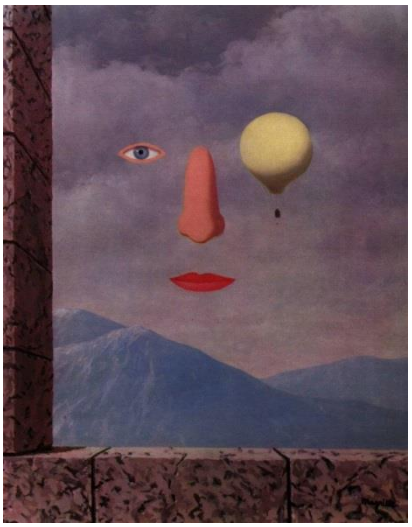
Network Algorithms

0510.7425



Administrative Information.

Lectures: Mondays 3-6, Kitot 001.
Lecturer: Boaz Patt-Shamir, boaz@tau.ac.il.
Prerequisite: Design & Analysis of Algorithms (510.6401), or equivalent.
Final exam: July 3.

Objective of the Course.

We will study algorithms that are run on a network of processors connected by communication links. The main questions that will guide us are the influence of locality and communication on the complexity and solvability of various tasks. The material will be explored from the theoretical perspective: the underlying system model is abstracted and simplified to enable us to state and prove rigorous assertions regarding the correctness and complexity of algorithms and tasks.

Topics. The course will include topics from the following list.

- Trees: construction and use
- Routing
- Independent sets, matching, coloring
- Logical and physical time: synchronizers
- Spanners and sparsifiers
- Datalink protocols
- Self-stabilization
- Buffer management

Requirements.

1. Homework will assigned every two weeks or so. The final grade will consist of 10% homework grades and 90% final exam.
2. In some lectures, one of the students will be assigned as a **scribe**. This means that the student will be responsible to taking careful notes and publishing them in electronic form. The idea is to help all students to have "standard" notes for the course. The student who takes notes is exempt from the current homework.

Bibliography.

1. Distributed Computing: A Locality-Sensitive Approach, D. Peleg. SIAM, 2000. Main textbook. (e-book available, see instructions.)
2. Distributed Algorithms, N. Lynch (L). Morgan Kaufmann, 1996. (e-book, instructions.)
3. Distributed Computing (Second Edition), H. Attiya and J. Welch (AW). Wiley InterScience, 2004. (e-book, instructions.)
4. Principles of Distributed Computing, Roger Wattenhofer. Lecture notes, 2016. Available via moodle.

Course material. All material will be placed on the course moodle site.