

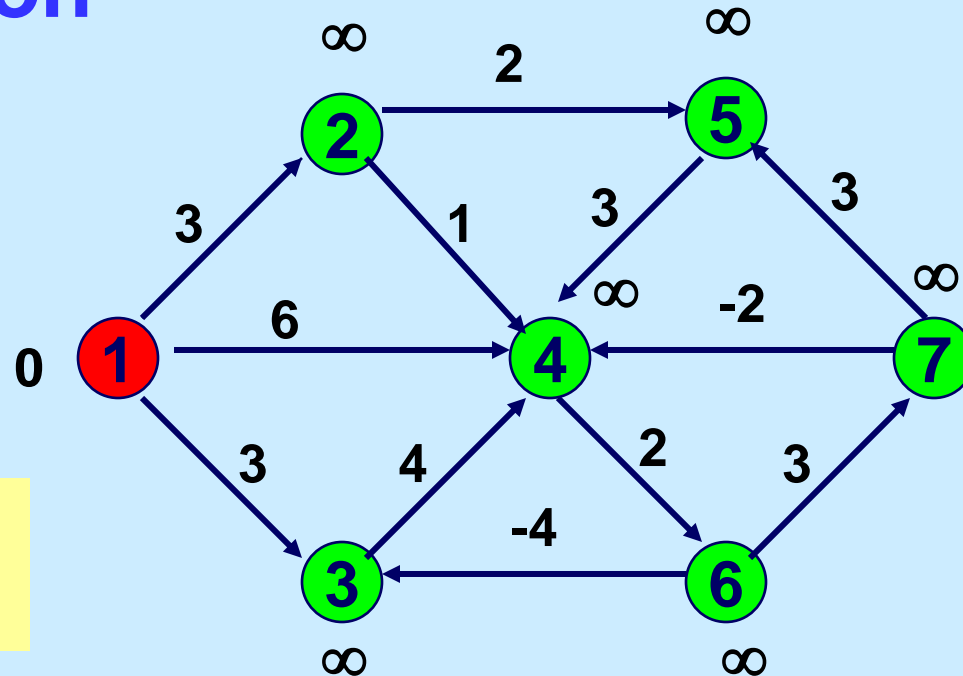
**15.082 & 6.855J & ESD.78J**  
**Algorithm visualizations**

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**Modified Label Correcting Algorithm**

