Cell Phones

ITS 214
In the Beginning...

- **The Telephone Network**
  - (Actually has an even more ancient history - more later)
  - User dials a telephone number, network sets up a connection

- **Mobile Radios (Walkie-Talkie)**
  - User selects a channel
  - Push to talk, one can talk, everyone on the channel listens
  - Manual connection to the telephone network.
Better service

• Use two channel, one to talk, one to listen

• Make the connection to the telephone network automatic (add dial-pad to the walkie-talkie)

• Still
  • Not very many channels available
  • No good way to call the mobile
Today

• Many more channels available

• Channel coverage is small
  • A channel is used in a “small” area
  • Channels are re-used a short distance away

• Cell phones are part of the overall telephone network
  • Can call a cell phone regardless of its location
A tale of two continents

• The US

  • Started with a single universal cell phone standard (AMPS). Any phone would work anywhere, with any carrier

  • Deregulation and competition have produced

    • Lower prices

    • Many more services

    • Phones that generally are “locked” to a carrier
...The other continent

• Europe
  • Started with a large number of incompatible systems
  • First in Scandinavia
  • Converted to a single, pan-European system (GSM)
  • Phones are not always compatible, but
    • Subscriber information is stored on a smart card
    • On a trip, if your phone won’t work, rent an “empty” phone and insert your smart card
Lets not leave out...

• Asia
  • Started a little later
  • Uses standards adapted from GSM as well as some US standards
  • Much, much further in the adoption of multi-media phones and applications
Topics and Questions

• What is a channel?
  • For that matter, what is “frequency” (or “wavelength”)?
  • What is “spectrum”
    • What is “spectrum coordination”
    • What is the ITU and the FCC, and what do they do?

• What is the nature of information
  • What does the reading mean by “analog” and “digital” systems?
  • We will start here!
More Topics

• How do we transmit information?
• Based on a telephone number, how do we figure out where a call is supposed to go?
  • Sounds simple, but there are complications
    • Mobile phones are, well, mobile.
    • People can move numbers from provider to provider.
• Who keeps track of telephone numbers and who they are assigned to?