Announcements

- Handouts
  - class syllabus
  - programming assignment #1 (includes computer account)
  - department newsletter
- Enrollment
  - there are 40 people in the class, and 12 on the wait list
  - due to the size of the room and projects enrollment will not be increased
    - priority to fill drops will be given to senior CS undergrads
  - this class will be offered again in the spring
- Required Background
  - must have 311 and 330 (412 or 430 would be helpful)
  - strong working knowledge of C or C++ (take your pick)
  - willingness to work in a group environment

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Announcements (cont.)

- Required Work
  - will require about the same amount of effort as 412
    - 412 a (slightly) harder project to debug
    - 417 project is (by design) more ambiguous
  - will need to write project proposals plus the code
- Materials
  - Tanenbaum, “Computer Networks”, **3rd Edition**
  - Nichols, Buttlar, and Farrell, “Pthreads Programming”
  - Handouts from Web page
- Reading (for this week)
  - Chapter 1

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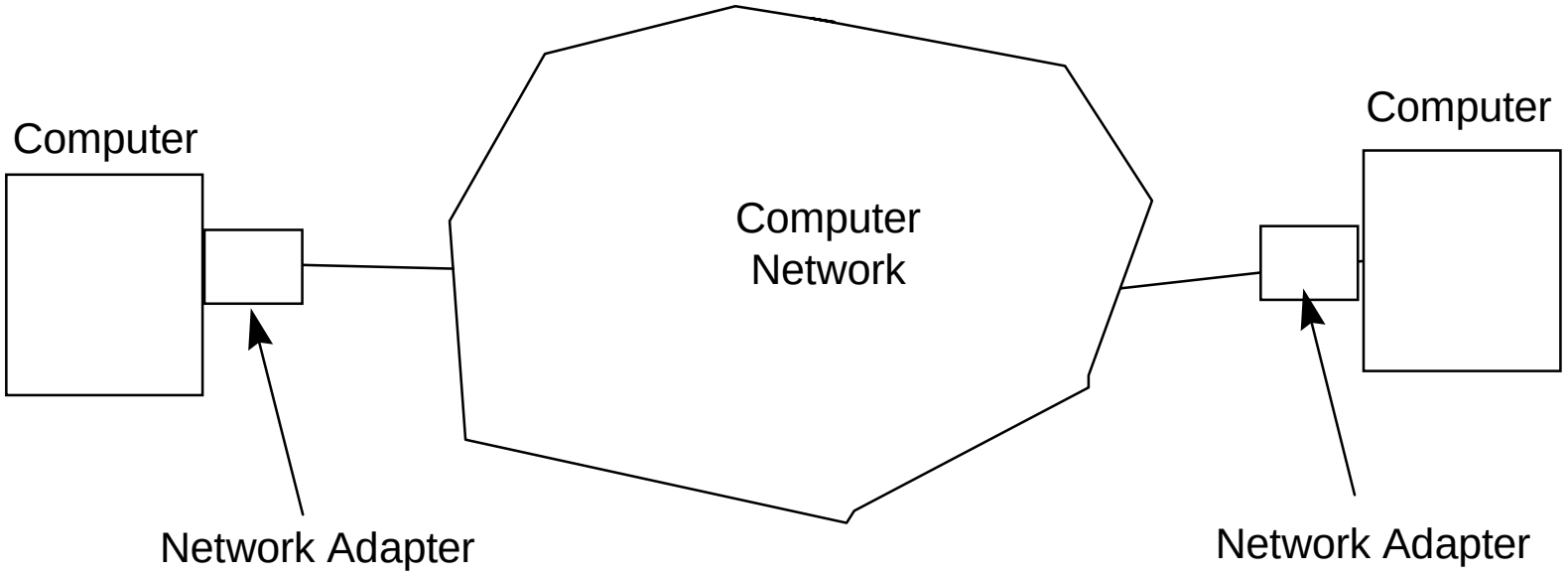
Networks

- Communication between semi-autonomous computers
- Attached to host system by an adapter



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Many Types of Networks

- Physical Media
  - copper wires (Ethernet, RS232-C, V.32, etc.)
  - fiber optics (ATM, FDDI)
  - air (IR, Radio, micro-wave)
- Speeds (link not aggregate)
  - low
    - modems (few k bits/sec)
    - pagers
  - medium
    - Ethernet (10-100 Mbps)
    - Token Ring (16 Mbps)
  - high
    - ATM (155-655 Mbps)
    - Myrinet (600-1200 Mpbs)
    - SONET (OC-48 - 2488 Mbps)