# The Modified Label Correcting Algorithm

## FIFO Version

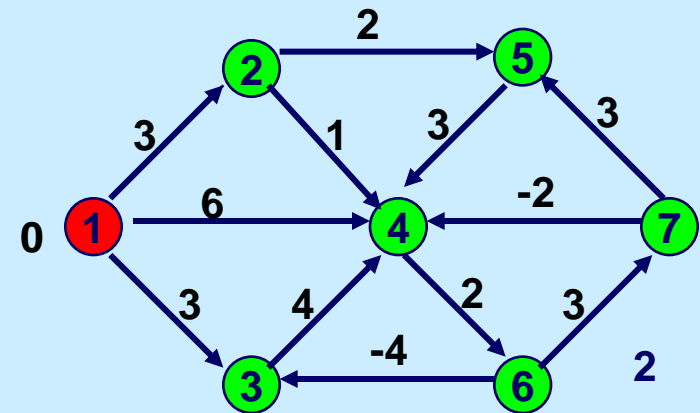


Initialize

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

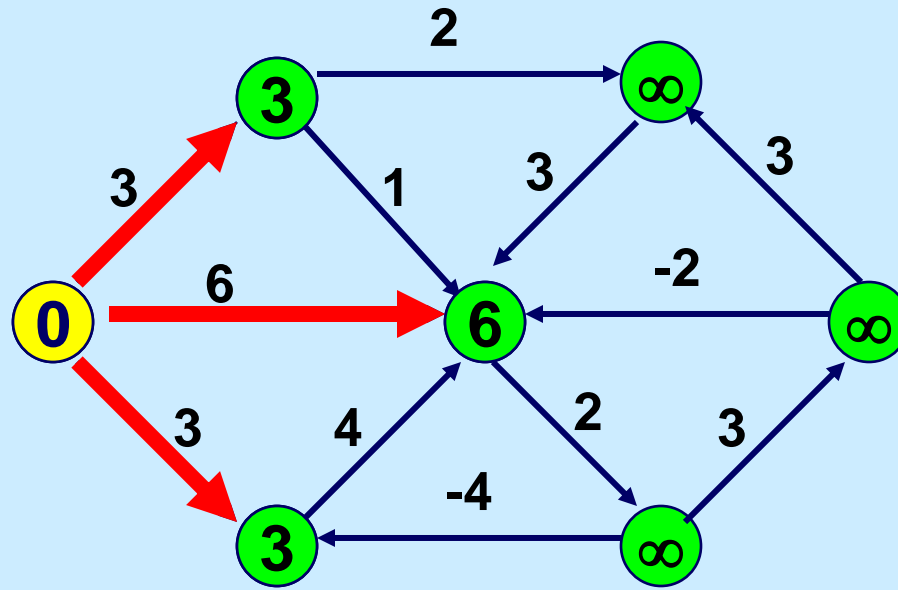
LIST := {1}

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



# An Example

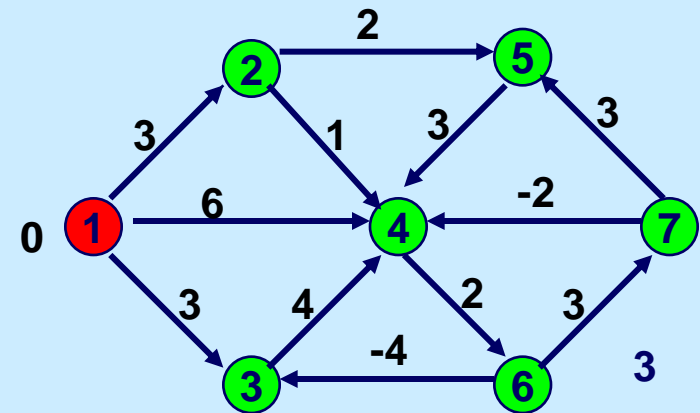
**LIST := { 2, 3, 4 }**



**Generic Step**

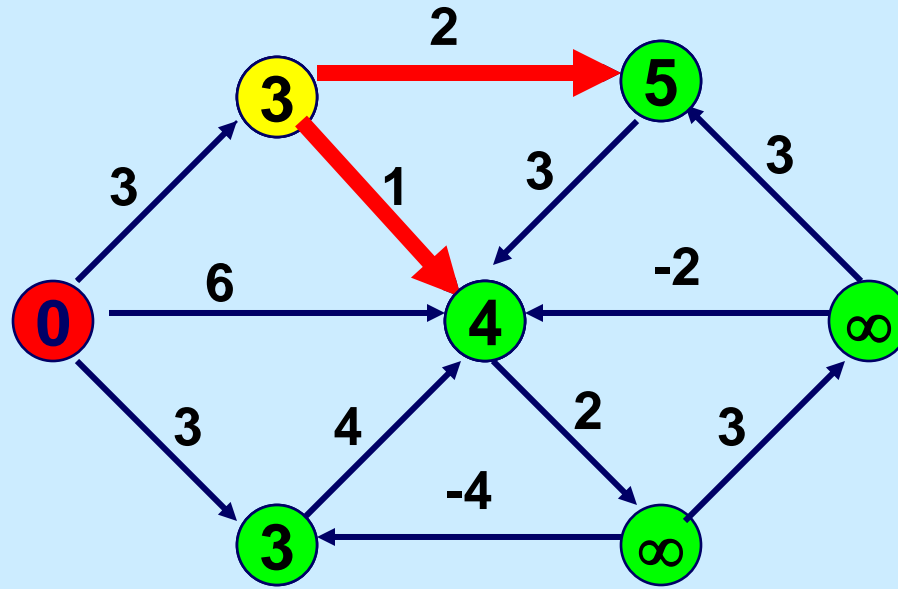
