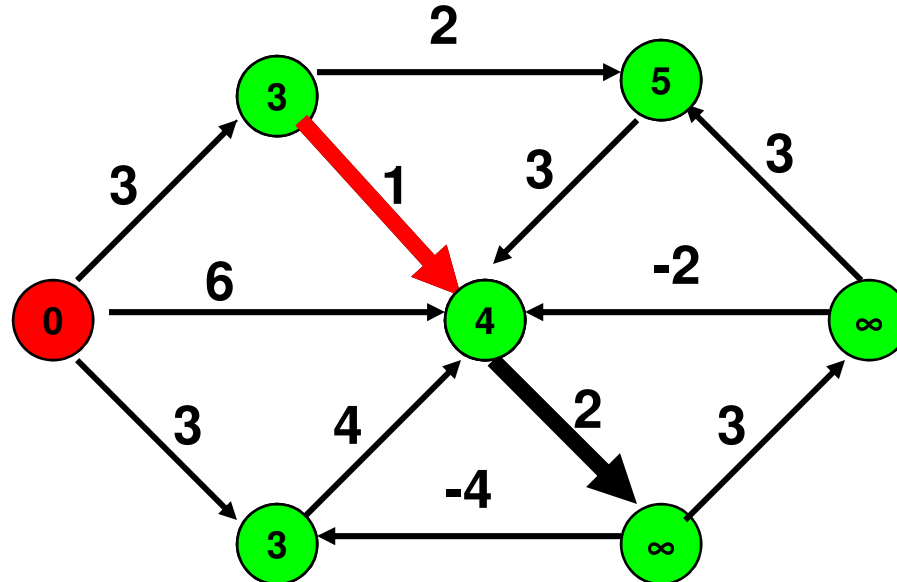


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# Label-Correcting Algorithm

Generic Step

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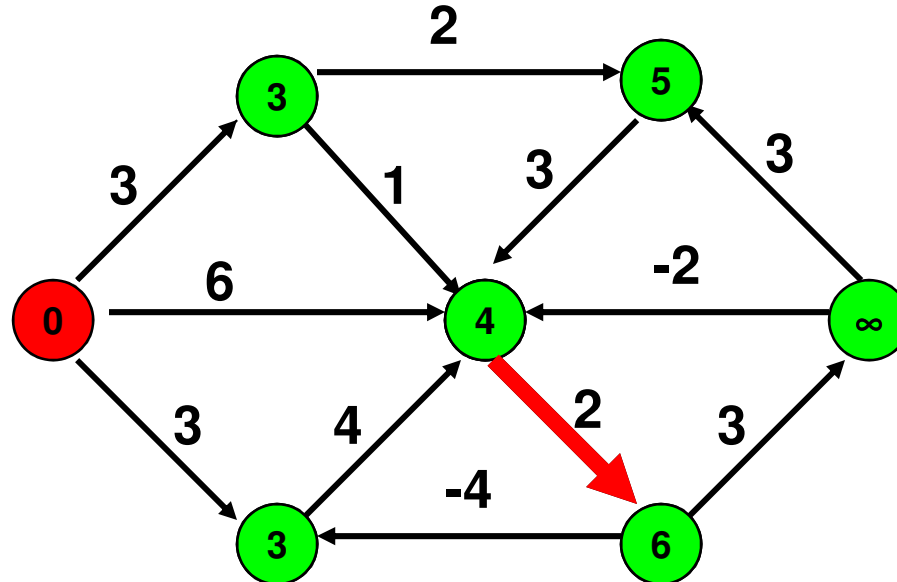


Pick a violating arc  $(i,j)$  and replace  $d(j)$  by  $d(i) + c_{ij}$ .

# Label-Correcting Algorithm

Generic Step

An arc  $(i,j)$  is violating if  $d(j) > d(i) + c_{ij}$ .



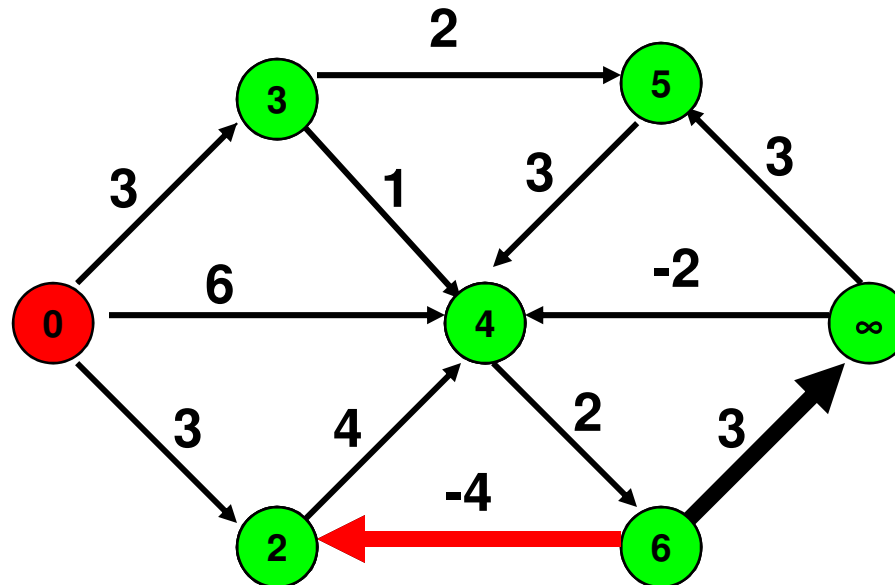
Pick a violating arc  $(i,j)$  and replace  $d(j)$  by  $d(i) + c_{ij}$ .



