

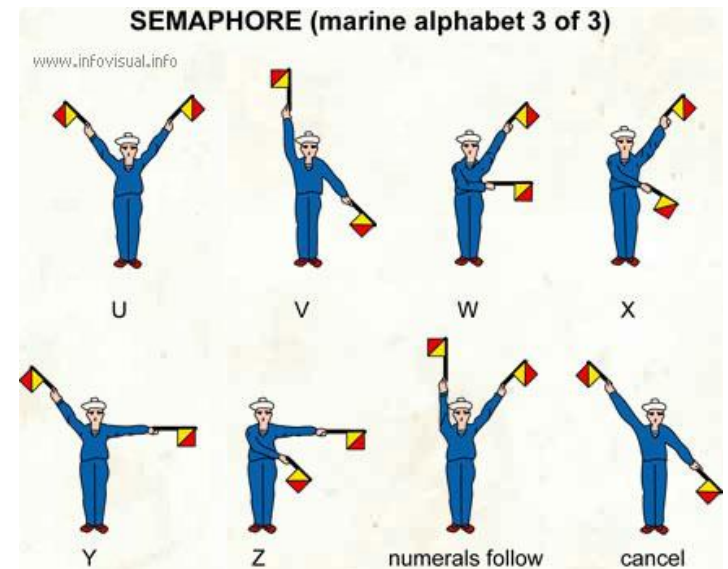
# Introduction to Computer Networks



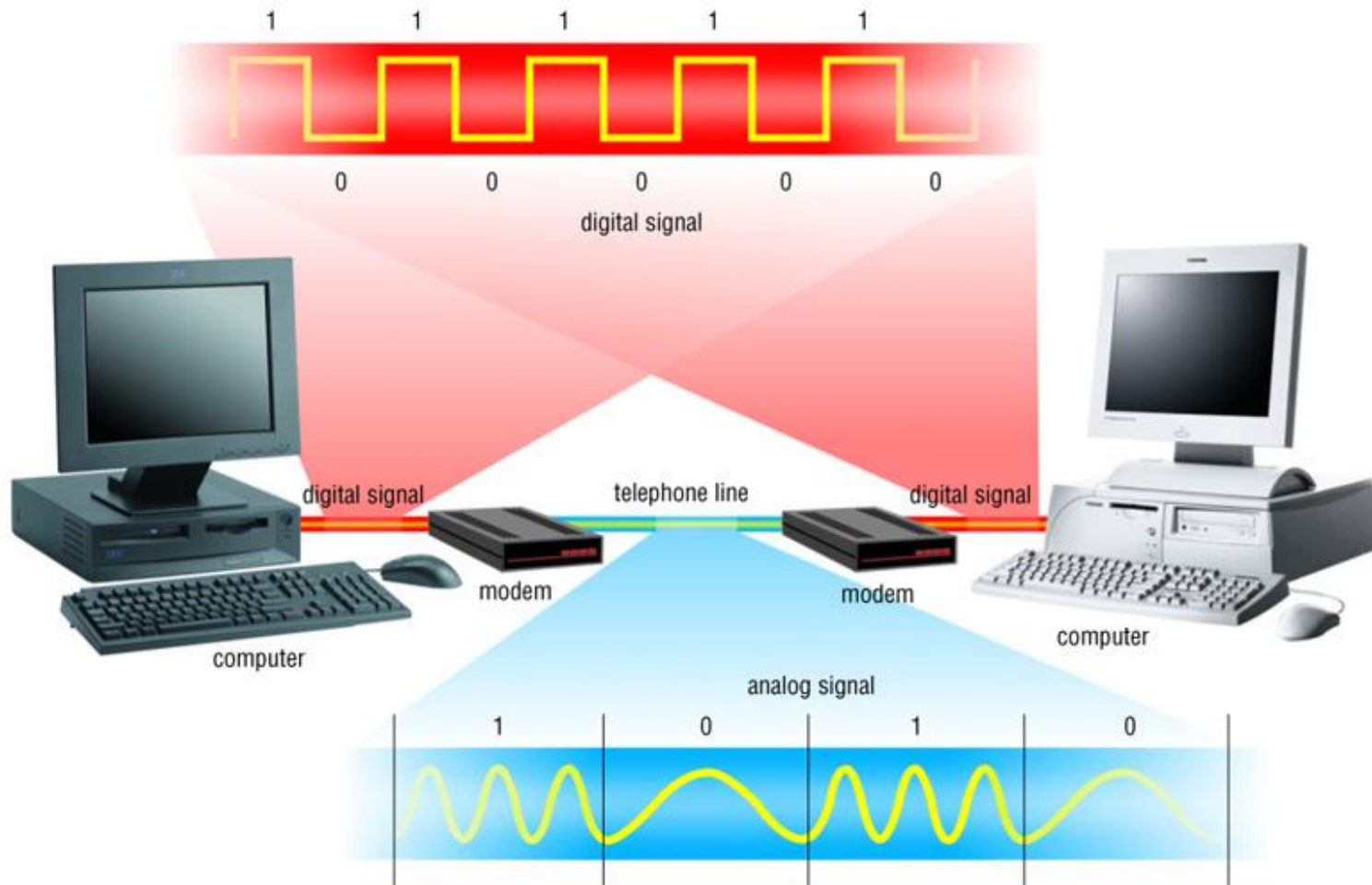
*Reference: Slides by Dr F.Farahmand*

# Telecommunications

- Tele (Far) + Communications
- Early telecommunications
  - smoke signals and drums
  - visual telegraphy (or semaphore in 1792)
- Telegraph and telephone
  - Telegraph (1839)
  - Telephone (1876)
- Radio and television
- Telephony
  - Voice and Data