**Take a node  $i$   
from LIST**

**Update( $i$ ):** for each arc  
( $i, j$ ) with  $d(j) > d(i) + c_{ij}$   
replace  $d(j)$  by  $d(i) + c_{ij}$ .



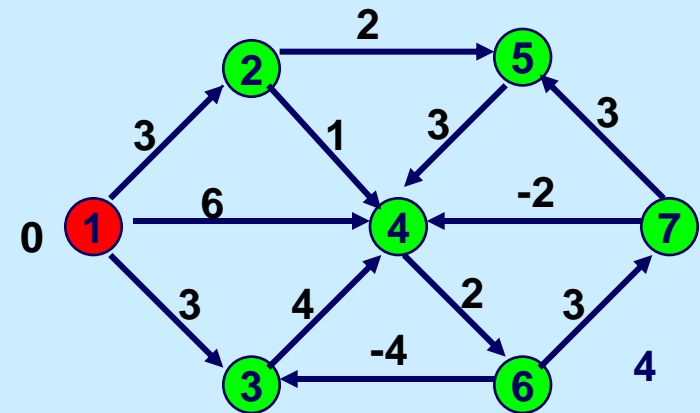
# An Example

**LIST := { 3, 4, 5 }**



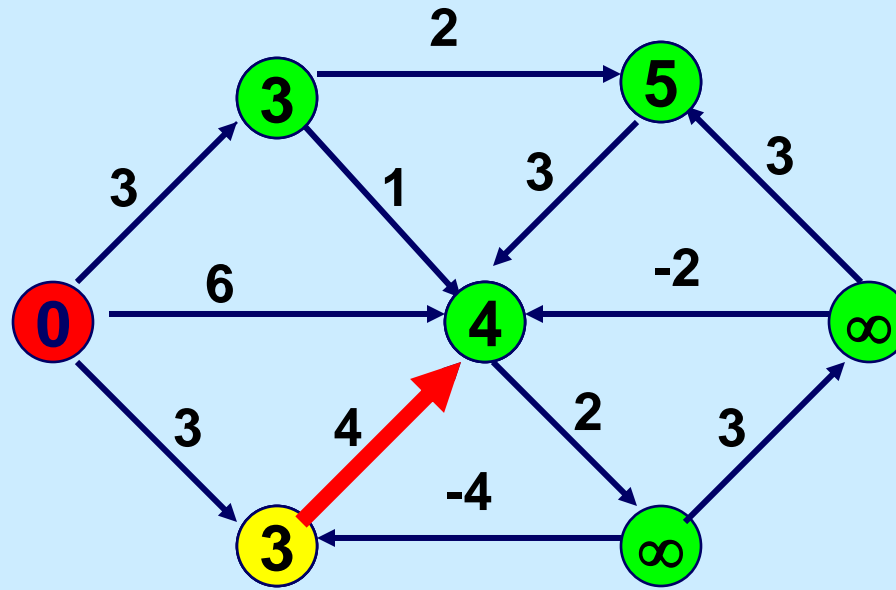
**Take a node  $i$   
from LIST**

**Update( $i$ ): for each arc  
( $i, j$ ) with  $d(j) > d(i) + c_{ij}$   
