All devices within range receive all frames and must be configured to ignore it, privacy of data within the LAN is a concern, so data is encrypted within the LAN, CSMA/CA is used to facilitate half duplex communications avoiding collisions.
CSMA/CD: detects and recovers from collisions, CSMA/CA: avoids collisions, Request to Send (RTS), CTS packets, wireless communications are regulated by various international and national bodies.
Wireless signal coverage area must be considered: signal range.
Signal absorption: when a wireless signal passes through a material and converted into heat weakening the original signal.
Signal reflection: when a signal bounces off a material as metal (WIFI reception is usually poor in elevators).
Signal refraction: a wave is bent when entering a medium where the signal travels at a different speed.
Signal diffraction: when a wave encounters an object and travels around it resulting in blind spots behind the obstacle.
Signal scattering: when a material causes a signal to scatter in all directions.
Other devices using the same channels can cause interference as neighboring wireless LANS.
Visible frequency range: 400 THZ-790THZ, Radio frrequency range 30 HZ—300GHZ, WIFI uses two main bands:
1- 2.4 GHz (2.400-2.4835 GHz), 2- 5 GHz band from 5.150-5.825 GHz, divided into four smaller bands, 2.4 GHz band provides further reach in open space and better penetration of obstacles as walls, WIFI 6 has expanded the spectrum range to include a band in the 6 GHz range.
Each band is divided into multiple channels, devices are configured to transmit and receive traffic on one or more (by channel bonding) of these channels.
In a large WLANs with multiple Aps, its important that adjacent Aps don't use overlapping channels.
Placing APs in a honeycomb pattern to provide complete coverage of an area without interference between channels.
Service sets are groups of wireless network devices, can be independent or mesh or infrastructure.
All devices in the same service set share the same SSID (service set identifier) which is a human readable name identifying the service set and don't have to be unique.
IBSS (Independent Basic Service Set): a wireless network in which two or more wireless devices communicate directly with no Ap (adhoc networks), can be used for file transfers as AirDrop, scalable beyond few devices, used for limited purposes (Independent).
BSS (Basic Service Set): a kind of infrastructure service set where clients connect to each other via Ap not directly.
BSSID (Basic Service Set ID) is used to uniquely identify the Ap (MAC address of the Ap's radio), wireless devices request to associate with the BSS, associated devices are called clients or stations, the area around Ap where signal is usable is called a BSA (Basic Service Area).
To create a larger WLAN beyond the range of a single AP use an ESS infrastructure service set, Aps with their own BSSs are connected by a wired network, each BSS use the same SSID, use a different channel to avoid interference, clients use Aps without having to reconnect providing a seamless WI-FI experience when moving between Aps called roaming, the BSAs
 should overlap about 10-15%.
MBSS (Mesh basic Service Set): can be used in situations where it's difficult to run an Ethernet connection to every Ap, uses two radios, one to provide a BSS to wireless clients so they can connect to the network, and one radio to form the mesh network between Aps to form a backhaul network which bridges traffic from Ap to Ap, at least one Ap is connected to a wired network called RAP (Root Access Point), other Aps are called MAPS (Mesh Access Points), a protocol is used to determine the best path through the mesh.
The upstream network is called DS (Distribution System): each wireless BSS or ESS is mapped to a VLAN in the wired network, an Ap can provide multiple wireless LANs each with a unique SSID, each WLAN is mapped to a separate VLAN and connected to the wired network via a trunk, each wireless LAN uses a unique BSSID usually by incrementing the last digit of BSSID by 1.
AP in repeater mode can be used to extend the range of a BSS, will retransmit any signal it receives from the AP, if it's a single radio, can reduce throughput by 50%, if it has two radios can receive on a channel and retransmit on another.
AP as a WGB (work group bridge): operates as a wireless client of another AP and can be used to connect wired devices to wireless networks.
Outdoor bridge: to connect networks over long distances without a physical cable connecting them,can be point to point or point to multipoint (hub and spoke topology).