MOBILE COMPUTING - ASSIGNMENT PRESENTATION (20XW61)
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Topic : **Wireless Communication**

Like the name suggests, wireless communication stands for communication without any form of physical media like cables as a channel of communication. The most popular method for the transmission of signals happens through the form of radio waves. We come across wireless communication constantly in our day-to-day lives like tv remote, bluetooth, wifi etc. A short history of wireless communication goes as follows :

- Light, flag, smoke signals - Making use of light, smoke or flag to send a message to a far place. Sending puffs of smoke, waving a flag etc.
- Optical telegraph - The optical telegraph transmitted information through a series of visual signals. Towers with moving shutters, named blades, were invented to encode the information through a series of mechanical elements.
- Electromagnetic Waves
- Radio - Short wave, AM, FM
- Television - John Baird

Wireless Network is a technology that enables two or more entities to communicate using electromagnetic waves in open space. Basically a network where communication is wireless only in the form of Electromagnetic waves. Some advantages of wireless communication include :

- Reduces cost
- Access communication services on the move
- Shrinks the world
- Always connected
- Scalable

Some wireless network standards used are given below. (Includes some not in slides but in use currently.Slides only had till 3G as current standards. Refer slides for some for some of the other standards) :

- NMT (Nordic Mobile Telephone): An analog cellular system used in the Nordic countries and other regions, primarily in the 1980s and 1990s.
- GSM (Global System for Mobile Communications): A digital cellular system used in most countries worldwide. It provides voice and data services and is the most widely used mobile communication standard globally.
- AMPS (Advanced Mobile Phone System): An analog cellular system used primarily in North America until the mid-2000s.
- DECT (Digital Enhanced Cordless Telecommunications): A digital wireless communication standard primarily used for cordless phone systems in homes and offices.
- CDMA (Code Division Multiple Access): A digital cellular technology that uses spread-spectrum techniques to allow multiple users to share the same frequency band. It is used primarily in the United States and some other countries.
- LTE (Long-Term Evolution): A fourth-generation (4G) cellular technology that provides faster data transfer rates and is used by many mobile networks worldwide.
- 5G NR (New Radio): The latest cellular technology that offers faster data transfer rates and lower latency than previous generations. It is designed to support new applications such as virtual reality and autonomous vehicles.

Limitations of wireless networks w.r.t wired :

Feature	Wired	Wireless
Noise (unwanted signal which degrades the quality of original data)	Can be shielded	Better technologies still in development stage
Attenuation (Reduction of signal strength due to long travel)	Repeaters are used	It is difficult
Data Speed	Can be increased using coaxial or fibre optic cables.	Re-engineering can't be done. We can improve transmission and reception techniques
Access Capacity	Any number of users can be added by increasing new wire circuits. Unlimited	Limited Access media is air and to be shared by all users
Interference	Minimal	Multi user interference (radio signal of different users interfere with each other) Self interference (created by itself, multipath effect) Interference Management : - Share Channel , Multiple Access Problem : FDMA, CDMA, TDMA - Media Access control : Aloha, CSMA