Describe how devices are connected on a wireless network.
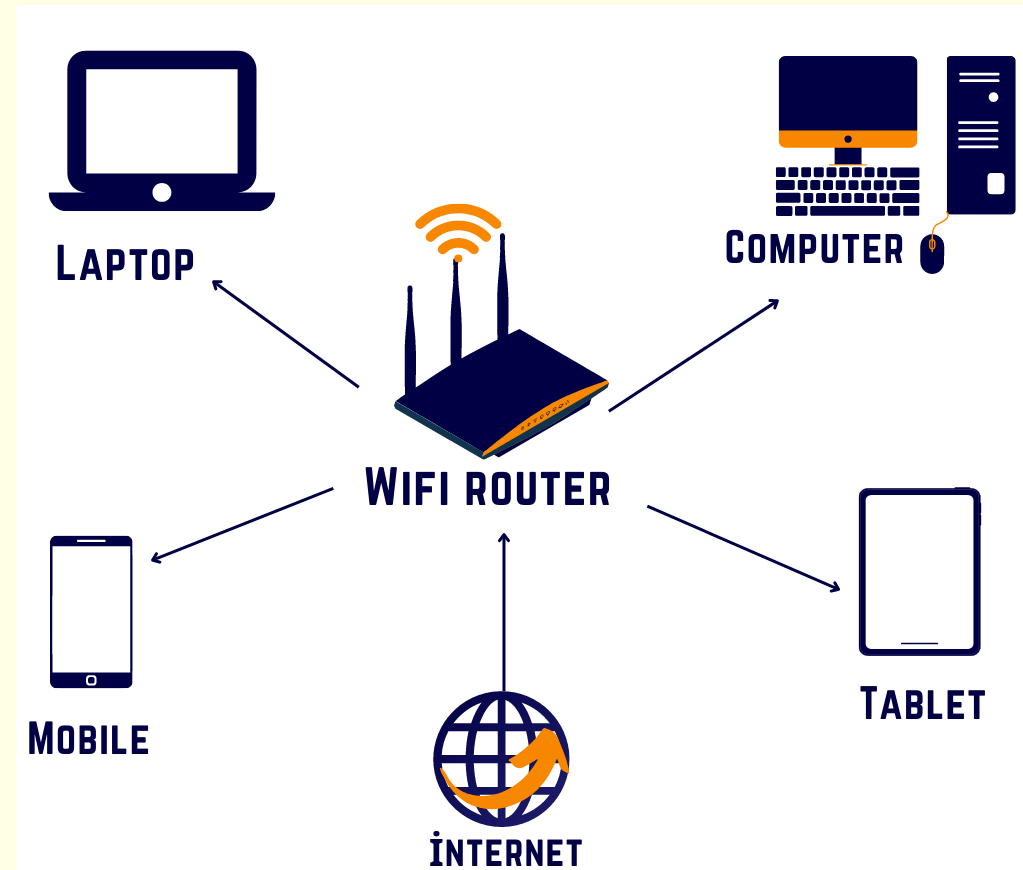
Compare the performance of wired and wireless LANs and give examples of situations where one is preferable to the other.
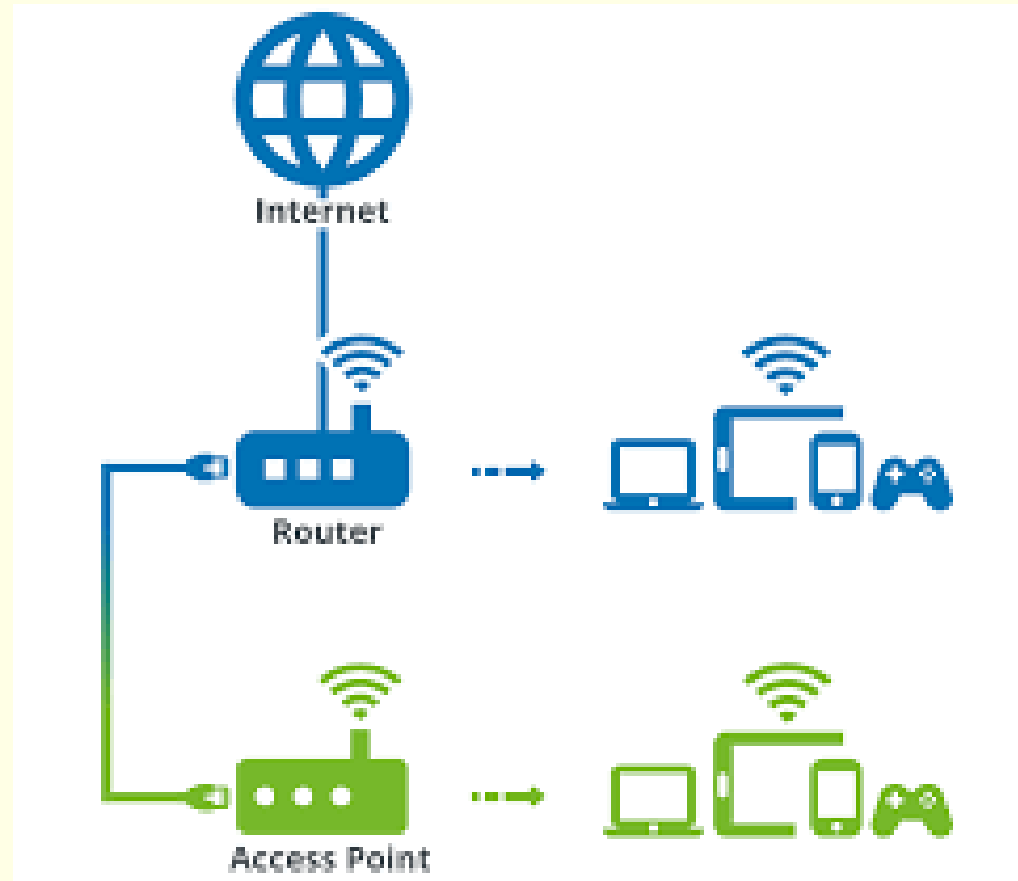
Wireless LAN (WLAN)

