Massachusetts Institute of Technology — Handout 2
6.895: Advanced Distributed Algorithms
Prof. Nancy Lynch — September 5, 2002

Reading List, Version 1.0

1 Shared memory, known and unknown sets of participants

1.1 Mutual exclusion

[1] Leslie Lamport. A fast mutual exclusion algorithm. *ACM Transactions on Computer Systems*, 5(1):1-11, February 1987. Also appeared as SRC Research Report 7.

[2] Stuart A. Friedberg, Gary L. Peterson. An efficient solution to the mutual exclusion problem using weak semaphores. *Information Processing Letters* 25(5):343-348, 1987.

1.2 Renaming

[1] M. Moir and J. Anderson. Wait-free algorithms for fast, long-lived renaming. *Science of Computer Programming*, 25(1):1-39, October 1995.

[2] H. Attiya and A. Fouren, Adaptive and efficient algorithms for lattice agreement and renaming. *SIAM Journal on Computing*, 31(2):642-664, 2001. Preliminary version in *PODC98*.

[3] H. Attiya and A. Fouren, Polynomial and adaptive long-lived (2k-1)-renaming. In *Proceedings of the 14th International Symposium on Distributed Computing (DISC 2000)*, Toledo, Spain, October 2000. (Best student paper).

1.3 Snapshot and collect

[1] Yehuda Afek, Gideon Stupp, Dan Touitou. Long-lived and adaptive collect with applications. In *Proceedings of the 40th IEEE Annual Symposium on Foundations of Computer Science (FOCS)*, New York City, NY, pages 262-272, October 1999.

[2] H. Attiya, A. Fouren and E. Gafni. An adaptive collect algorithm with applications. To appear in *Distributed Computing*.

1.4 Miscellaneous problems

[1] M. Merritt and G. Taubenfeld. Computing with infinitely many processes. In *Proceedings of the 14th International Symposium on Distributed Computing (DISC 2000)*, Toledo, Spain, October 2000.

[2] Eli Gafni, Michael Merritt, and Gadi Taubenfeld. The concurrency hierarchy, and algorithms for unbounded concurrency. In *20th Symposium on Principles of Distributed Computing (PODC 2001)*, pages 170–179, Newport, RI, August 2001.

1.5 Computing with faulty objects

[1] Yehuda Afek, David Greenberg, Michael Merritt, and Gadi Taubenfeld. Computing with faulty shared objects. *Journal of the ACM*, 42(6):1231–1274, November 1995.

[2] Prasad Jayanti, Tushar Deepak Chandra, and Sam Toueg. Fault-tolerant wait-free shared objects. *Journal of the ACM*, 45(3):451–500, May 1998.

2 Client-server computing, known and unknown sets of participants

2.1 Quorum systems

[1] Dahlia Malkhi and Michael Reiter. Byzantine quorum systems. *Distributed Computing*, 11(4):203–213, 1998.

[2] Dahlia Malkhi, Michael Reiter, and Rebecca Wright. Probabilistic quorum systems. In *Proceedings of the 16th Annual ACM Symposium on the Principles of Distributed Computing (PODC 97)*, pages 267–273, Santa Barbara, CA, August 1997.

[3] Dahlia Malkhi and Michael Reiter. Secure and scalable replication in Phalanx. In *17th IEEE Symposium on Reliable Distributed Systems (SRDS98)*, pages 51–60, West Lafayette, Indiana, October 1998.

[4] Lorenzo Alvisi, Dahlia Malkhi, Evelyn Pierce, Michael Reiter, and Rebecca Wright. Dynamic Byzantine quorum systems. In *International Conference on Dependable Systems and Networks (DSN, FTCS-30 and DCCA-8)*, New York, 2000.

2.2 Consensus

[1] Eli Gafni and Leslie Lamport. Disk Paxos. To appear in *Distributed Computing*. Also appeared as SRC Research Report 163 (July, 2000).

[2] G. Chockler and D. Malkhi. Active disk Paxos with infinitely many processes. In *Proceedings of the Twenty-First ACM Symposium on Principles of Distributed Computing (PODC 2002)*, Monterey, CA, July 2002.

2.3 Data replication

[1] Miguel Castro and Barbara Liskov. Practical Byzantine fault tolerance. In *Proceedings of the Third Symposium on Operating Systems Design and Implementation*, pages 173–186, New Orleans, Louisiana, USA, February 1999. USENIX Association. Also, Technical Report MIT-LCS-TR-817, MIT Laboratory for Computer Science, Cambridge, MA, January 2001. PhD Thesis.