replace  $d(j)$  by  $d(i) + c_{ij}$ .**



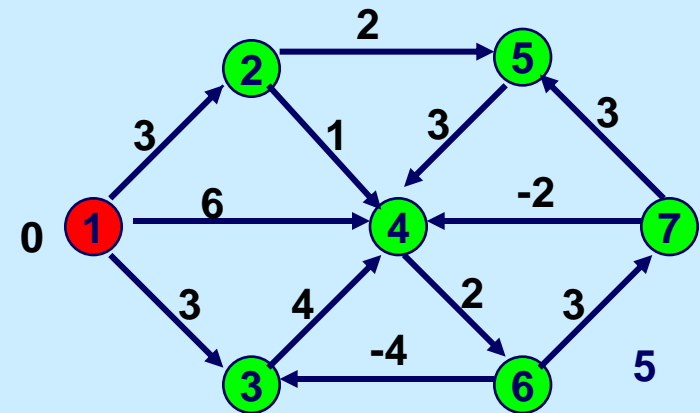
# An Example

**LIST := { 4, 5 }**



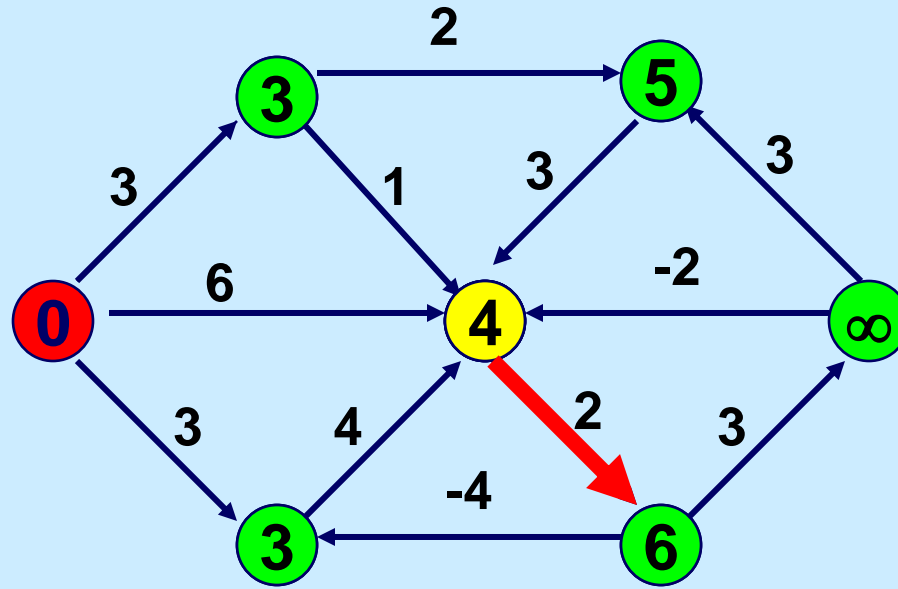
**Take a node  $i$   
from LIST**

**Update( $i$ ): for each arc  
( $i, j$ ) with  $d(j) > d(i) + c_{ij}$   
replace  $d(j)$  by  $d(i) + c_{ij}$ .**



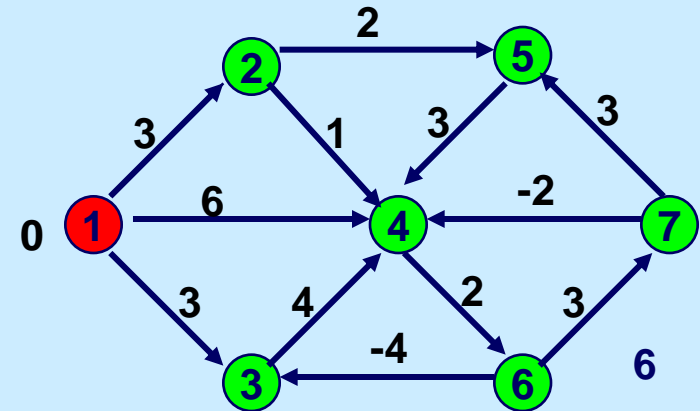