# Label-Correcting Algorithm

Generic Step

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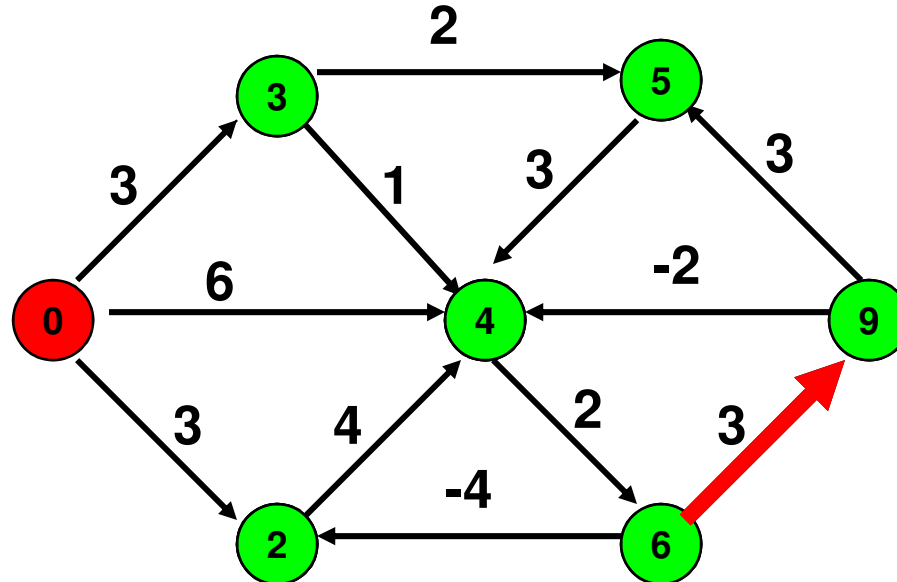


Pick a violating arc  $(i,j)$  and replace  $d(j)$  by  $d(i) + c_{ij}$ .

# Label-Correcting Algorithm

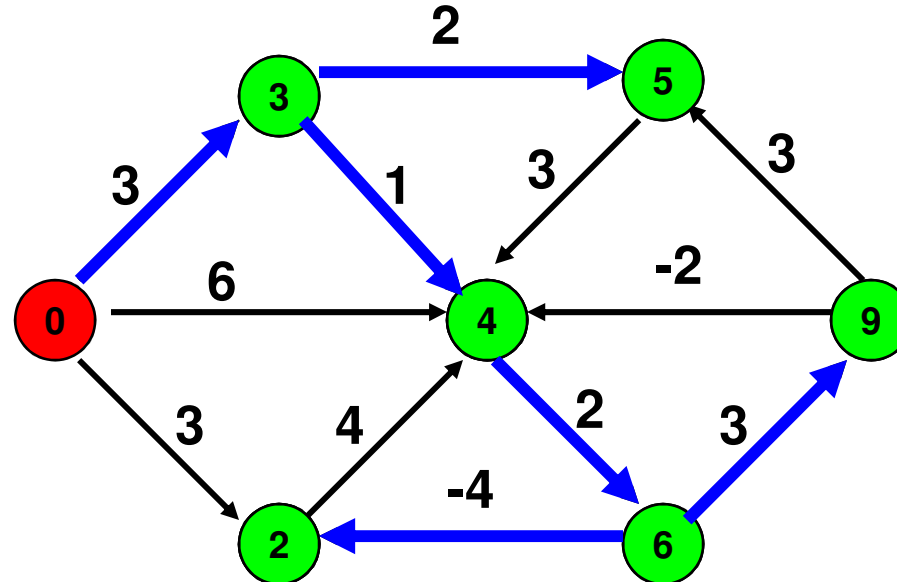
Generic Step

An arc  $(i,j)$  is violating if  $d(j) > d(i) + c_{ij}$ .



Pick a violating arc  $(i,j)$  and replace  $d(j)$  by  $d(i) + c_{ij}$ .

# Label-Correcting Algorithm



Generic Step

An arc  $(i,j)$  is violating if  $d(j) > d(i) + c_{ij}$ .

Pick a violating arc  $(i,j)$  and replace  $d(j)$  by  $d(i) + c_{ij}$ .

No arc is violating

The distance labels are optimal

We now show the predecessor arcs.



The End