[2] Rodrigo Rodrigues, Miguel Castro, and Barbara Liskov. BASE: Using abstraction to improve fault tolerance. In *Proceedings of the 18th ACM Symposium on Operating Systems Principles (SOSP)*, Banff, Canada, October 2001.

3 Networks, known set of participants

3.1 Logical time and clock synchronization

[1] Friedemann Mattern. Virtual time and global states of distributed systems. In Michel Cosnard et al., editors, *Parallel and Distributed Algorithms: Proceedings of the International Workshop on Parallel and Distributed Algorithms* (Chateau de Bonas, Gers, France, October, 1988), pages 215–226. North Holland, 1989.

[2] Colin Fidge. Logical time in distributed computing systems. *IEEE Computer*, 24(8):28–33, August 1991.

[3] R. Schwarz and F. Mattern. Detecting causal relationships in distributed computations: In search of the holy grail. *Distributed computing*, 7(3):149-174, 1994.

[4] Leslie Lamport and P. M. Melliar-Smith. Synchronizing clocks in the presence of faults. *Journal of the ACM*, 32(1):52–78, January 1985.

[5] Jennifer Lundelius and Nancy Lynch. An upper and lower bound for clock synchronization. *Information and Control*, 62(2-3):190–204, August/September 1984.

[6] Danny Dolev, Joseph Y. Halpern, H. Raymond Strong. On the possibility and impossibility of achieving clock synchronization. *Journal of Computer and System Sciences*, 32(2): 230-250, 1986.

[7] Michael J. Fischer and Nancy A. Lynch and Michael Merritt. Easy impossibility proofs for distributed consensus problems. *Distributed Computing*, 1(1):26-39, January 1986.

[8] T. K. Srikanth and Sam Toueg. Optimal clock synchronization. *Journal of the ACM*, 34(3):626–645, July 1987.

[9] Jennifer Lundelius Welch and Nancy A. Lynch. A new fault-tolerance algorithm for clock synchronization. *Information and Computation*, 77(1):1-36, April 1988.

[10] Danny Dolev, Joseph Y. Halpern, Barbara Simons, H. Raymond Strong. Dynamic fault-tolerant clock synchronization. *Journal of the ACM* 42(1): 143-185, 1995.

[11] Hagit Attiya and Jennifer Welch. Distributed Computing: Fundamentals, Simulations and Advanced Topics. Chapters 6 and 13. McGraw-Hill Publishing Company, UK, 1998.

[12] S. Biaz and J. L. Welch. Closed form bounds for clock synchronization under simple uncertainty assumptions. *Information Processing Letters.* To appear.

3.2 Failure detectors

[1] Tushar Deepak Chandra and Sam Toueg. Unreliable failure detectors for reliable distributed systems. *Journal of the ACM*, 43(2):225–267, March 1996.

[2] Tushar Deepak Chandra, Vassos Hadzilacos, and Sam Toueg. The weakest failure detector for solving consensus. *Journal of the ACM*, 43(4):685–722, July 1996.

[3] Eli Gafni. A round-by-round failure detector - unifying synchrony and asynchrony. In *Proceedings of the 17th Annual ACM Symposium on Principles of Distributed Computing*, pages 143–152, Puerto Vallarta, Mexico, June 1998.

[4] M. Aguilera, W. Chen, and S. Toueg. Using the heartbeat failure detector for quiescent reliable communication and consensus in partitionable networks. *Theoretical Computer Science*, 220(1):3-30, June 1999. (Special issue on Distributed Algorithms)

[5] Wei Chen, Sam Toueg, and Marcos Kawazoe Aguilera. On the quality of service of failure detectors. In *International Conference on Dependable Systems and Networks (DSN)*, New York, NY, June 2000. Technical report in preparation.

[6] R. Guerraoui. Indulgent algorithms. In *Proceedings of the 19th Annual ACM Symposium on Principles of Distributed Computing (PODC'00)*, Portland, Oregon, pages 289-298, July 2000. Technical Report SSC-2000-007, Swiss Federal institute of Technology, Lausanne, 2000.

[7] J. M. Hélary, M. Hurfin, A. Mostefaoui, M. Raynal, and F. Tronel. Computing global functions on asynchronous distributed systems with perfect failure detectors. *IEEE Transactions on Parallel and Distributed Systems*, 11(9):897-909, September 2000.