# An Example

**LIST := { 5, 6 }**



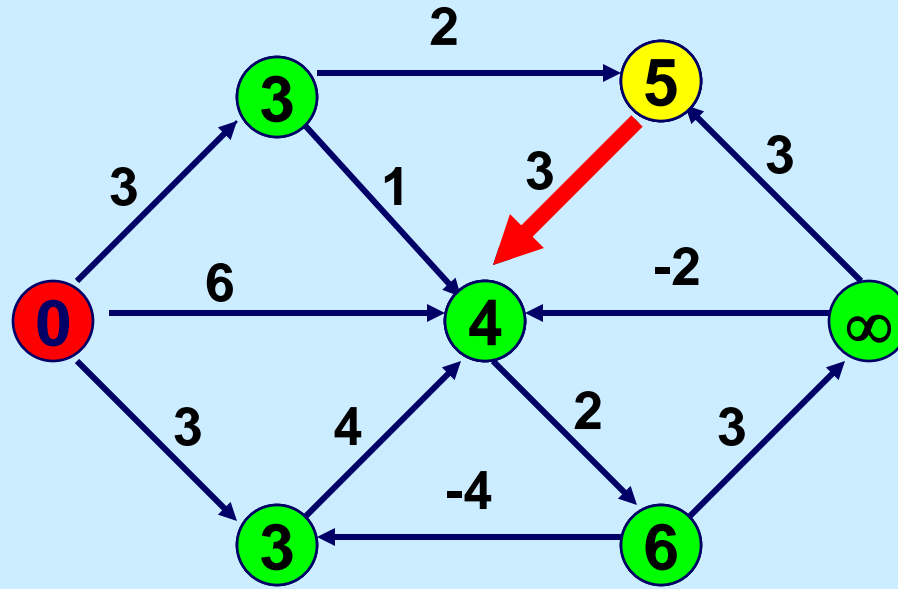
**Take a node  $i$   
from LIST**

**Update( $i$ ): for each arc  
( $i, j$ ) with  $d(j) > d(i) + c_{ij}$   
replace  $d(j)$  by  $d(i) + c_{ij}$ .**



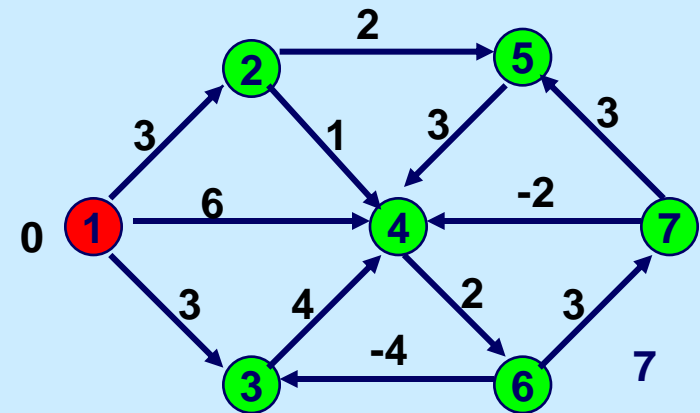
# An Example

**LIST := { 6 }**



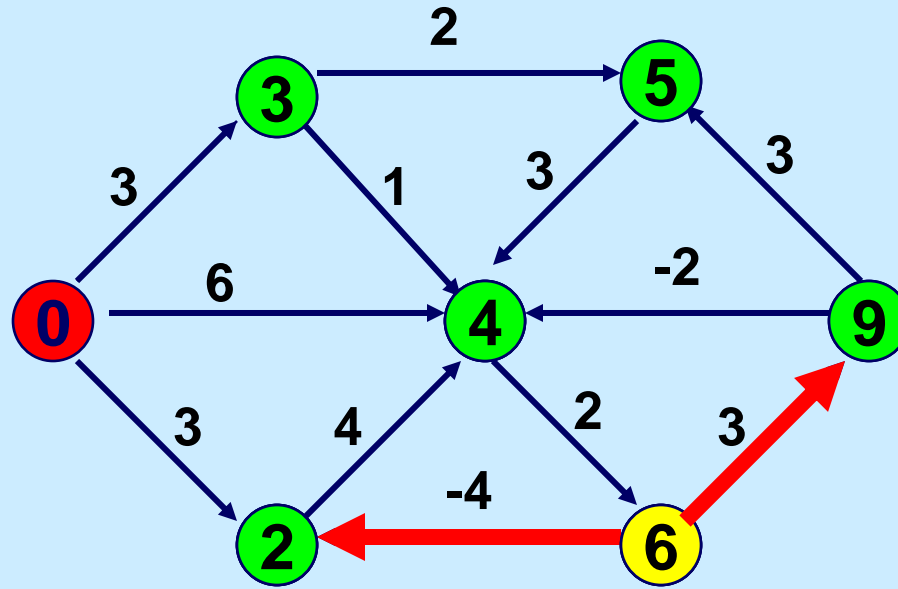
**Take a node  $i$   
from LIST**