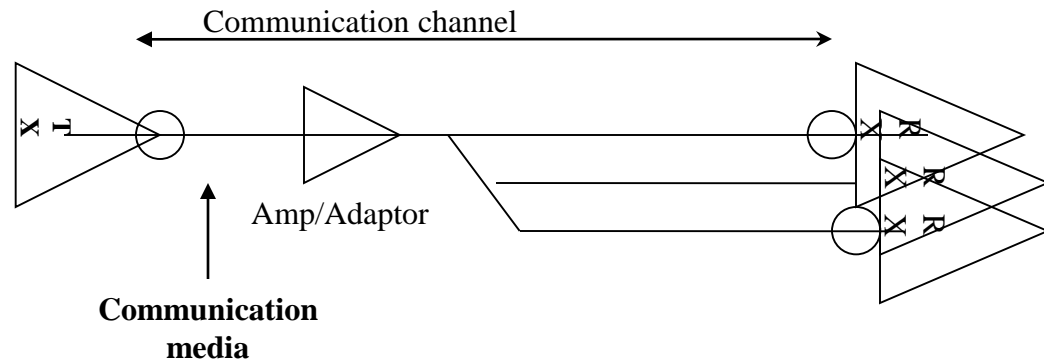


# Communication Systems



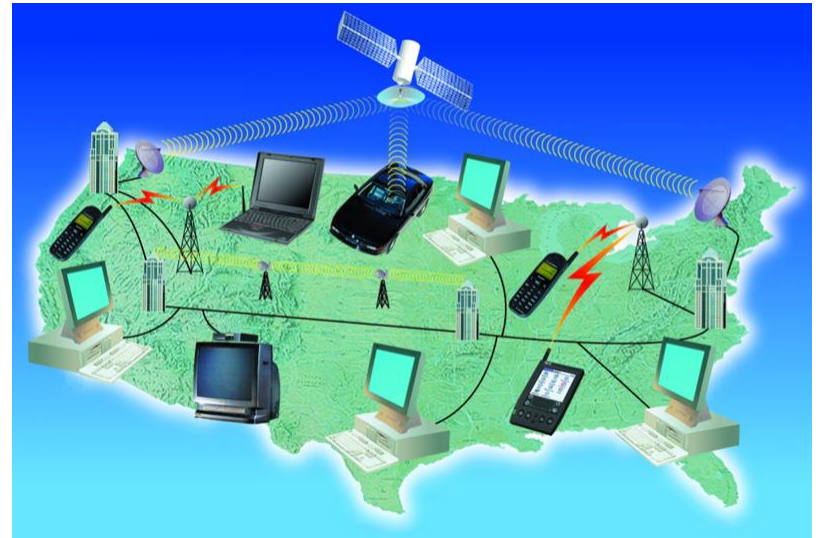
# Communication Systems

- **Process** describing **transfer** of information, data, instructions between one or more systems through some media
  - Examples
    - people, computers, cell phones, etc.
    - Computer communication systems
- Signals passing through the communication channel can be **Digital**, or **analog**
  - Analog signals: continuous electrical waves
  - Digital signals: individual electrical pulses (bits)
- Receivers and transmitters: desktop computers, mainframe computers, etc.

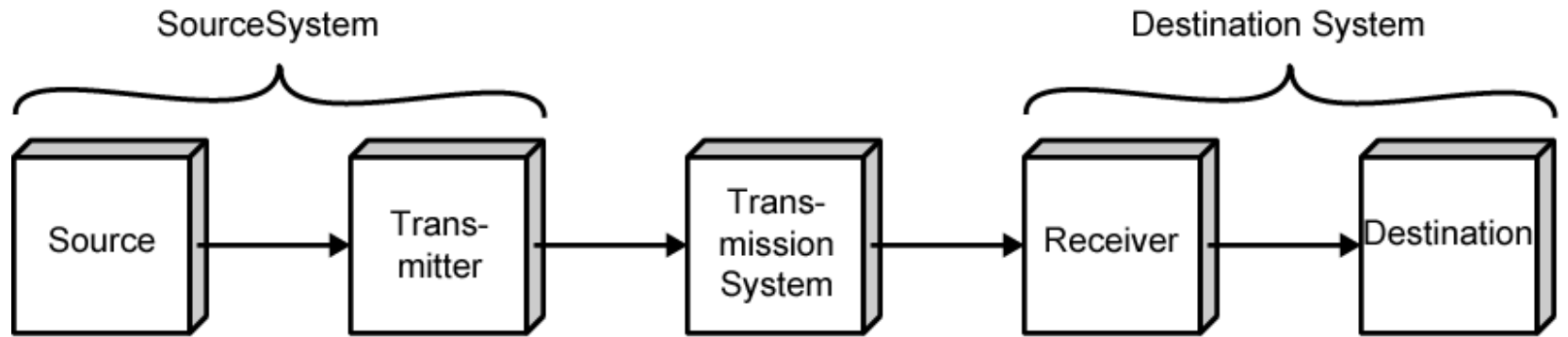


# Communications Components

- Basic components of a communication system
  - Communication technologies
  - Communication devices
  - Communication channels
  - Communication software



