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### Tutorial 5 / Network Architecture

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## Exercise 1

1. Why is the IEEE 802.11 wireless technology capable of transmitting over greater distances than Bluetooth technology?
  - It transmits at much lower frequencies
  - Its output power is higher
  - It transmits at much higher frequencies
  - It uses better encryption methods
2. What are the advantages (name three) of wireless technology compared to wired local area network technology?
  - Lower maintenance costs
  - Longer transmission distance
  - Ease of installation
  - Ease of development
  - Higher security level
  - Less expensive host adapters
3. In which scenario is wireless network security more important?
  - Your wireless mouse uses the IrDA port on your PC
  - The local café offers a wireless access point and provides free internet access
  - A real estate agent sends information about the sale of a house to a mobile phone
  - Two users create a peer-to-peer wireless network to share music
4. Which wireless technology standard offers the best compatibility with older wireless standards, but also provides the best performance?
  - 802.11a
  - 802.11b
  - 802.11g
  - 802.11n
5. What is the CSMA/CA method in a network?
  - An access method used by wireless technology to avoid duplicate SSIDs
  - An access method used by any technology with too many collisions
  - An access method used by wired Ethernet technology to avoid collisions
  - An access method used by wireless technology to avoid collisions
6. From the following list, match the statements that correspond to the *Ad Hoc mode* and those that correspond to the *Infrastructure mode*.
  - An access point controls who speaks and when

- Multiple wireless clients in a peer-to-peer network
  - STAs do not communicate directly with each other
  - Generally a less expensive network
  - Larger networks require this type of setup
  - Does not include an access point
7. From the following list, match the statements that correspond to a *wireless client*, those that correspond to an *access point*, and those that correspond to a *wireless bridge*.
- Allows long-distance point-to-point connections between networks.
  - Acts as a media converter
  - Is part of a wireless network as a host device
  - Connects two wired networks via a wireless link
  - Controls access between a wired network and a wireless network
  - Also called STA

## Exercise 2

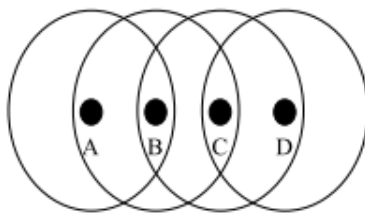


FIGURE 1 – Ad Hoc network

1. Describe the scenario in which A is a hidden terminal for C.
2. Now consider the following scenario : B transmits to A. C wants to transmit to D.
  - (a) Describe the scenario in detail.
  - (b) How could the encountered problem have been resolved ?

## Exercise 3

1. Why, in your opinion, is the RTS/CTS mechanism reserved only for networks where there is a large message exchange ?
2. In your opinion, what is/are the most important field(s) in the RTS/CTS structure, aside from the source MAC address and destination MAC address ?

## Exercise 4

1. Give the format of the CTS/RTS/ACK control packets.
2. Provide the transfer time in  $\mu$  seconds of these control packets in an 802.11g network (Consider the theoretical throughput).

3. The exposed terminal problem impacts packet latency. Why?
4. The hidden terminal problem has a dual impact, namely on energy and latency. Why?