CISC 7332X T6

Multiplexing

Hui Chen

Department of Computer & Information Science

CUNY Brooklyn College

Outline

- Multiplexing
  - FDMA, TDMA, and CDMA

Multiplexing

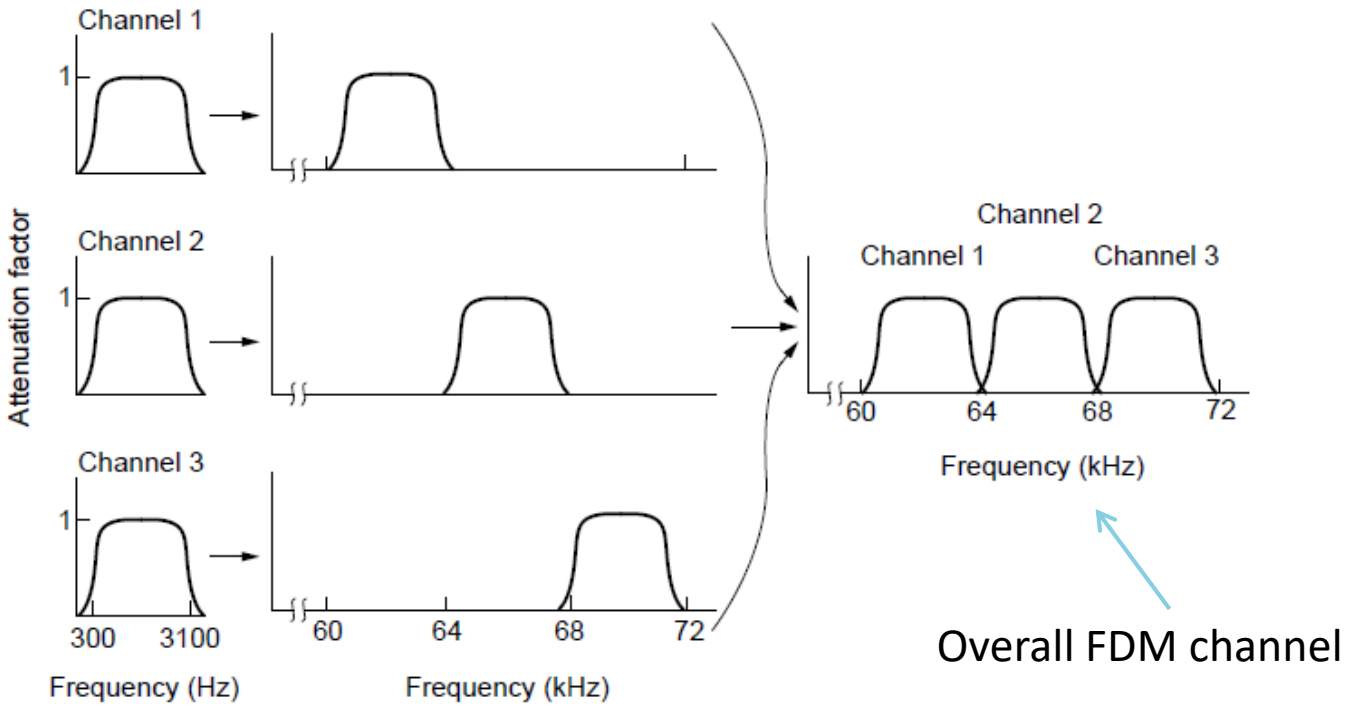
- Channels are often shared by multiple signals
- The schemes that allow multiple signals to share a channel are called multiplexing

Schemes of Multiplexing

- Frequency Division Multiplexing
- Time Division Multiplexing
- Code Division Multiple Access

