

Routing: Link State Algorithm

Common Plan for Distributed Routing

- Determine live neighbors
 - HELLO protocol: send HELLO packet periodically to neighbors
- Advertisement step
 - Periodically send some information to neighbors
- Integration step
 - Compute routing/forwarding table from advertisements

Link-State Routing

Advertisement:

- Each node sends information about its links to its neighbors
- They re-send this to their neighbors, etc.
- Each node discovers every other node and link in the network (the complete graph)

Integration:

- Each node then runs a shortest path computation, e.g. Dijkstra's Algorithm, over its local version of the graph

Dijkstra's Algorithm

Initialization:

$N' = \{u\}$

For all nodes v adjacent to u , set

$D(v) = c(u,v)$ and $p(v) = u$

Otherwise, set

$D(v) = \infty$ and $p(v)$ undefined

Loop until all nodes in N' :

Find $w \notin N'$ with smallest $D(w)$,
add w to N'

For all v adjacent to w and $v \notin N'$,

If $D(w) + c(w,v) < D(v)$, set
 $D(v) = D(w) + c(w,v)$ and
 $p(v) = w$

Notation:

u = source node

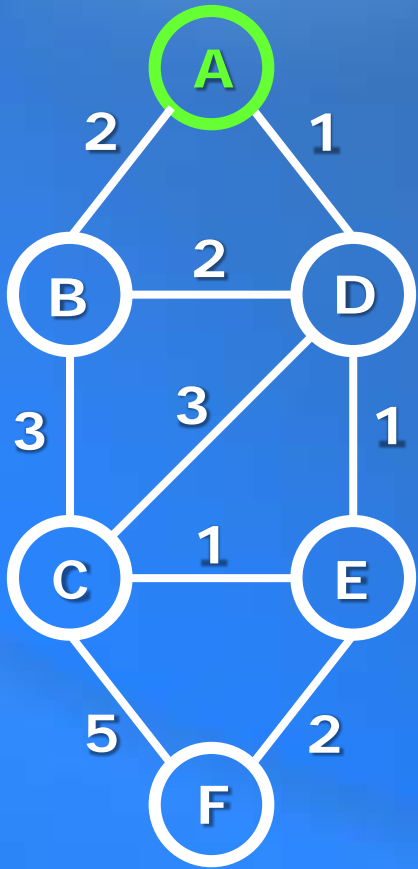
N' = set of nodes whose least
cost path is known

$c(x,y)$ = link cost from x to y

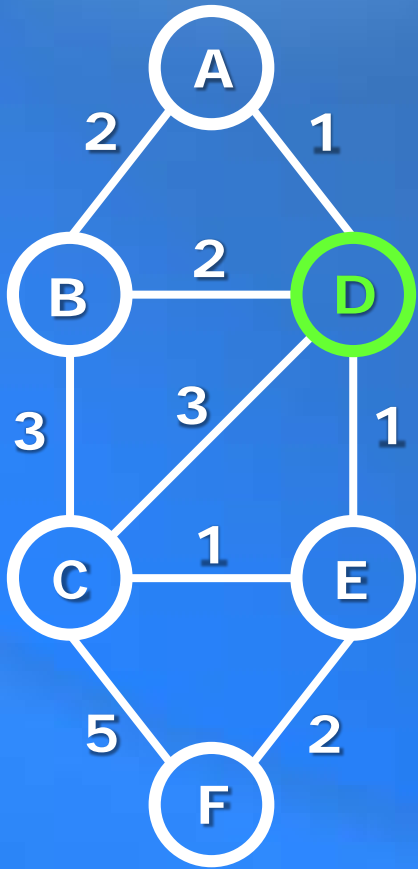
$D(v)$ = current estimate of
path cost from u to v

$p(v)$ = predecessor node along
path from u to v

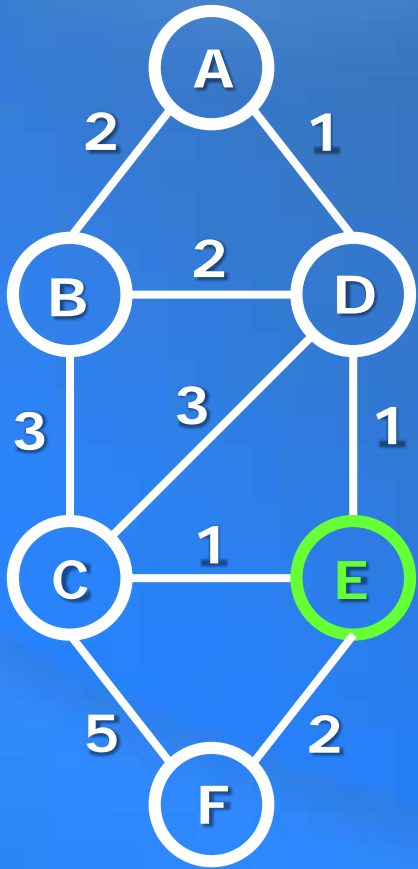
Example (Source = A)

[illegible]

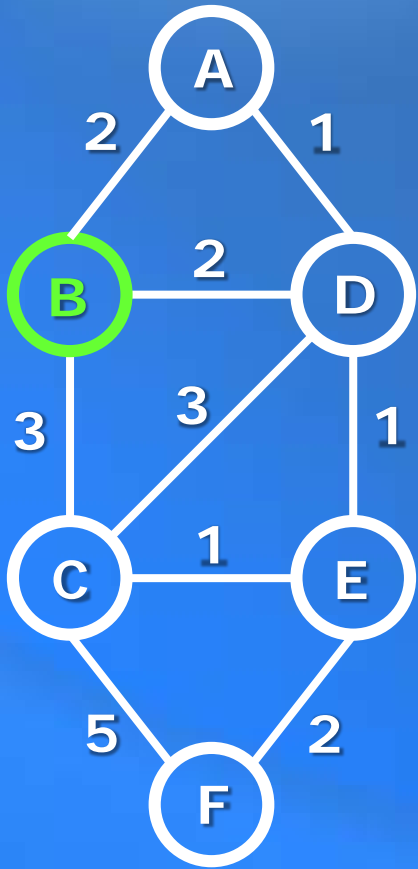
Example (Source = A)