**Update( $i$ ):** for each arc  
( $i,j$ ) with  $d(j) > d(i) + c_{ij}$   
replace  $d(j)$  by  $d(i) + c_{ij}$ .



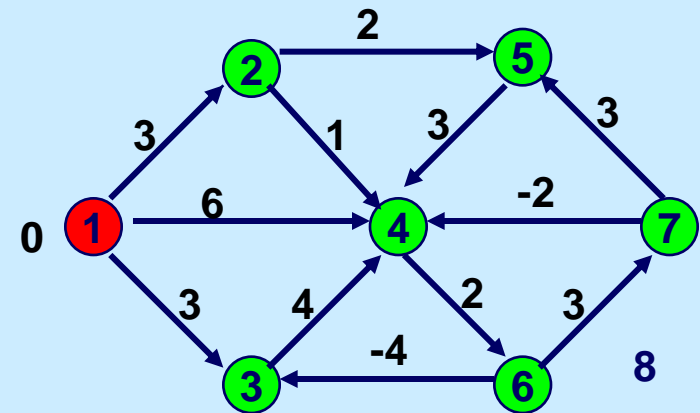
# An Example

**LIST := { 3, 7 }**



Take a node  $i$  from LIST

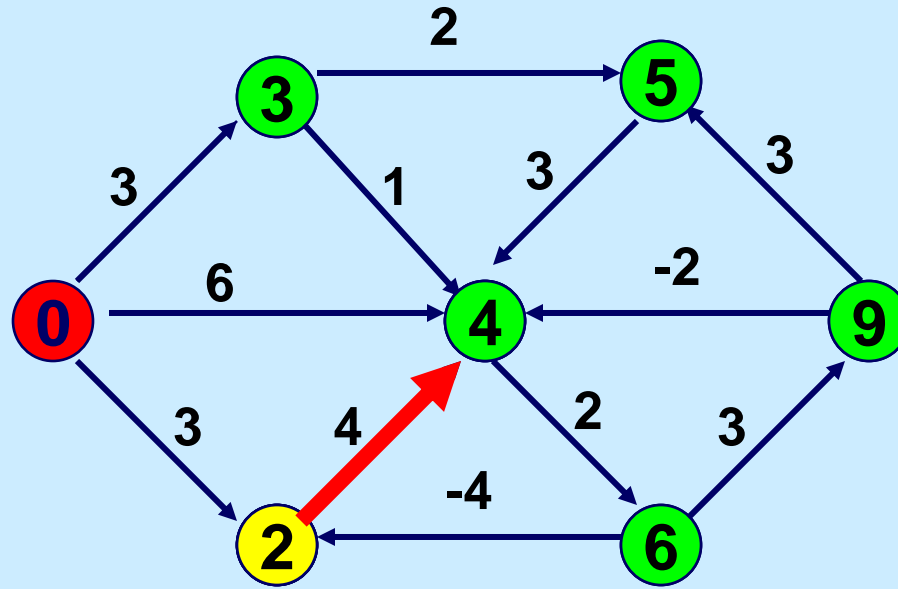
Update( $i$ ): for each arc  $(i,j)$  with  $d(j) > d(i) + c_{ij}$  replace  $d(j)$  by  $d(i) + c_{ij}$ .