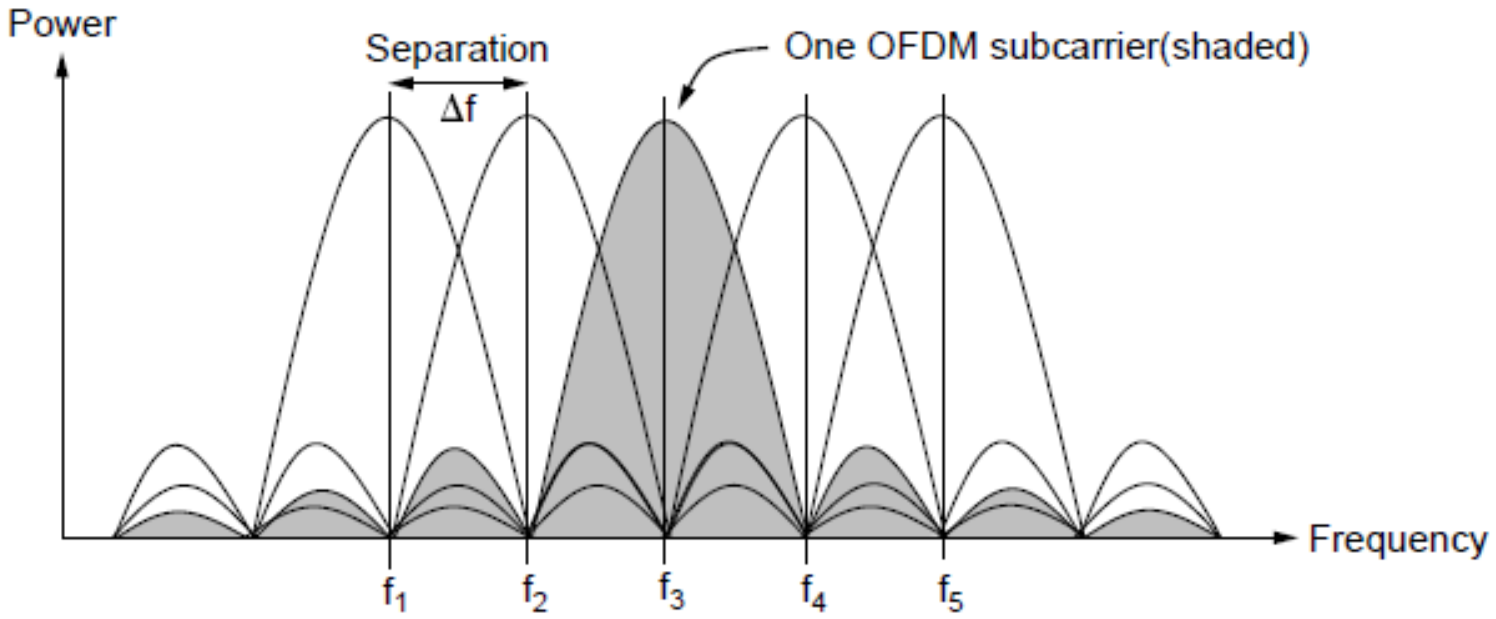
Frequency Division Multiplexing

- FDM (Frequency Division Multiplexing) shares the channel by placing users on different fr



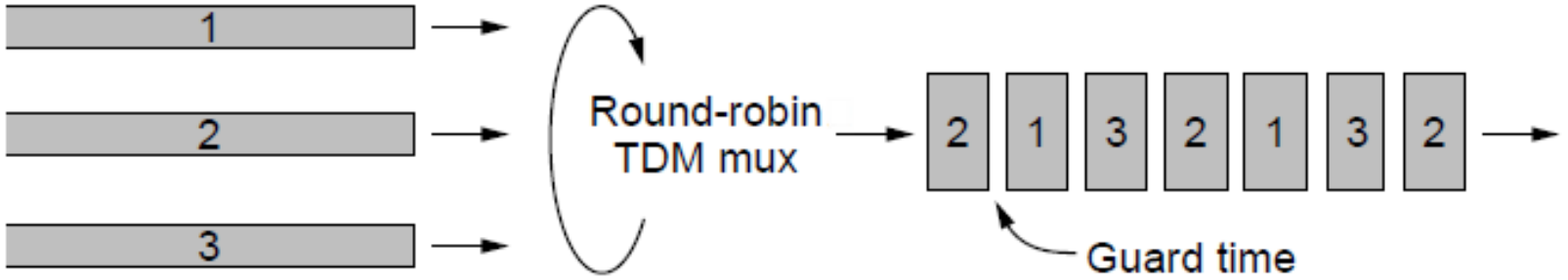
Orthogonal FDM (OFDM)

- an efficient FDM technique used for 802.11, 4G cellular and other communications



Time Division Multiplexing (TDM)

- Time division multiplexing shares a channel over time:
  - Users take turns on a fixed schedule; this is not packet switching or STDM (Statistical TDM)
  - Widely used in telephone / cellular systems

