



Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Spring Term 2014



ADVANCED COMPUTER NETWORKS

Assignment 2: Wireless Networks: Fundamentals

Assigned on: **6 March 2014**
Due by: **13 March 2014**

Question 1: Signal propagation

- a) What is path loss model for signal propagation?
- b) Why the log-normal shadowing model is more realistic compared to the pass loss model?
- c) What determines if a signal can be correctly decoded?
- d) Why the log-normal shadowing model is still not realistic enough?

Question 2:

Define what spread spectrum technique is. What are the main benefits of a spread spectrum system? How can spreading be achieved?

Question 3:

How does the spreading factor affect the bandwidth of the spread signal? Consider a Direct Sequence Spread Spectrum system that uses XOR, with the chipping sequence of 0110101, draw the spread spectrum signal that belongs to the data sequence 0110.

Question 4:

Paper reading: “The Design Philosophy of the DARPA Internet Protocols” [1].

- a) What was the top level goal for the DARPA Internet Architecture? Please describe the fundamental structure of the Internet this goal leads to.
- b) “Internet communication must continue despite loss of networks or gateways” is also a very important goal and this goal leads to the reliability fate-sharing approach. What alternative design could there be? what are the advantages of fate-sharing?

- c) Why the use of datagrams is an important architectural feature of the Internet? What is its drawback? What alternative building block could there be.

Question 5:

Paper reading: “End-to-End Arguments in System Design” [2].

- a) Please summarize the end-to-end argument;
- b) Please list some commonly used examples where the argument can be applied;
- c) Please list three examples where the end-to-end argument is diluted.

Hand In Instructions

This is a paper exercise. Please hand it in during the exercise session on the due date.

References

- [1] D. Clark. The design philosophy of the darpa internet protocols. *SIGCOMM Comput. Commun. Rev.*, 18(4):106–114, August 1988.
- [2] J. H. Saltzer, D. P. Reed, and D. D. Clark. End-to-end arguments in system design. *ACM Trans. Comput. Syst.*, 2(4):277–288, November 1984.