# Communications Model

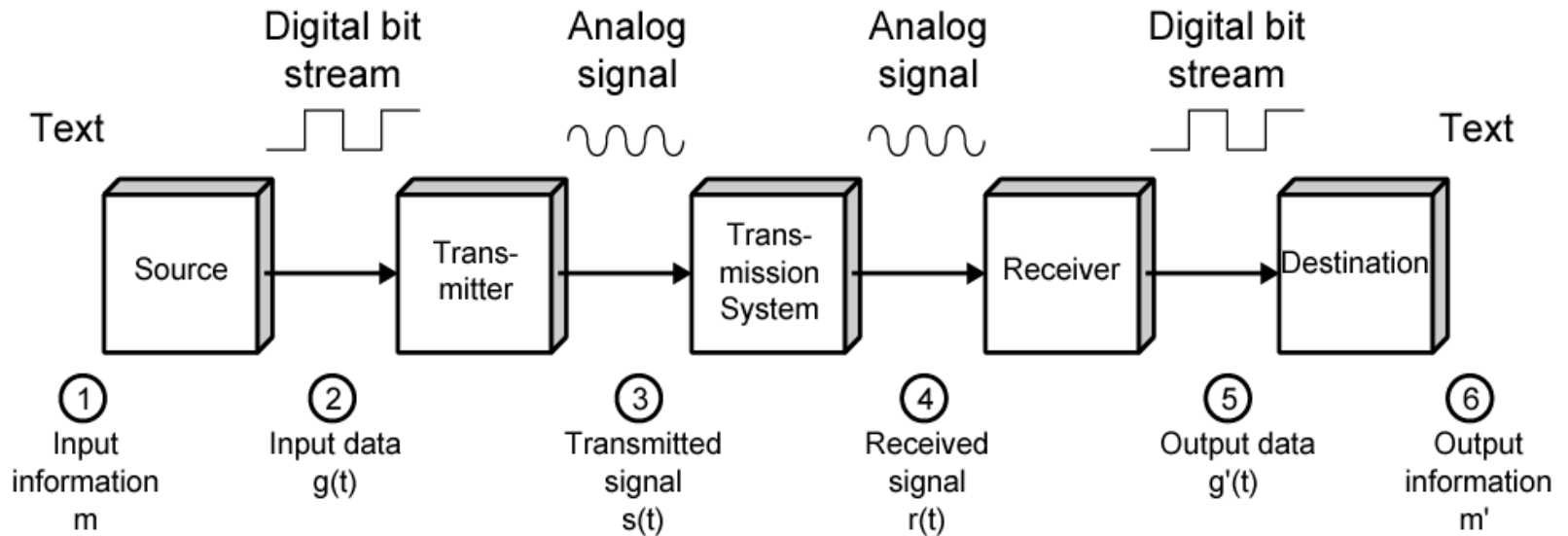


(a) General block diagram



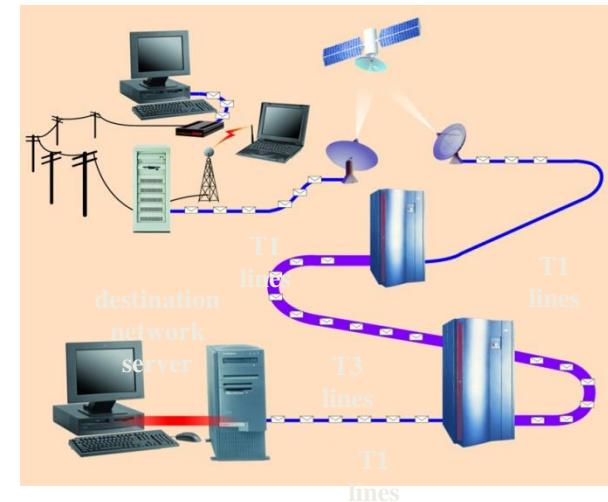
(b) Example

# Data Communications Model



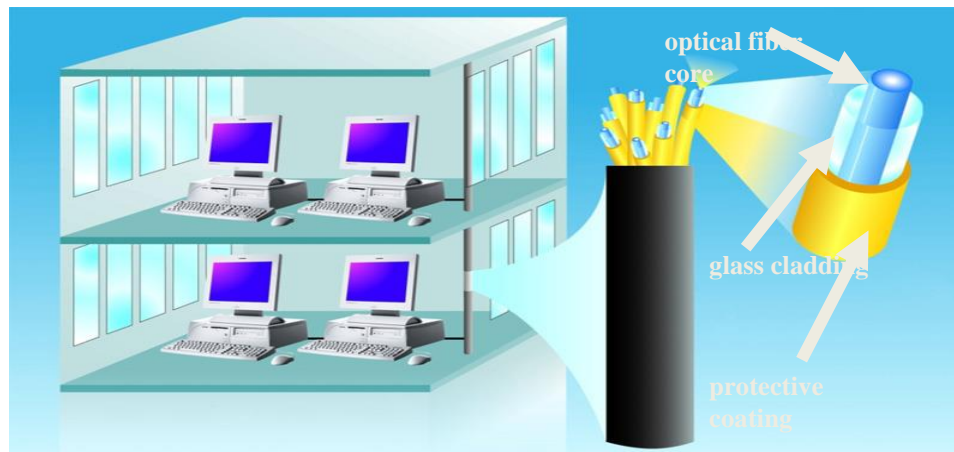
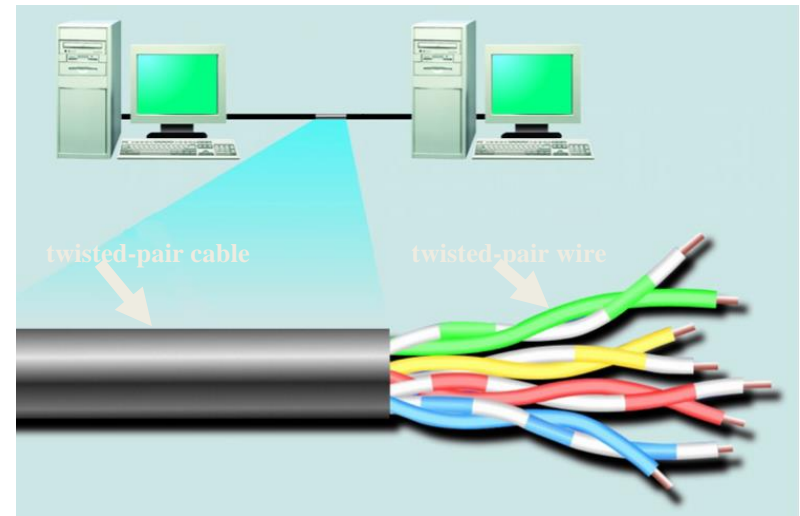
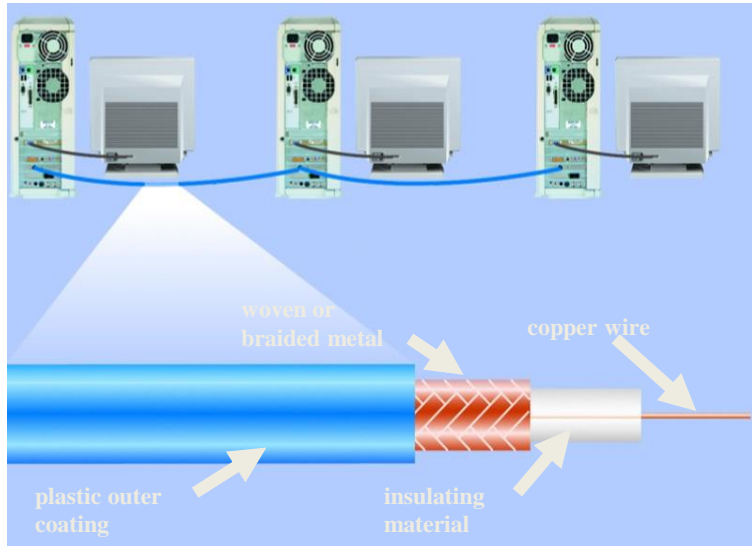
# Communication Channels