[illegible]

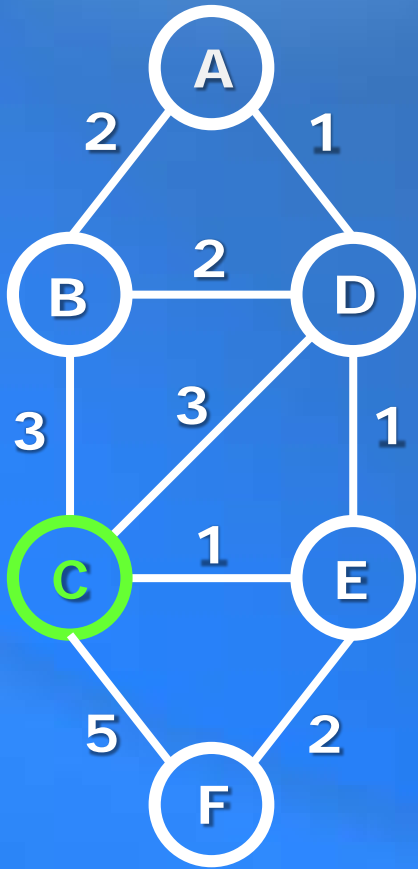
Example (Source = A)

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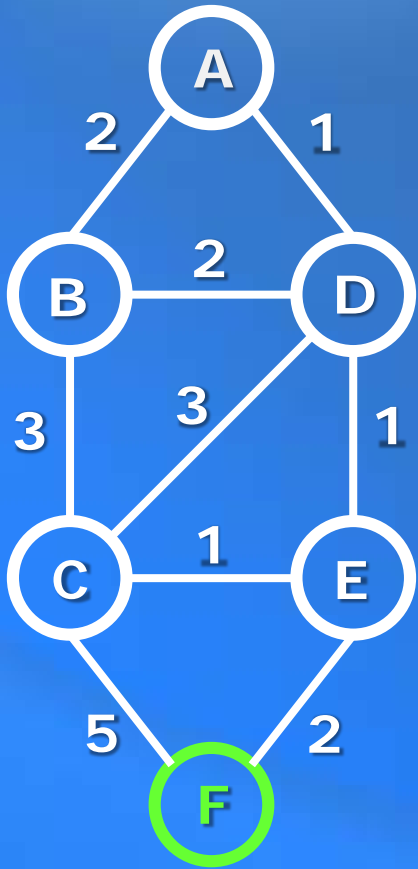
Example (Source = A)

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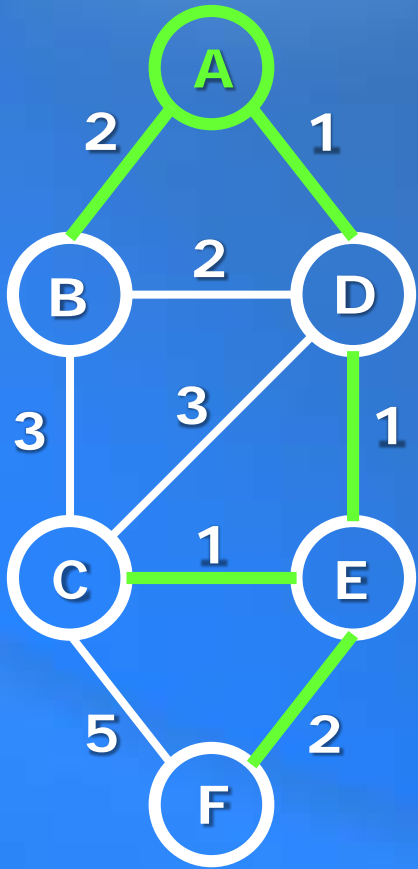
Example (Source = A)

[illegible]

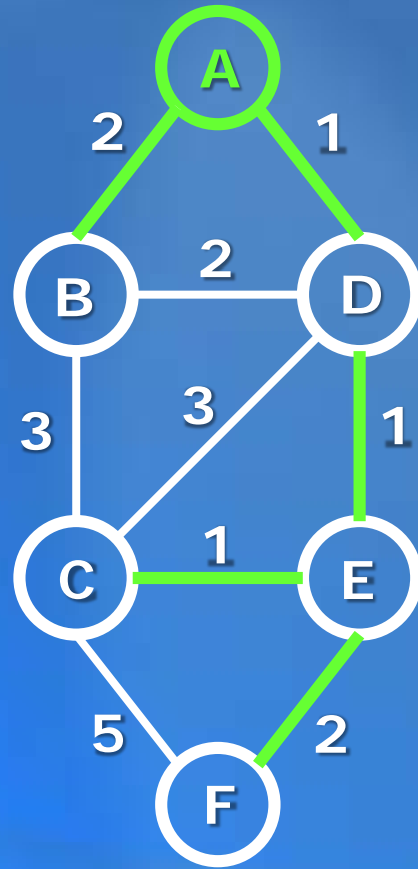
Example (Source = A)

[illegible]

Shortest Paths

[illegible]

Forwarding Table



Dest	Link
B	B
C	D
D	D
E	D
F	D