[8] Marcos Kawazoe Aguilera and Wei Chen and Sam Toueg. Failure detection and consensus in the crash-recovery model. To appear in *Distributed Computing.*

[9] Marcos Kawazoe Aguilera, Wei Chen, and Sam Toueg. On quiescent reliable communication. To appear in the *SIAM Journal on Computing*.

[10] Indranil Gupta, Tushar D. Chandra, and German Goldszmidt. On scalable and efficient distributed failure detectors. In *20th Symposium on Principles of Distributed Computing (PODC 2001)*, pages 170–179, Newport, RI, August 2001.

3.3 Fault-tolerant broadcasts

[1] Vassos Hadzilacos and Sam Toueg. Fault-tolerant broadcasts and related problems. In Sape Mullender, editor, *Distributed Systems*, chapter 5, pages 97–145. ACM Press and Addison-Wesley, 1993. Second Edition.

[2] V. Hadzilacos and S. Toueg. A modular approach to the specification and implementation of fault-tolerant broadcasts. Technical Report TR94-1425, Department of Computer Science, Cornell University, Ithaca NY, May 1994.

[3] Achour Mostefaoui and Michel Raynal. Solving consensus using Chandra-Toueg's unreliable failure detectors: a general quorum-based approach. IRISA Publication number 1254, July 1999.

[4] Marcos Kawazoe Aguilera and Sam Toueg. A simple bivalency proof t resilient consensus requires $t+1$ rounds. *Information Processing Letters*, 71(3-4):155-158, August 1999.

[5] Kenneth Birman, Mark Hayden, Oznur Ozkasap, Zhen Xiao, Mihai Budiu, and Yaron Minsky. Bimodal multicast. *ACM Transactions on Computer Systems*, 17(2):41-88, May 1999.

3.4 Consensus

[1] L. Lamport. The part-time parliament. *ACM Transactions on Computer Systems*, 16(2):133–169, May 1998. Also Research Report 49, Digital Equipment Corporation Systems Research Center, Palo Alto, CA, September 1989.

[2] Leslie Lamport. Paxos made simple. *ACM SIGACT NEWS (Distributed Computing Column)*, 32(4):18–25, December 2001.

[3] R. Boichat, P. Dutta, S. Frolund, and R. Guerraoui. Deconstructing Paxos. Submitted for publication. Also, Technical Report, Distributed Programming Laboratory, Swiss Federal Institute of Technology, Lausanne, January 2001.

[4] Roberto De Prisco, Alex Shvartsman, Nicole Immorlica, and Toh Ne Win. A formal treatment of Lamport's Paxos algorithm. In prorgress, 2002.

[5] R. Guerraoui. Revisiting the relationship between non-blocking atomic commitment and consensus. In Jean-Michel Hélary and Michel Raynal, editors, *9th International Workshop on Distributed Algorithms (WDAG)*, volume 972 of *Lecture Notes in Computer Science*, pages 87–100. Springer Verlag, September 1995.

[6] A. Schiper. Early consensus in an asynchronous system with a weak failure detector. *Distributed Computing*, 10(3):149-157, 1997.

[7] Michael Hurfin and Michel Raynal. A simple and fast asynchronous consensus protocol based on a weak failure detector. *Distributed Computing*, 12(4):409-223, 1999.

[8] R. Guerraoui and A. Schiper. The generic consensus service. *IEEE Transactions on Software Engineering*, 2000. Technical Report 98/282, cole Polytechnique Fdrale de Lausanne, Switzerland, July 1998.

[9] Idit Keidar and Sergio Rajsbaum. On the cost of fault-tolerant consensus when there are no faults -a tutorial. Technical Report MIT-LCS-TR-821, May 2001. Preliminary version in *SIGACT News*, 32(2):45-63, Distributed Computing column, June 2001 (published in May 15th). Also, PODC tutorial slides.

[10] Achour Mostefaoui, Sergio Rajsbaum, Michel Raynal, and Matthieu Roy. A hierarchy of conditions for consensus solvability. In Nir Shavit, editor, *Proceedings of the Twentieth ACM Symposium on Principles of Distributed Computing*, pages 151–160, Newport, Rhode Island, August 2001.

[11] A. Mostefauoi and M. Raynal. Leader-based consensus. *Parallel Processing Letters*, 11(1):95–107, 2001.

