S-38.3610 Network Programming / Examination 8.4.2015

1. **Transport protocols and socket API**

   a) Describe the main socket types and related transport protocols used for Internet networking. How does the socket API differ between the socket types? (4 p)

   b) Which protocols and socket types did you use in your project. What APIs did you use and why? Discuss also what buffering strategies you used (especially if handling larger amounts of data). If you used some special communication libraries, describe how. (2 p)

2. **Portability across different system architectures**

   a) What aspects does a programmer need to take into consideration when implementing portable code intended to interact between different computer systems, particularly when transmitting binary data? (3 p)

   b) What kind of protocol did your project use for communication? Was it text-based or binary? Discuss the benefits and difficulties in message parsing and message composition in your protocol design. If given a second start, would you design the protocol somehow differently? (3 p)

3. **Name service and IPv4/IPv6 support at client and server side**

   a) Outline how to write a client application that supports both IPv4 and IPv6. How to write server application that supports both address families? (4 p)

   b) What kind of performance (or other) challenges could one face with an application that supports both IPv6 and IPv4? How did your project test IPv6 interoperability, and what kind of problems did you encounter (if any)? (2 p)

4. **Design strategies for parallel socket event processing**

   a) Consider a server that needs to maintain ongoing connections between multiple (varying number of) parallel clients such that all clients are served as soon as possible without significant delays. Describe a design for a single-threaded server running in one process. How would a multi-threaded or multi-process server be different? Compare the different alternatives, and their pros and cons. (3 p)

   b) How did your project work manage multiple parallel event sources, such as multiple clients, possible timers, or other sources or input? Describe the overall approach. (3 p)

5. **Describe your responsibilities and contributions in the software project**
   (not part of exam grading, but may affect as individual adjustment on project score)