- A **channel** is a path between two communication devices
- **Channel capacity**: How much data can be passed through the channel (bit/sec)
  - Also called **channel bandwidth**
  - The smaller the pipe the slower data transfer!
- Consists of one or more **transmission media**
  - Materials carrying the signal
  - Two types:
    - Physical: wire cable
    - Wireless: Air

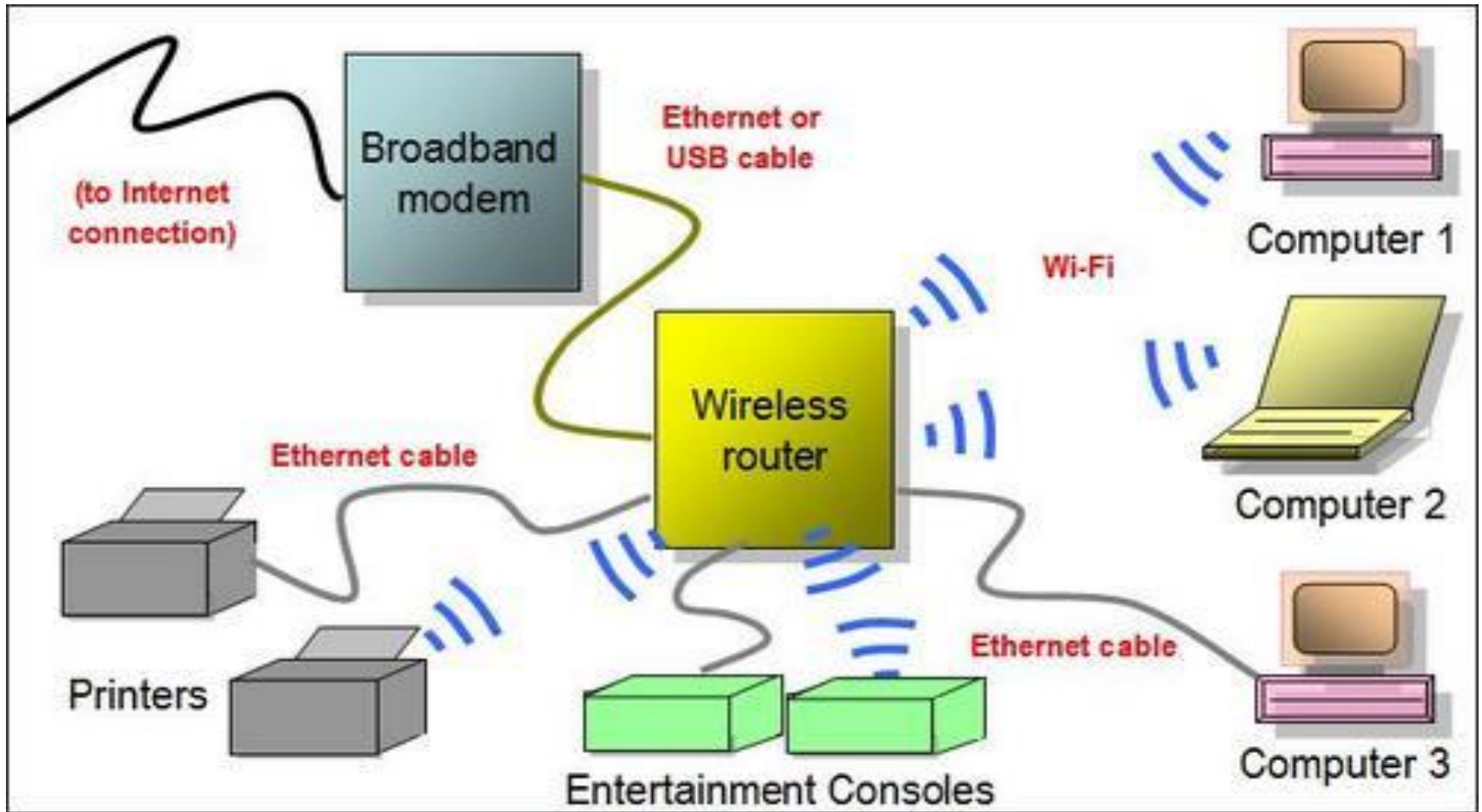




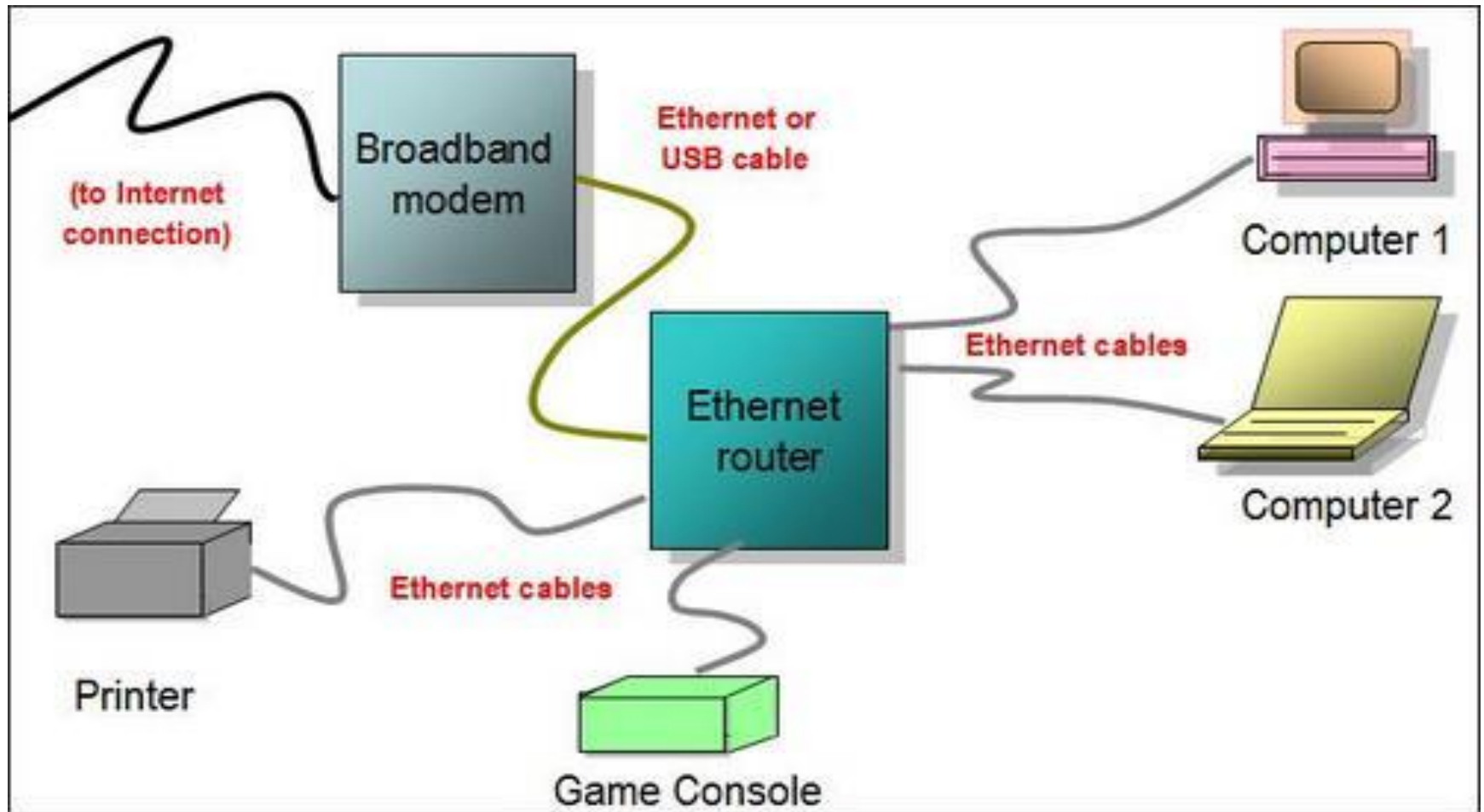
# Physical Transmission Media



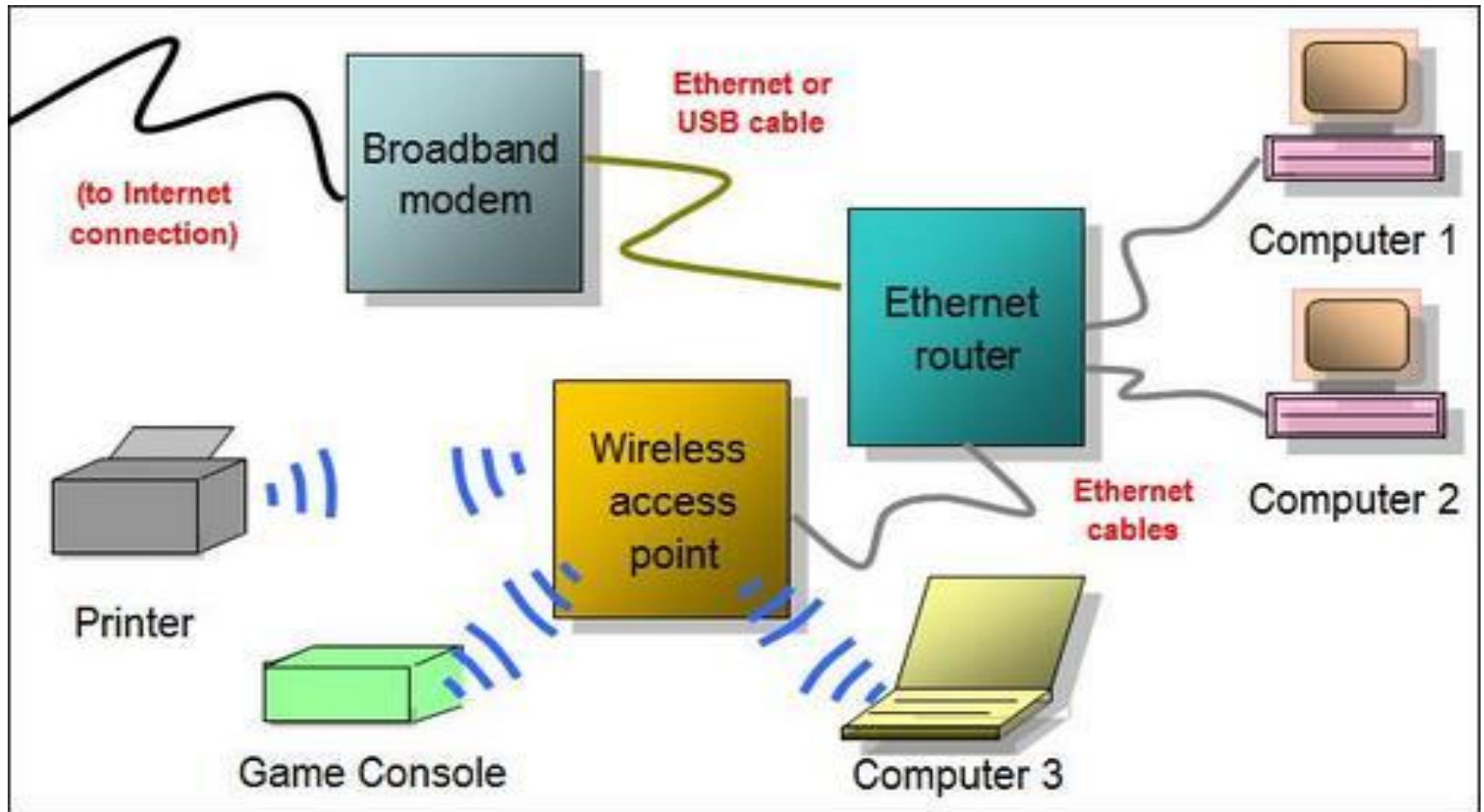