[12] Partha Dutta and Rachid Guerraoui. The inherent price of indulgence. In *Proceedings of the Twenty-First ACM Symposium on Principles of Distributed Computing (PODC 2002)*, Monterey, CA, July 2002. IC Technical Report ID: 200231, LPD Distributed Programming Laboratory, Swiss Federal Institute of Technology in Lausanne, 2002.

3.5 Data Replication and Data Consistency

[1] F. B. Schneider. Implementing fault tolerant services using the state machine approach: A tutorial. *ACM Computing Surveys*, 22(4):299–319, December 1990.

[2] H. Attiya and J. L. Welch. Sequential consistency versus linearizability. *ACM Transactions on Computer Systems*, 12(1):91–122, May 1994. An earlier version appeared in *Proc. 3rd ACM Symposium on Parallel Algorithms and Architectures*, pages 304-315, Hilton Head, South Carolina, July 1991.

[3] Rivka Ladin, Barbara Liskov, Liuba Shrira, and Sanjay Ghemawat. Providing high availability using lazy replication. *ACM Transactions on Computer Systems*, 10(4):360–391, 1992.

[4] Alan Fekete, David Gupta, Victor Luchangco, Nancy Lynch, and Alex Shvartsman. Eventually-serializable data service. *Theoretical Computer Science*, 220(1):113–156, June 1999. Special Issue on Distributed Algorithms.

[5] S. Frolund and R. Guerraoui. X-Ability: a theory of replication. *Distributed Computing*, 14(4), 2001. An extension of our *PODC'00 ACM Symposium on Principles of Distributed Computing* paper, July 2000. IC Technical Report ID: 200009, LPD Distributed Programming Laboratory, wiss Federal Institute of Technology in Lausanne, January 2000.

3.6 Performing work in distributed systems

[1] C. Dwork, J. Halpern, and O. Waarts. Performing work efficiently in the presence of faults. *SIAM J. on Computing*, Vol. 27 , **series 5**, pages 1457–1491, 1998.

[2] B. S. Chlebus, R. De Prisco, and A. A. Shvartsman. Performing tasks on restartable message-passing processors. *Distributed Computing*, Vol. 14 **1**, pages 49-64, 2001.

[3] C. Georgiou and A. Shvartsman. Cooperative computing with fragmentable and mergeable groups. In *Proceedings of the 7th International Colloquium on Structural Information and Communication Complexity*, pages 141–156, 2000. Also, Accepted for publication in *J. of Discrete Alg-s.*

[4] G. G. Malewicz, A. Russell, and A. A. Shvartsman. Distributed cooperation in the absence of communication. In *Proceedings of the 14th International Conference on Distributed Computing, DISC*, Toledo, Spain, pages 119-133, 2000.

[5] C. Georgiou, A. Russell, and A.A. Shvartsman. The complexity of synchronous iterative do-all with crashes. *Distributed algorithms (DISC 2001)*, in volume 2180 of *Lecture Notes in Computer Science*, pages 151-165, 2001.

3.7 Self-stabilizing systems

[1] Edsger W. Dijkstra. Self-stabilizing systems in spite of distributed control. *Communication of the ACM*, 17(11):643–644, November 1974.

[2] A. Arora and M. Gouda. Distributed reset. *IEEE Transactions on Computers*, 43(9):1026–1038, 1994.

[3] A. Arora and S. Kulkarni. Designing masking fault-tolerance via nonmasking fault-tolerance. *IEEE Transactions on Software Engineering*, 24(6):435–450, 1998.

[4] A. Arora and A. Singhai. Fault-tolerant reconfiguration of trees and rings in distributed systems. *Journal of High Integrity Systems*, 1(4):375c–384, 1995.

[5] A. Arora and S. Kulkarni. Detectors and correctors: a theory of fault-tolerance components. In *Proceedings of the 18th International Conference on Distributed Computing Systems*, 1998.

[6] George Varghese and Mahesh Jayaram. The fault span of crash failures. *Journal of the ACM*, 47(2):244-293, March, 2000.

[7] Baruch Awerbuch, Boaz Patt-Shamir, and George Varghese. Self-stabilization by local checking and correction. Submitted for publication. Based on *FOCS 91* paper and Ph.D. thesis.

[8] George Varghese Lecture 23: Self-Stabilization. Lecture notes from 6.852, *Distributed Algorithms*, Massachusetts Institute of Technology, Cambridge, MA, December 1992.