- Wi-Fi uses **radio waves** to **transmit** data to and from a **wireless access point**.
- A router distributes signals to the devices **(broadband router)**

What is a wireless access point?

Wireless access points (WAP) often used in larger offices or school which sends and receives wireless transmissions to and from the other devices.

The router will be connected (usually wired) to an internet access point in order to connect the WLAN to the internet.

The benefits of a wireless network include:

- ✓ Wireless devices can connect without a cable

- ✓ Wireless devices are not restricted to a specific location for network access

- ✓ mobile phones can be connected to Wi-Fi at home and using public hotspots which saves 4G data costs

- ✓ the bandwidth (data transfer rate) is big enough for Internet connectivity

- ✓ any device which conforms to the Wi-Fi standard can connect to any Wi-Fi network across the world if it has permission

- ✓ wireless networks are very easy to setup at home with no technical experience required

- ✓ wireless networks are relatively low cost to setup as very little cabling is required

- ✓ employees may be able to take their own device to work (BYOD – bring your own device)

Limitations

- bandwidth is usually lower than that available through wired networks, although it is usually higher than the bandwidth to the Internet and so for most applications this is not an issue (it would however slow down internal file transfers to/from wireless devices)

- obstacles such as walls and steel can interrupt wireless signals causing lots of lost data packets which reduces the overall bandwidth

- the range of Wi-Fi signals is limited, and so additional wireless access points are needed if a large area is to be covered

- wireless signals suffer from interference from electrical signals, microwaves and other wireless devices which causes lost data packets and reduces the overall bandwidth.

- if too many laptops or other devices are connected to a single wireless access point then bandwidth is shared, and transfer rates reduced

Performance of wired and wireless LANs

Range

Interference

Bandwidth

Flexibility

Ease and cost of installation

Security

Latency

Reliability

Bandwidth – the amount of data sent per second
Latency – Time taken for data to be sent

	Wired	Wireless
Installation	Laying cables is time-consuming	Only cables between wireless access points
Range	Transmit data over long distances	100 metres limit
Reliability	Delivers a consistent speed – less susceptible to interference.	Obstacles such as walls can interrupt wireless signals Wireless signals suffer from interference from electrical signals, microwaves and other wireless devices.
Bandwidth	Fast – up to 10 Gbps per connection	Slower – 3.2 Gbps but bandwidth is shared by all active wireless devices.
Latency Delay in network communication	Low	High
Security	Data can only be accessed by devices that are physically attached to that network, so it is not easy to intercept.	Less secure – date needs to be encrypted to prevent interception.
Flexibility	Additional cabling will be need to extend the network.	Very flexible. Anyone with a wireless enabled device can access the network and can move around

The best option

Most LANs are generally a combination of wired and wireless technologies.