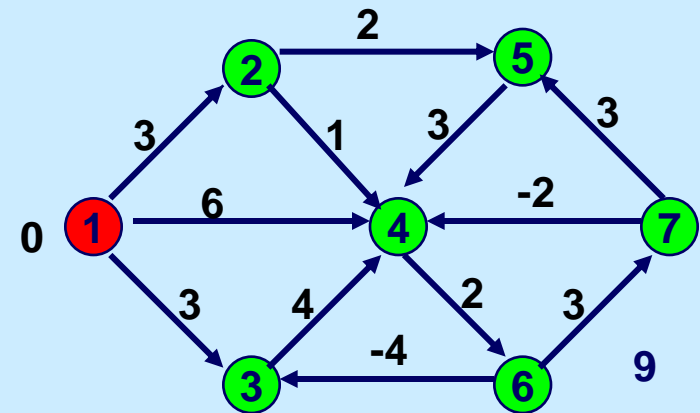
# An Example

**LIST := { 7 }**



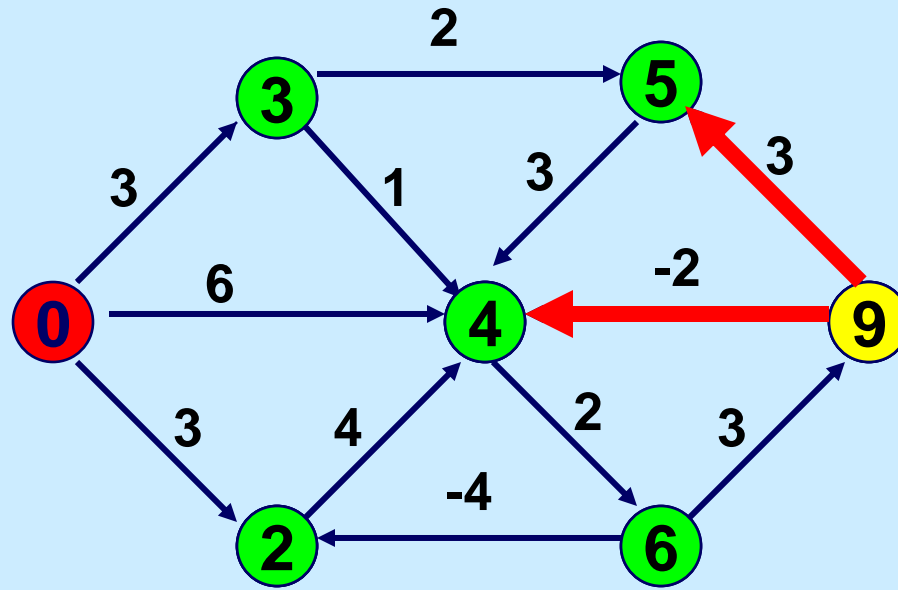
**Take a node  $i$   
from LIST**

**Update( $i$ ):** for each arc  
( $i, j$ ) with  $d(j) > d(i) + c_{ij}$   
replace  $d(j)$  by  $d(i) + c_{ij}$ .



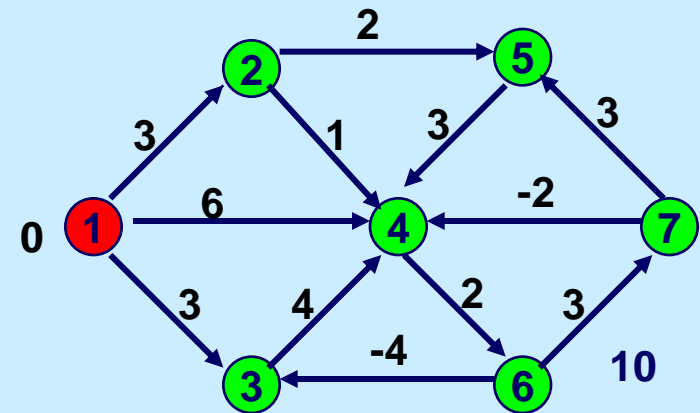
# An Example

**LIST := { }**



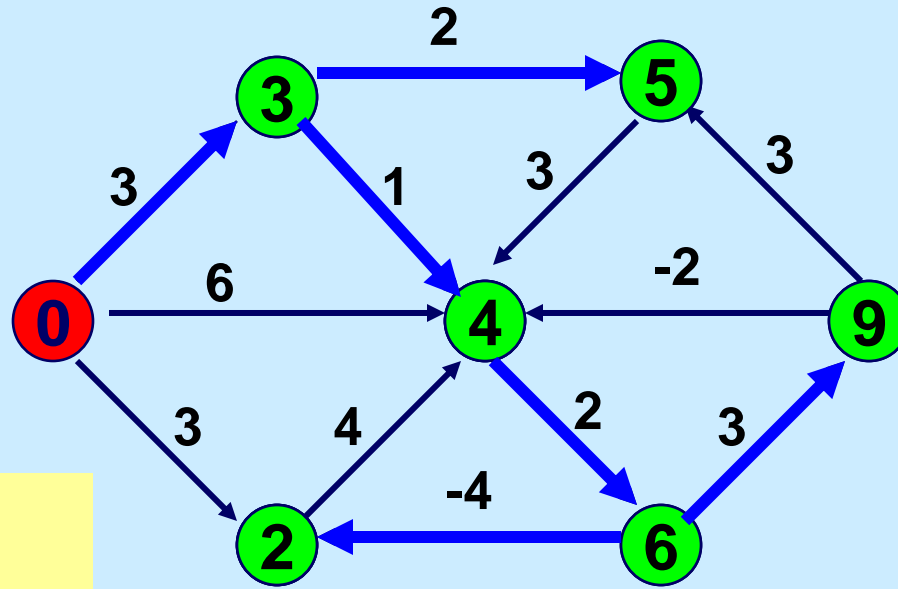
**Take a node  $i$   
from LIST**

**Update( $i$ ): for each arc ( $i, j$ )  
with  $d(j) > d(i) + c_{ij}$   
replace  $d(j)$  by  $d(i) + c_{ij}$ .**



# An Example

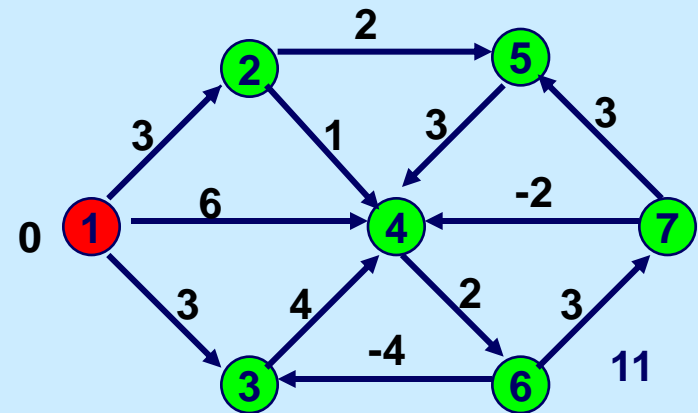
**LIST := {}**



**LIST is empty.**

**The distance labels  
are optimal**

**Here are the predecessors**



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15.082J / 6.855J / ESD.78J Network Optimization  
Fall 2010

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