[9] Baruch Awerbuch, Boaz Patt-Shamir, George Varghese, and Shlomi Dolev. Self-stabilization by local checking and network reset. *Proceedings of the 8th International Workshop on Distributed Algorithms, WDAG'94*, Terschelling, The Netherlands, pages 326-339. October 1994.

[10] George Varghese. Self-stabilization by counter flushing. *SIAM Journal on Computing*, 30(2):486-510, 2000. Society for Industrial and Applied Mathematics.

[11] Adam M. Costello and George Varghese. Self-stabilization by window washing. *Proceedings of the 15th Annual ACM Symposium on Principles of Distributed Computing (PODC '96)*, Philadelphia, Pa., USA, pages 35-44, May 1996.

[12] George Varghese. Dijkstra's protocols as examples of local checking and counter flushing. Manuscript, July 11, 1994.
URL `http://www-cse.ucsd.edu/users/Varghese/PAPERS/dijk.ps.Z`

[13] Shlomi Dolev. *Self-Stabilization*. MIT Press, 2000.

[14] Mohamed G. Gouda. Multiphase stabilization. *IEEE Transactions on Software Engineering*, 28(2):201-208, February 2002.

4 Networks, unknown set of participants

4.1 End-to-end communication and routing

[1] E.M. Gafni and D.P. Bertsekas. Distributed algorithms for generating loop-free routes in networks with frequently changing topology. *IEEE Transactions on Communications*, 29(1):11–18, January 1981.

[2] Y. Afek, B. Awerbuch, E. Gafni, Y. Mansour, A. Rosen, and N. Shavit. Slide: The key to polynomial end-to-end communication. *Journal of Algorithms*, 22:158–186, January 1997.

[3] Costas Busch, Maurice Herlihy, and Roger Wattenhofer. Routing without flow control. In the *Proceedings of the Thirteenth ACM Symposium on Parallel Algorithms and Architectures (SPAA)*, Crete Island, Greece, July 2001.

4.2 Building and maintaining communication structures

[1] B. Awerbuch and D. Peleg. Sparse partitions. In *In 31st Annual IEEE Symposium on Foundations of Computer Science*, pages 503–513, 1990.

[2] David Peleg. *Distributed Computing: A Locality-Sensitive Approach.* SIAM Monographs on Discrete Mathematics and Applications, 2000.

[3] B. Awerbuch and D. Peleg. Online tracking of mobile users. *Journal of the ACM*, 42(5):1021–1058, 1995.

[4] D. Peleg and V. Rubinovich, A near-tight lower bound on the time complexity of distributed MST construction, *SIAM J. on Computing*, 30(5):1427–1442, 2000.

[5] Zvi Lotker, Boaz Patt-Shamir, David Peleg. Distributed MST for constant diameter graphs. In *Proceedings of the 20th ACM Symposium on Principles of Distributed Computing (PODC 2001)*, Newport, RI, pages 63-71, August 2001.

[6] Subhendu Chattopadhyay, Lisa Higham, and Karen Seyffarth. Dynamic and self-stabilizing distributed matching. In *Twenty-First ACM Symposium on Principles of Distributed Computing (PODC 2002)*, Monterey, CA, July 2002. Technical report in progress. (long-version)

[7] B. Englert, L. Rudolph, and A.A. Shvartsman. Developing and refining an adaptive token-passing strategy. In *Proceedings of the 21st IEEE International Conference on Distributed Computer Systems (ICDCS-21)*, Phoenix, Arizona, April 2001.

4.3 Group communication

[1] K. Birman and T. Joseph. Exploiting virtual synchrony in distributed systems. *Proceedings of the 11th ACM Symposium on Operating Systems Principles (SOSP)*, pages 123-138, November 1987.

[2] Flaviu Cristian and Frank Schmuck. Agreeing on processor group membership in asynchronous distributed systems. Technical Report CSE95-428, University of California-San Diego, La Jolla, CA 92093-0114, 1995.

[3] I. Keidar and D. Dolev. Efficient message ordering in dynamic networks. In *15th ACM Symposium on Principles of Distributed Computing (PODC)*, Philadelphia, PA, pages 68–76, May 1996.

[4] Idit Keidar and Danny Dolev. Totally ordered broadcast in the face of network partitions. *exploiting group communication for replication in partitionable networks.* In D. Avresky, editor, *Chapter 3 of Dependable Network Computing*, pages 51-75, Kluwer Academic, 2000.