# Wireless Network



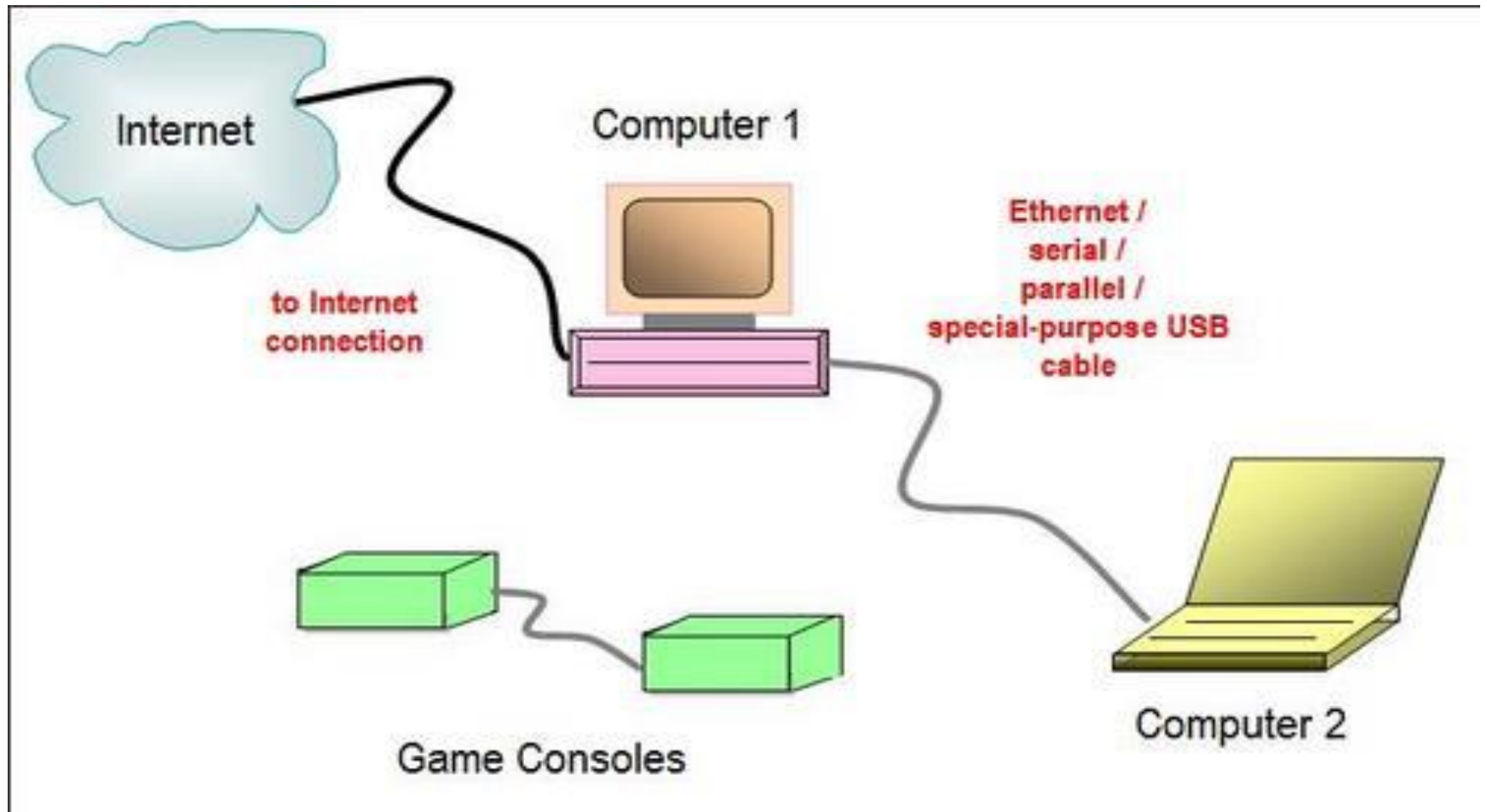
# Wired Network



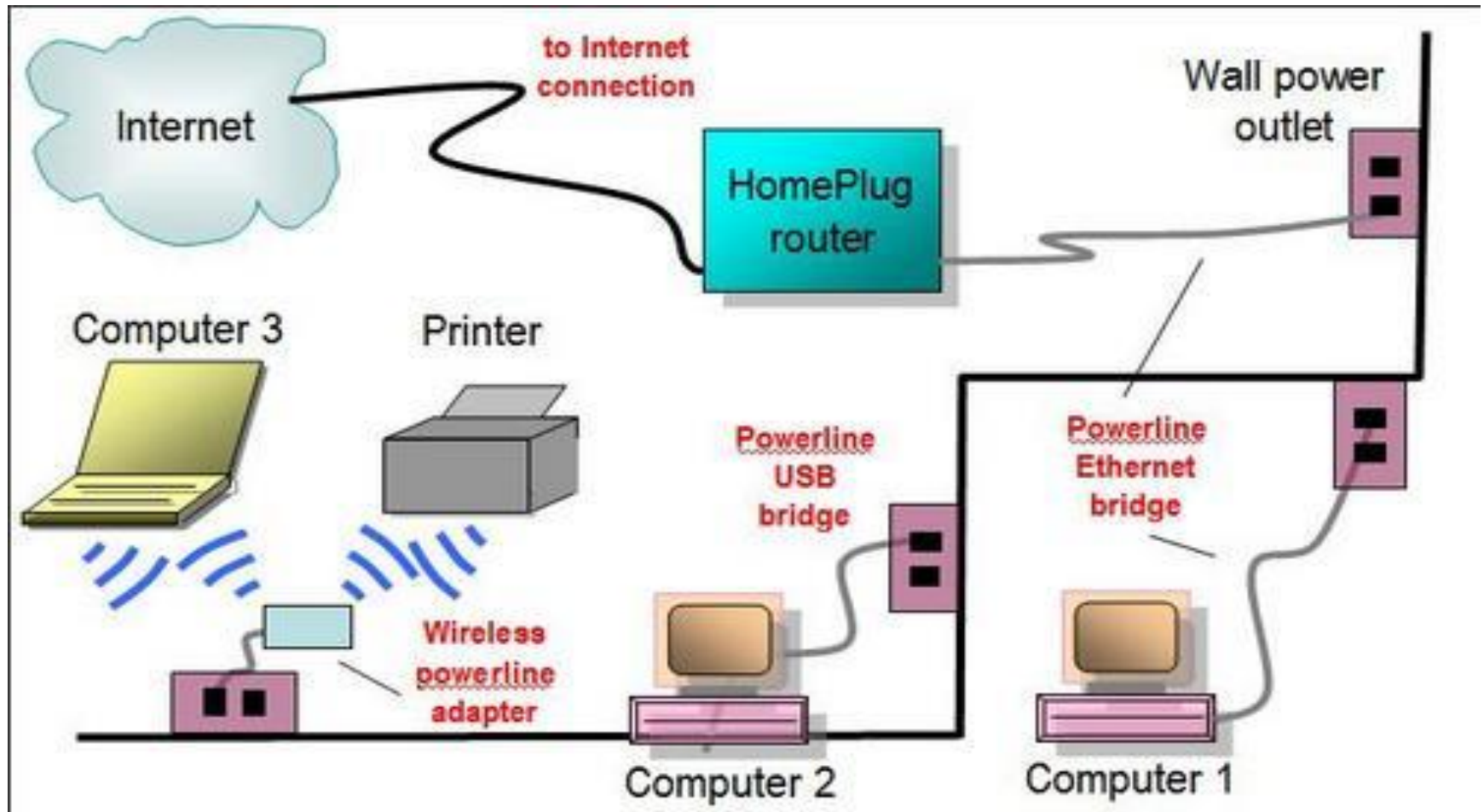
# Hybrid Network



# Direct Connect



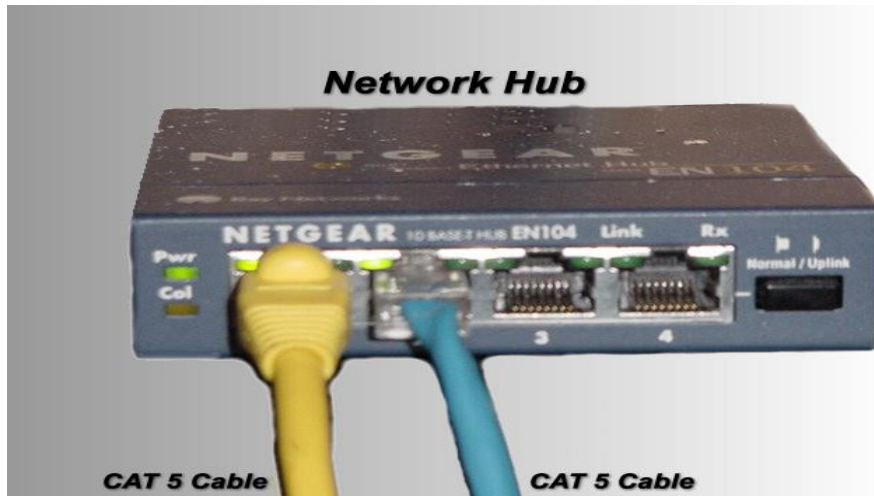
# Powerline Network



# Basic Equipment: Cards/Cables



# Hubs & Switches





# Routers

- A device that forwards data packets along networks. A router is connected to at least two networks, commonly two LANs or WANs or a LAN and its ISP's network. Routers are located at gateways, the places where two or more networks connect.

