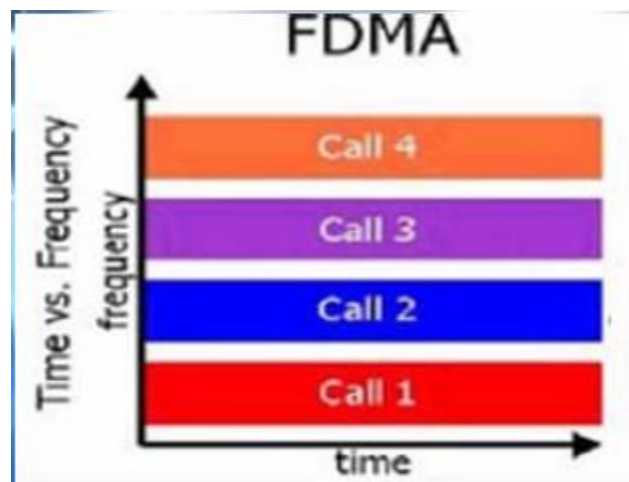


4G Technology

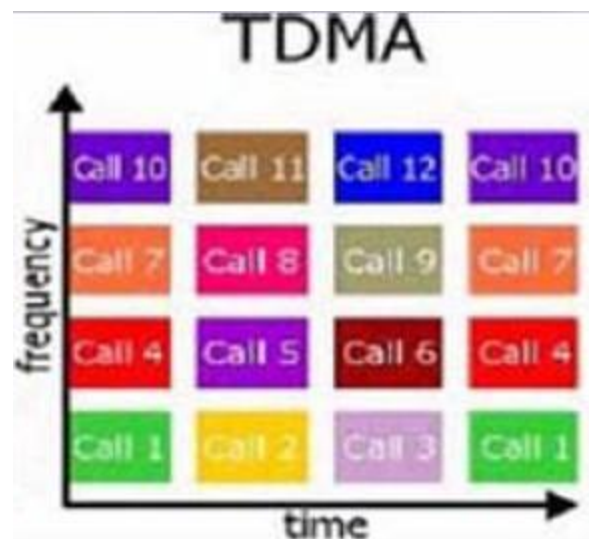
Types of Multiplexing

- FDMA – Frequency Division Multiple Access
 - Each phone call is allocated one frequency for the entire duration of the call



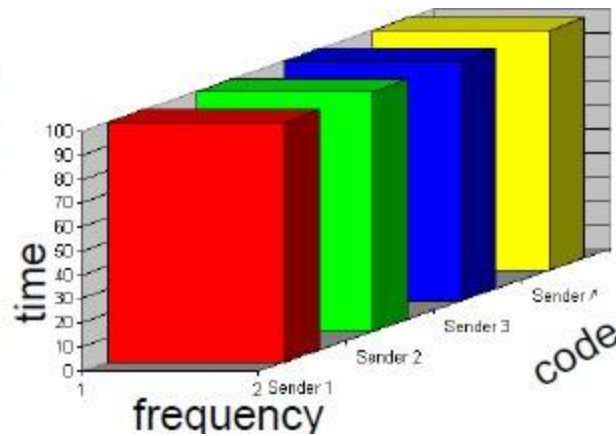
Types of Multiplexing

- TDMA - Time Division Multiple Access
 - Each phone call is allocated a spot in the frequency for a small amount of time, and "takes turns" being transmitted



Types of Multiplexing

- CDMA - Code Division Multiple Access
 - Each phone call is uniquely encoded and transmitted across the entire spectrum, in a manner known as spread spectrum transmission



Reasons for New Research

- Even though 3G has successfully been introduced to mobile users, there are some issues that are debated by 3G providers and users.
 - High input fees for the 3G service licenses
 - Great differences in the licensing terms
 - 3G phones are expensive

Fourth Generation



What is 4G?

- Fourth Generation Technology
 - Faster and more reliable
 - 100 Mb/s
 - Lower cost than previous generations
 - Multi-standard wireless system
 - Bluetooth, Wired, Wireless
 - Ad Hoc Networking
 - IPv6 Core
 - OFDM used instead of CDMA
 - Potentially IEEE standard 802.11n
 - Most information is proprietary

Communications Architecture

- **Broadcast layer:**
 - fix access points, (i.e.) cell tower connected by fiber, microwave, or satellite (ISP)
- **Ad-hoc/hot-spot layer:**
 - wireless LANs (i.e. internet at Starbuck's)

Communications Architecture

- **Personal Layer Gateway:**
 - devices that connect to upper layers; cell phone, fax, voice, data modem, MP3 players, PDAs
- **Info-Sensor layer:**
 - environmental sensors
- **Fiber-optic wire layer:**
 - high speed subterranean labyrinth of fiber optic cables and repeaters

Ad Hoc Networks

- Spontaneous self organization of networks of devices
- Not necessarily connected to internet
- 4G will create hybrid wireless networks using Ad Hoc networks
- Form of mesh networking–
Very reliable



Enhance Mobile Gaming

- Experience enhance wireless capabilities that deliver mobile gaming interaction with less than five seconds
- Play online multi player games while traveling at high speeds or sitting outside

Broadband access in Remote location

- 4G will provide a wireless alternative for broadband access
- I will provide first opportunity for broadband access in remote locations without an infrastructure to support cable or DSL access.