[5] D. Dolev and D. Malki. The Transis approach to high availability cluster communications. *Communications of the ACM*, 39(4):64–70, 1996.

[6] Y. Amir, G. V. Chockler, D. Dolev, and R. Vitenberg. Efficient state transfer in partitionable environments. In *2nd European Research Seminar on Advances in Distributed Systems (ERSADS'97)*, pages 183–192. BROADCAST (ESPRIT WG 22455), Operating Systems Laboratory, Swiss Federal Institute of Technology, Lausanne, March 1997.

[7] Alan Fekete, Nancy Lynch, and Alex Shvartsman. Specifying and using a partitionable group communication service. *ACM Transactions on Computer Systems*, 19(2):171–216, May 2001.

[8] Gregory Chockler, Idit Keidar, and Roman Vitenberg. Group communication specifications: A comprehensive study. *ACM Computing Surveys*, 33(4):1–43, December 2001. Previous version: MIT Technical Report MIT-LCS-TR-790, September 1999.

[9] E. Yeger Lotem, I. Keidar, and Dolev, D. Dynamic voting for consistent primary components. In *Proceedings of the Sixteenth Annual ACM Symposium on Principles of Distributed Computing*, pages 63–71, Santa Barbara, CA, August 1997.

[10] R. De Prisco, A. Fekete, N. Lynch, and A. Shvartsman. A dynamic view-oriented group communication service. In *17th ACM Symposium on Principles of Distributed Computing (PODC)*, pages 227–236, June 1998.

[11] R. De Prisco, A. Fekete, N. Lynch, and A.A. Shvartsman. A dynamic primary configuration group communication service. In Prasad Jayanti, editor, *Distributed Computing (Proceedings of DISC'99 - 13th International Symposium on Distributed Computing, Bratislava, Slovak Republic, September 1999)*, volume 1693 of *Lecture Notes in Computer Science*, pages 64–78, Bratislava, Slovak Republic, 1999. Springer-Verlag-Heidelberg.

[12] Dolev, S., Segala, R., Shvartsman, A.: Dynamic load balancing with group communication. In *Proceedings of the 6th International Colloquium on Structural Information and Communication Complexity (1999)*, pages 111-125. (Accepted for publication in TCS.)

[13] I. Keidar, J. Sussman, K. Marzullo, and D. Dolev. A client-server oriented algorithm for virtually synchronous group membership in WANs. In *20th International Conference on Distributed Computing Systems (ICDCS)*, pages 356–365, Taipei, Taiwan, April 2000. Full version: MIT Technical Memorandum MIT-LCS-TM-593.

[14] Bettina Kemme, Alberto Bartoli, and Ozalp Babaoglu. Online reconfiguration in replicated databases based on group communication. In *Proceedings of the Int. Conf. on Dependable Systems and Networks (DSN 2001)*, Goteborg, Sweden, June 2001.

4.4 Broadcast communication

[1] Ziv Bar-Joseph, Idit Keidar, Tal Anker, and Nancy Lynch. QoS preserving totally ordered multicast. In *5th International Conference On Principles Of Distributed Systems (OPODIS)*, pages 143–162, Paris, France, December 2000.

[2] Ziv Bar-Joseph, Idit Keidar, and Nancy Lynch. Early-delivery dynamic atomic broadcast. In *Proceedings of the 16th International Symposium on DIStributed Computing (DISC)*, Toulouse, France, October 2002. To appear.

4.5 Location services

[1] D. Karger, E. Lehman, T. Leighton, M. Levine, D. Lewin, and R. Panigraphy. Consistent hashing and random trees: distributed caching protocols for relieving hot spots on the world wide web. In *Proceedings of the Twenty-Ninth Annual ACM Symposium on Theory of Computing (STOC)*, El Paso, Texas, May 4-6, 1997.

[2] C. Greg Plaxton, Rajmohan Rajaraman, and Andrea W. Richa. Accessing nearby copies of replicated objects in a distributed environment. *Theory of Computing Systems*, 32:241-280, 1999. A preliminary version of this paper appeared in *Proceedings of Parallel Algorithms and Architectures (SPAA)*, pages 311-320, June 1997.

[3] David R. Karger and Matthias Ruhl. Finding nearest neighbors in growth restricted metrics. In *Proceedings of the 34th ACM Symposium on Theory of Computing*, Montreal, Canada, May 2002.

