CS100: CPADS

Wireless Networks

David Babcock / James Moscola
Department of Physical Sciences
York College of Pennsylvania

Wireless Networks

- **Allow devices to connect to a network wirelessly**

  - Great for mobile devices

  - Great for connecting a device to a network when it is not conveniently located nearby a wired switch/port

- **Requirements**

  - Wireless Access Point

  - Wireless adapter in computer that you want to connect to wireless network

Wireless Network Adapters

- **Most likely included in *EVERY* mobile computer on the market today**

- **Most desktop computers do NOT come with wireless network adapters**

  - Adding a wireless adapter is cheap and easy

    - Two possible options

External USB Wireless Adapter

Internal PCI/PCIe Wireless Adapter

Wireless Access Points

- **Allow wireless devices to connect to network**

  - One side physically plugs into wired network, other side sends/receives radio signals

- **Often integrated into a single device that also contains . . .**

  - a router

  - a switch

  - a firewall

  - sometimes a print server

  - sometimes even a cable modem

Wireless Access Points

- **When setting wireless router, location is key**

  - Desirable to locate the AP nearby wireless devices

  - Performance (i.e. speed) decreases as distance from AP increases

- **Setup requires that you *name* your network with an SSID**

  - This is the name that others see when they are looking for wireless networks

  - It is possible to hide this SSID for extra security

Wireless Access Points

- **Additional security measures**

  - Encryption (WEP, WPA, WPA2)

    - Add an encryption password to your network to prevent others from accessing your network

    - Encrypting packets also prevents others from snatching your data from thin air

  - MAC Filtering

    - Set up your AP such that only devices with specific MAC addresses can connect

Wireless Standards

- **Multiple wireless standards exist, and will continue to evolve as technology improves**
    - Many different implementation standards for 802.11n and 802.11ac
        - Vary number of antennae
        - More antennae => More simultaneous data streams => More Speed
    - Most 802.11n and 802.11ac computers only support 2-3 simultaneous data streams
    - Most 802.11n handheld devices only support a single data stream
    - No handheld devices currently support 802.11ac

	Frequency (GHz)	Max Data Streams	Avg. Data Rate Per Stream (Mb/s)	Max Data Rate Per Stream (Mb/s)	Max Agg. Data (Mb/s)	Range (ft)
802.11a	5	1	23	54	54	25 - 75
802.11b	2.4	1	5.9	11	11	100 - 150
802.11g	2.4	1	22	54	54	100 - 150
802.11n	2.4 / 5	4	74	150	600	~230
802.11ac	5	8	??	866.7	6770	115