

- 1) *Why* network protocols are defined and built in *layers*? (4points)
- 2) Consider an email system with a www-interface (web-mail) which keeps the emails at the server and is used through browser client. How it covers the *transparency goals of a distributed system*. Describe shortly how the system reflects each transparency goal of a distributed system. (7p)
- 3) What are the benefits and drawbacks of using *thin client* and *network computer* -architectures in implementation of a distributed system? (5p)
- 4) Define *logical time* and *logical clock*. Define a system of *totally ordered events* and describe how it can be achieved with logical clocks. Given an example of a need for total ordering of events in a distributed system. (8p)
- 5) Compare (benefits and drawbacks of) different *methods to delimit messages* (detect the end of each message) in connection oriented (e.g., TCP) protocols. (6p)