

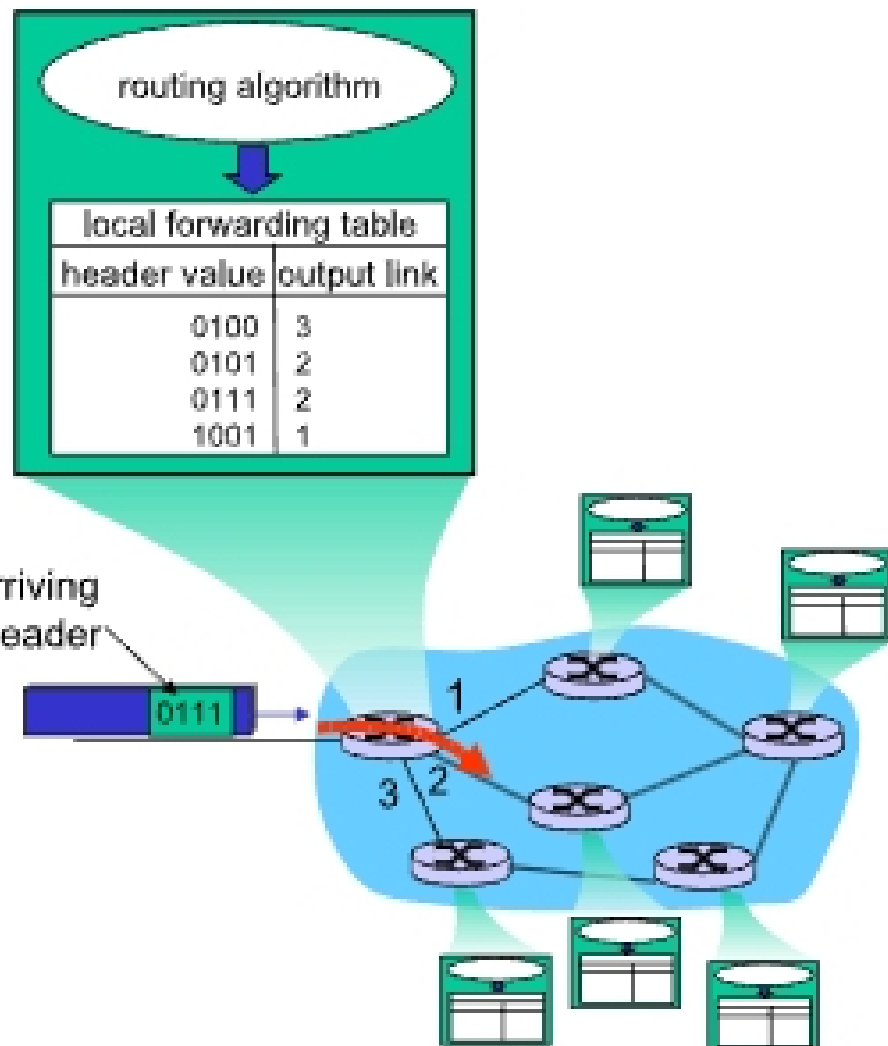
What is routing?

- *forwarding* – moving packets between ports

- Look up destination address in forwarding table
- Find *out-port* or *(out-port, MAC addr)* pair

- *Routing* is process of populating forwarding table

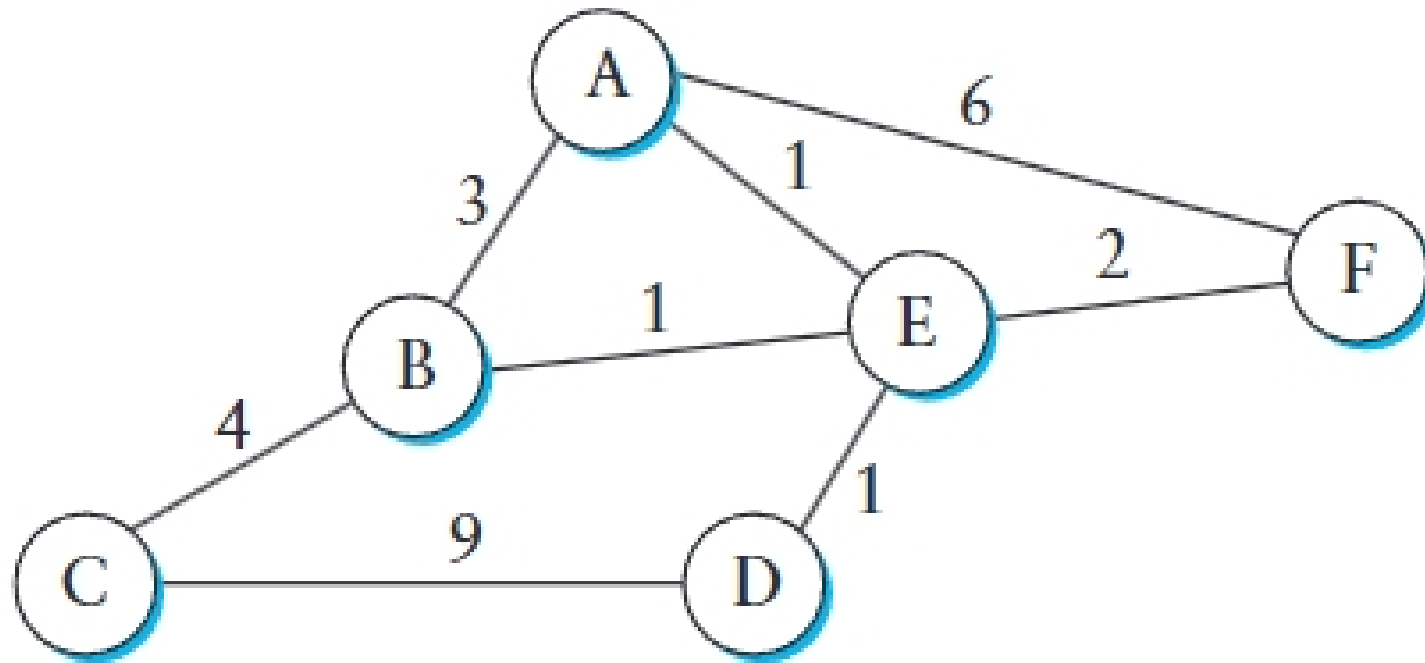
- Routers exchange messages about nets they can reach
- Goal: Find optimal route for every destination
- ...or maybe good route, or just any route (depending on scale)



Routing algorithm properties

- **Static vs. dynamic**
 - Static: routes change slowly over time
 - Dynamic: automatically adjust to quickly changing network conditions
- **Global vs. decentralized**
 - Global: All routers have complete topology
 - Decentralized: Only know neighbors & what they tell you
- ***Intra-domain vs. Inter-domain* routing**
 - Intra-: All routers under same administrative control
 - Intra-: Scale to ~ 100 networks (e.g., campus like Stanford)
 - Inter-: Decentralized, scale to Internet

Optimality



- **View network as a graph**
- **Assign *cost* to each edge**
 - Can be based on latency, b/w, utilization, queue length, ...
- **Problem: Find lowest cost path between two nodes**
 - Must be computed in *distributed* way