CS556: Distributed Systems

Spring 2012 – Panagiota Fatourou

Student Presentations

Presentation Proposal Deadline: March 2, 2012

Announcement of Presentations Schedule until: March 5, 2012

Papers

1. K. Mani Chandy and Leslie Lamport, "Distributed Snapshots: Determining global states of distributed systems", *ACM Transacitons on Computer Systems*, 3(1): 63-75, February 1985.
2. M. Choy and A. K. Singh, "Efficient fault-tolerant algorithms for resource allocation in distributed systems", *Proceedings of the 24th Annual ACM symposium on Theory of Computing*, pp. 593-602, Victoria, British Columbia, Canada, May 1992.
3. K. M. Chandy and J. Misra, "The Drinking Philosophers Problem", *ACM Transactions on Programming Languages and Systems*, 6(4): 632-646, October 1984.
4. Kung and Robinson, "On optimistic Methods for Concurrency Control", *ACM Transactions on Database Systems*, Vol. 6, No. 2, pp. 213-226, 1981.
5. Gabriel Bracha and Sam Toueg, "Distributed Deadlock Detection", *Distributed Computing*, 2(3): 127-138, December 1987.
6. S. Kutten, D. Peleg, and U. Vishkin, "Deterministic Resource Discovery in Distributed Networks", Proceedings of the13th ACM Symposium on Parallel Algorithms and Architectures (SPAA'01), pp. 77-83, Crete Island, Greece, July 2001.
7. L. Lamport, "Time, clocks and the ordering of events in a distributed system", *Communication of the ACM*, Vol. 21, No. 7, pp. 558-565, 1978.
8. Hagit Attiya, Amotz Bar-Noy, and Danny Dolev, "Sharing memory robustly in message-passing systems", *Journal of the ACM*, 42(1): 124-142, January 1995.
9. Baruch Awerbuch, "Complexity of network synchronization", *Journal of the ACM*, 32(4):804-823, October 1985.
10. Tushar Deepak Chandra, Vassos Hadzilacos, and Sam Toueg, "Unreliable Failure Detectors for reliable distributed systems", *Journal of the ACM*, 43(2), pp. 374-382, March 1996 (selective reading).
11. Maurice Herlihy, "A quorum-consensus replication method for abstract data types", ACM Transactions on Computer Systems, 4(1): 32-53, February 1986.
12. H. Attiya, A. Bar-Noy, D. Dolev, D. Koller, D. Peleg, and R. Reischuk, "Renaming in an asynchronous environment", *Journal of the ACM*, 37(3): 524-548, July 1990.

13. H. Garcia-Molina and A. Spauster, "Ordered and Reliable Multicast communication", *ACM Transactions on Computer Systems (TOCS)*, 9(3): 242-271, August 1991.
14. J. Chang and N. Maxemchuck, "Reliable Broadcast Protocols", *ACM Transactions on Computer Systems*, Vol. 2, No. 3, pp. 251-275, 1984.
15. K Birman and T. Joseph, "Reliable Communication in the presence of failures", *ACM Transactions on Computer Systems (TOCS)*, 5(1): 47-76, 1987.
16. A. Bar-Noy, D. Dolve, C. Dwork, and H. Raymond Strong, "Shifting gears: Changing algorithms on the fly to expedite byzantine agreement", *Information and Computation*, 97(2): 205-233, April 1992.
17. L. Lamport, "The part-time parliament problem", *ACM Transactions on Computer Systems*, Vol. 16, No. 2, pp. 133-169, 1998.
18. Mordechai Ben-Ari, "Algorithms for on-the-fly garbage collection", ACM *Transactions on Programming Languages and Systems (TOPLAS)*, pp.333,-344, Volume 6 Issue 3, July 1984.
19. E. J. H. Chang, "Echo Algorithms: Depth Parallel Operations on General Graphs", IEEE Transactions on Software Engineering, pp. 391-401, Vol. Se-8, No. 4, July 1982.
20. Paola Flocchini, Matthew Kellett, Peter C. Mason, Nicola Santoro, "Map construction and exploration by mobile agents scattered in a dangerous network", IPDPS 2009: 1-10.
21. Stefan Dobrev, Paola Flocchini, Rastislav Kralovic, and Nicola Santoro, "Exploring an Unknown Graph to Locate a Black Hole Using Tokens", IFIP TCS 2006: 131-150

Paper Understanding

Each student should deeply understand the material presented in the paper s/he has undertaken. Most specifically, each student should:

- know the algorithms and the techniques presented in the paper;
- be able to answer to questions of the style «Why is each line of the code useful in the algorithms s/he will present and what could go wrong if any line was removed»;
- invest time on the algorithm s/he studies, devise his/her own bad scenarios of execution and understand how the algorithms cope with these scenarios;
- study/devise a big number of examples to deeply understand how the algorithms work; each student should include such examples in his/her presentation (and it is these examples that give a concrete idea of how deeply the student has understood the technical part of the paper);
- invest some time to understand the high level idea of the analysis of the algorithms included in the paper;

Each student should be able to present an intuitive description of the algorithms, their correctness and their complexity.

Presentation

Each presentation should last for 35 minutes (another 25 minutes will be allocated to questions and discussion). Each student should ensure that his/her presentation will not require more than 25 minutes (marking will be performed based on the material that each student will manage to cover in the first 35 minutes of his/her). Roughly speaking, each presentation should have the following form:

1. Description of the problem.
2. Brief description of the results.
3. Description of new algorithms (this description should be first highly intuitive and only when the speaker is sure that the audience has understood the main ideas of the algorithms, s/he can provide more technical details).
4. A lot of examples to prove that the student has achieved a good level of understanding of the algorithms.
5. Bad/difficult scenarios with which the algorithms should cope.
6. Why are all the components of an algorithm necessary? (e.g., why are all the line codes needed?, etc.)? The students may choose to answer these questions either by using examples or by providing sufficient explanation.
7. Intuitive (high-level) description of the analysis of the algorithm.
8. Conclusions– Open Problems

In a presentation, brief phrases (and not big sentences) are used. Moreover, a lot of figures and examples must be provided. In each slide, the material should be explained in a detailed way.

Each student must initiate a discussion on the topic that s/he presents. The marking will take into consideration whether this goal is accomplished. The marking will also be based on whether (and in what degree) the audience has understood the presented material.

The instructor and the other students are allowed to make questions. The time schedule should be respected despite this (so, each student should take into consideration any discussion and question that may arise during the presentation when it makes the time schedule of it).