T-110.5111 Computer Networks II - Advanced Features

Exam 10.12.2014
No auxiliary material (books, notes, computers, etc.) allowed
Each question is worth 2 points
Keep your answers brief and to the point and justify your answers.
Duration 3h
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1. Explain briefly how Software Defined Networking differs from "traditional" networking.

2. Describe at least two technical aspects that differ when accessing the Internet through a cellular network (3G or LTE) or through a Wi-Fi network. Discuss also the reasons behind these differences.

3. How do Internet applications try to improve their quality of experience? Give two examples.

4. Describe at least two situations where bandwidth can be shared unfairly among Internet users. Explain also what causes the unfairness in these situations.

5. Describe the difference between electromagnetic backscattering and magnetic induction and how they are exploited for battery-less communications with smartphones.

6. Explain the fundamentals of the congestion control in the Internet, namely where it is done and how (no protocol details, just the main principles).

7. Discuss the major technical aspects (at least two) of IEEE 802.15.4 and compare them with those in IEEE 802.11 (Wi-Fi).

8. Describe one technique that a mobile app developer can apply in order to reduce the smartphone's energy consumption caused by wireless communication. Explain also why and when (if not always) that technique reduces the energy consumption.

9. Besides RTS/CTS, explain briefly the two main mechanisms that make it possible for many devices to communicate at the same time using the same 802.11 (WLAN) network. *Hint: Consider separately multiple client devices communicating with a single access point (AP) and multiple APs in the same geographical area.*

10. You are appointed as responsible for designing a datacenter network for the company you work for. Name and justify three factors that you consider to be the most important ones when making design decisions.