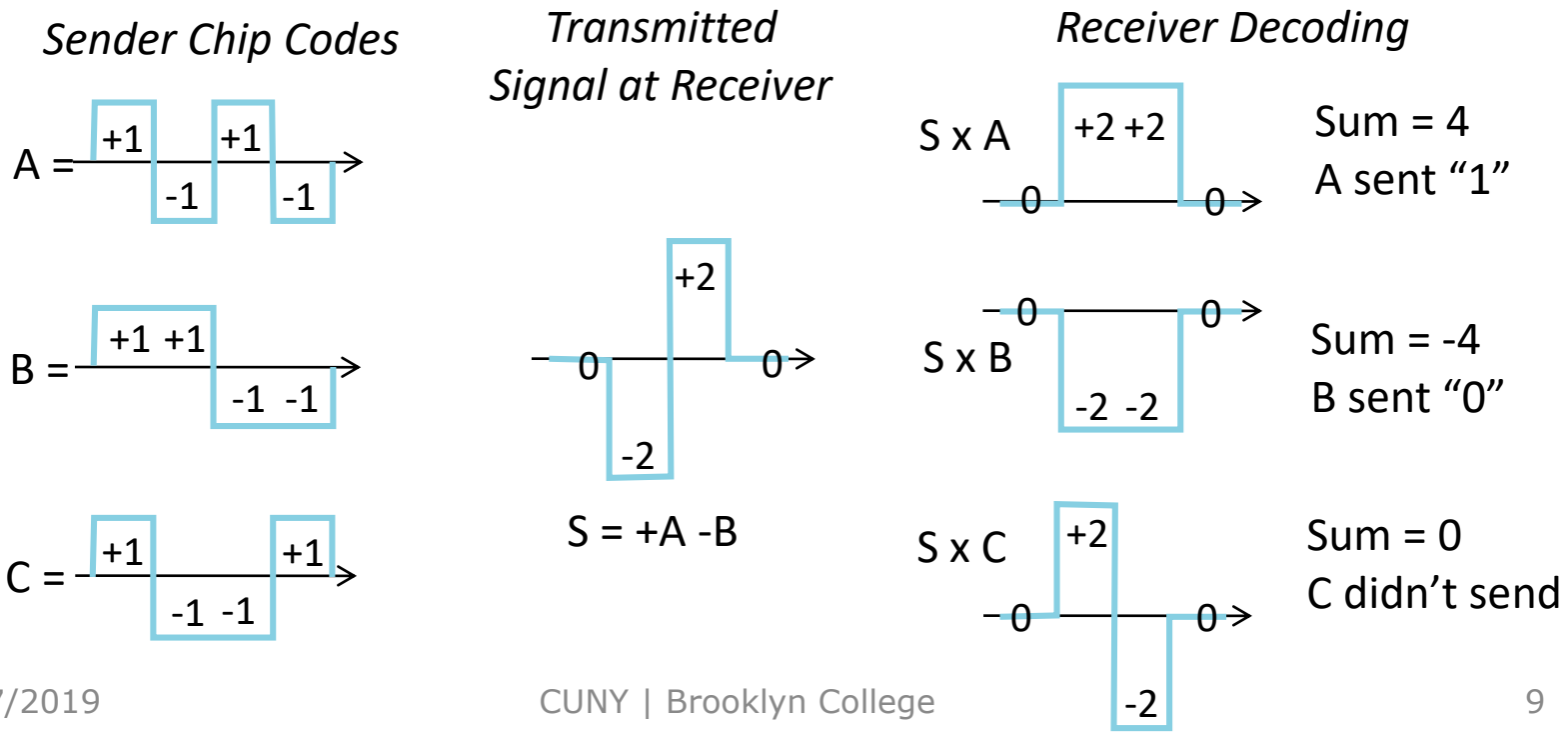


Code Division Multiple Access (CDMA)

- CDMA shares the channel by giving users a code
  - Codes are orthogonal; can be sent at the same time
  - Widely used as part of 3G+ cellular communication networks

CDMA: Example

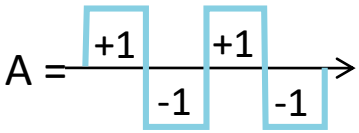
- Each user has a chip code/sequence
  - transmit 1 = transmit the chip code; transmit 0 = transmit the negation of the chip code

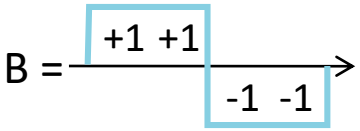


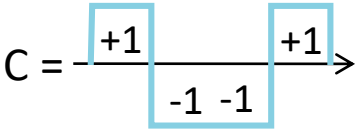
CDMA: Example

- Each user has a chip code/sequence
  - transmit 1 = transmit the chip code; transmit 0 = transmit the negation of the chip code

Sender Chip Codes







A transmits 1
B transmits 0
C does not transmit

?

Questions?

- Concept of multiplexing
- FDMA and ODMA
- TDMA
- CDMA