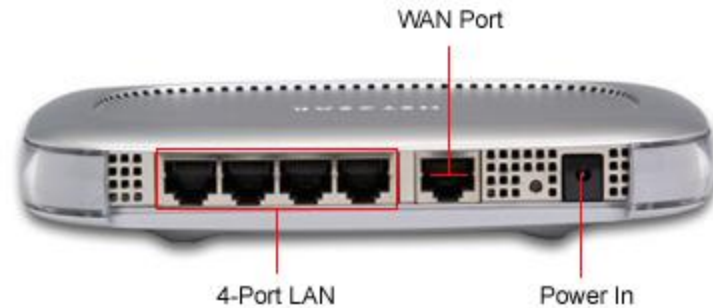
# Routers, Routers, Routers



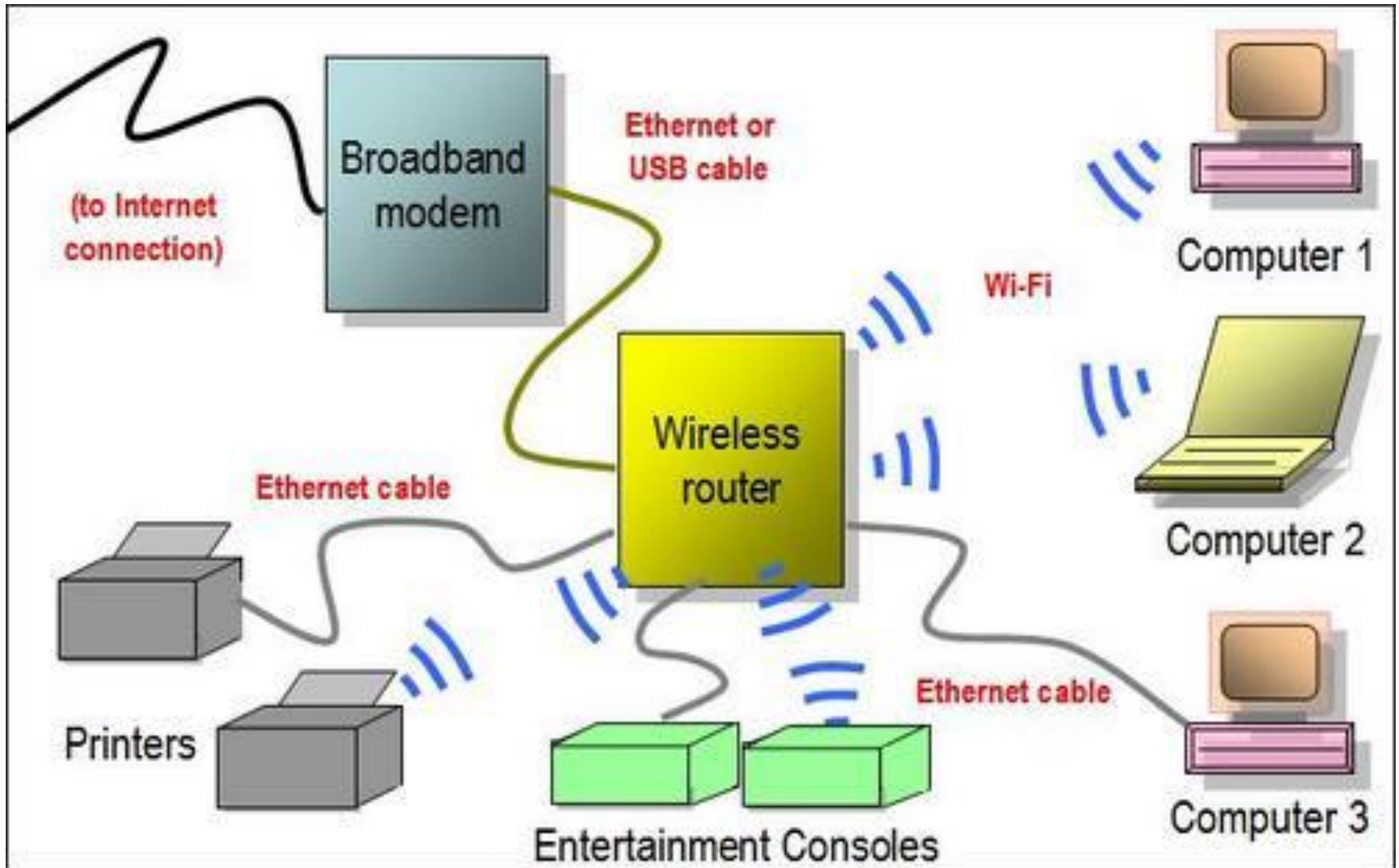
D-Link DIR-450(EV-DO)



**D-Link**  
Building Networks for People  
D-Link DIR-451(UMTS/HSDPA)



# Most common home network



# Devices, Devices, (what can you use)

- PDA, Cell Phones, Notebooks, Printers, Hard drives, cameras, robots

