Announcements

- **Reading**
  - Chapter 5: 5.1-5.4
  - Pthread Book Chapter 1 and Chapter 3 (to page 97)

- **Homework #1 (due 9/30/97 in class)**
  - chapter 1: 4, 5, 8, 22
  - chapter 2: 3,4,14, 47, 49, 50

- **Programming Project #2 was handed out**
Transmission Media (Coax)

- copper with an insulator between it
  - 75 ohm - common for T.V.
  - 50 ohm - common for data transmission
- rates: 10’s of Mbps baseband, 100’s MPS broadband
  - supports multiple drops
Transmission Media (cont.)

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● **Fiber**
  – uses principal of total internal reflection
    • get light to “bounce” along the fiber
  – point to point communication
  – 100’s Mbps to several Gbps
Transmission: No Cables

• **Microwave**
  – above 100MHz
  – uses directional (parabolic antenna)
  – with 100m towers, can space them every 80km
  – security:
    • directional signal
    • can add hop-by-encryption

• **Infrared**
  – uses: television remote, computer TANs (Table Area Nets)
  – signal will not pass through walls
  – security:
    • signal confined to a single room
    • anyone in the room can hear the signal though
Transmission: No Cables (cont.)

- **Cellular Radio (AMPS)**
  - divide service areas into cells
    - each unit talks to a base station in the cell
    - 832 duplex channels (allocated to two providers)
  - security
    - virtually none
    - easy to eavesdrop
    - ease to “clone” cell phones

![Diagram of cellular radio cells with a mobile station and cells that can hear the mobile station]
Transmission: Satellites

- **Different Orbits Possible**
  - orbit affects many communication properties

- **Geosynchronous**
  - always over the same spot on the earth
  - 36,000 Km orbit is required
  - only 180 slots possible
  - uses one uplink and one down link frequency
  - large round-trip latencies

- **LEO (Low Earth Orbit)**
  - each satellite keeps moving into and out of range
    - solution: use a large number of satellites
    - sort of like cells, but the cells are the ones moving
  - lower round-trip latency