Ve489 Computer Networks

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Homework Set 4

Due date: July 13, 2023

1. Answer following questions about random access protocols:
   1) What is the vulnerable period for Aloha? How about slotted Aloha? Explain it.
   2) What is vulnerable period of CSMA? How can we make sure the performance of CSMA is better than Aloha?
   3) Why collision detection (CD) can improve performance of CSMA?
2. Considering the CSMA/CA based DCF in IEEE 802.11, answer the following questions:
   1) What is virtual carrier sensing? Why is it helpful for IEEE 802.11 MAC?
   2) What does hidden node mean? How about exposed node?
   3) Why does DCF need DIFS and SIFS?
   4) What is collision avoidance in IEEE 802.11? What key mechanisms are needed?
3. Considering a WiFi network, if a station wants to send data from one BSS to another station in a different BSS, how data forwarding is carried out without relying on layer-3 routing functions?
4. PCF is a polling MAC function, while DCF is a random MAC function. Explain how PCF and DCF can work together in the same WiFi network?