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Network Topologies

- How are the communicating objects connected
- Fully connected - link between all sites
- Partially connected
  - links between subset of sites
  - can be an arbitrary graph
- Hierarchical networks
  - network topology looks like a tree
  - internal nodes route messages between different sub-trees
  - if an internal node fails, children can not communicate with each other
  - star network - hierarchical network with single internal node

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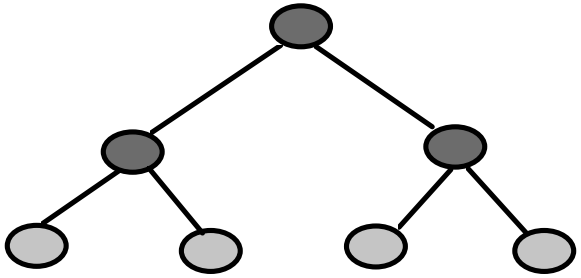
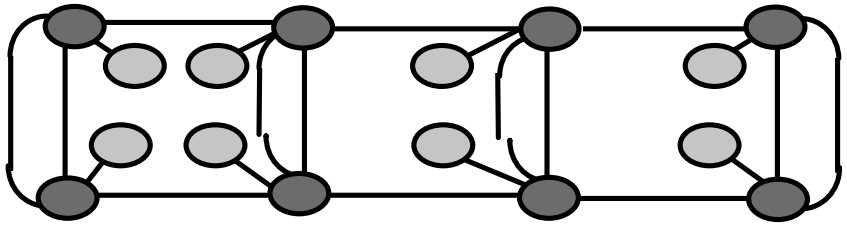
Network Topologies

Network device Processor

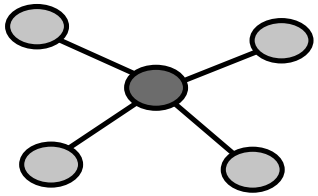
- Tree



- Mesh



- Star (Ethernet 10Base-, physical only)



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A Network is not an Island

- Reason for networks is to share information
  - must be able to communicate in a common language
  - called protocols
    - The nice thing about protocols is that there are so many of them!
- Protocols
  - must be unambiguous and followed exactly
    - rule of thumb for good protocol implementations
      - be rigorous is what you generate
      - be liberal in what you accept
  - there are many different aspects to protocols
    - electrical through web services

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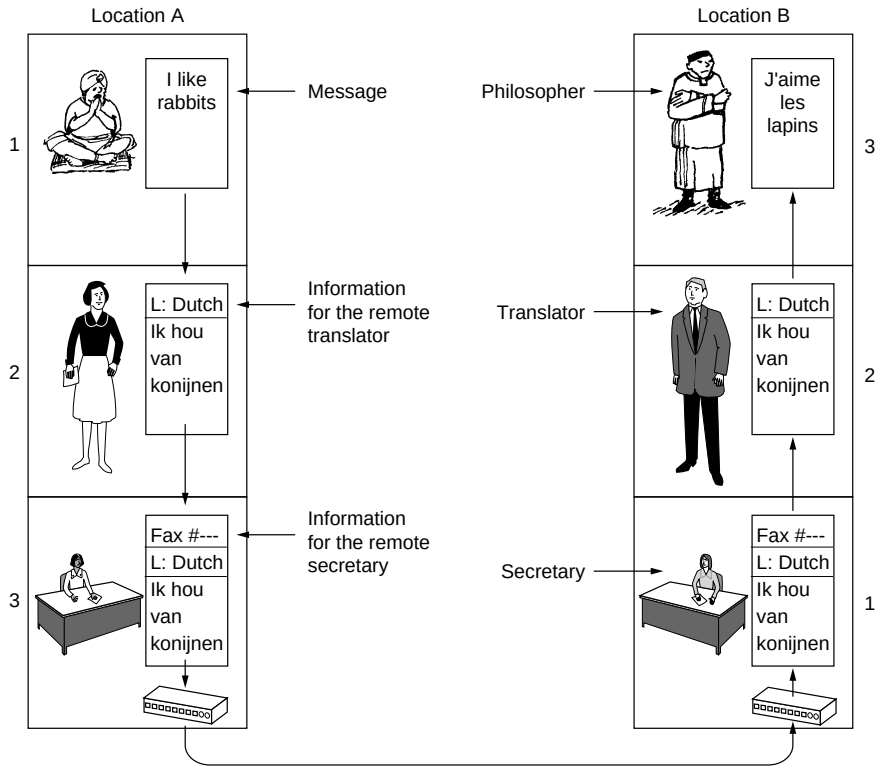
Layering

- Layers provide information hiding
  - doesn't matter what lower level layers use as long as higher layers speak the same protocol.



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