[4] Ben Y. Zhao, John D. Kubiatowicz, and Anthony Joseph. Tapestry: an infrastructure for fault-tolerant wide-area location and routing. Technical Report UCB/CSD-01-1141, Univerisity of California Berkeley, CA 94720, April 2001.

[5] Kirsten Hildrum, John Kubiatowicz, Satish Rao, and Ben Y. Zhao. Distributed object location in a dynamic network. In *Proceedings of the Fourteenth ACM Symposium on Parallel Algorithms and Architectures (SPAA 2002)*, Winnipeg, Manitoba, Canada, August 2002.

[6] Ion Stoica, Robert Morris, David Karger, M. Frans Kaashoek, and Hari Balakrishnan. Chord: A scalable peer-to-peer lookup service for internet applications. To appear in *IEEE/ACM Transactions on Networking*. Also, in *Proceedings of the ACM SIGCOMM '01 Conference*, San Diego, California, August 2001.

[7] David Liben-Nowell, Hari Balakrishnan, and David Karger. Analysis of the evolution of peer-to-peer systems. In *Proceedings of the 21st ACM Symposium on Principles of Distributed Computing (PODC 2002)*, Monterey, CA, July 2002.

[8] Frank Dabek, M. Frans Kaashoek, David Karger, Robert Morris, and Ion Stoica. Wide-area cooperative storage with CFS. In *Proceedings of the 18th ACM Symposium on Operating Systems Principles (SOSP '01)*, Chateau Lake Louise, Banff, Canada. October 2001.

[9] Frank Dabek, Emma Brunskill, M. Frans Kaashoek, David Karger, Robert Morris, Ion Stoica, and Hari Balakrishnan. Building peer-to-peer systems with Chord, a distributed lookup service. In *Proceedings of the 8th Workshop on Hot Topics in Operating Systems (HotOS-VIII)*, Schloss Elmau, Germany, May 2001.

[10] Silvia Ratnasamy, Paul Francis, Mark Handley, Richard Karp, and Scott Shenker. A scalable content-addressable network. In *Proceedings of the ACM SIGCOMM' 01 Conference*, San Diego, CA, pages 161-172, August 2001.

[11] A. Rowstron and P. Druschel. Pastry: scalable, distributed object location and routing for large-scale peer-to-peer systems. In *Proceedings of the IFIP/ACM International Conference on Distributed Systems Platforms (Middleware)*, Heidelberg, Germany, pages 329-350, November 2001.

[12] D. Malkhi, M. Naor, and David Ratajczak. Viceroy: A scalable and dynamic emulation of the Butterfly. In *Twenty-First ACM Symposium on Principles of Distributed Computing (PODC 2002)*, Monterey, CA, July 2002.

[13] David Mazires and Dennis Shasha. Building secure file systems out of Byzantine storage. In *Proceedings of the Twenty-First ACM Symposium on Principles of Distributed Computing (PODC 2002)*, July 2002.

[14] John R. Douceur. The Sybil attack. In *Proceedings for the 1st International Workshop on Peer-to-Peer Systems (IPTPS'02)*, MIT, Cambridge, March 2002.

[15] James Aspnes, Zo Diamadi, and Gauri Shah. Fault-tolerant routing in peer-to-peer systems. In *Proceedings of the Twenty-First ACM Symposium on Principles of Distributed Computing*, Monterey, CA, pages 223-232, July 2002. Also, longer version.

4.6 Data management

[1] Maurice Herlihy and Michael Demmer. The arrow distributed directory protocol. In *12th International Symposium on DIStributed Computing (DISC98)*, pages 119–133, Andros, Greece, September 1998.

[2] Maurice Herlihy, Srikanta Tirthapura, and Roger Wattenhofer. Competitive concurrent distributed queuing. In *Proceedings of the 20th Annual ACM Symposium on Principles of Distributed Computing (PODC 2001)*, Newport, RI, pages 127-133, August 2001.

[3] Nancy Lynch and Alex Shvartsman. RAMBO: A reconfigurable atomic memory service for dynamic networks. In *Proceedings of the 16th International Symposium on DIStributed Computing (DISC)*, Toulouse, France, October 2002.

5 Mobile Computing

5.1 Topology control

[1] L. Li, J. Halpern, V. Bahl, Y. M. Wang, and R. Wattenhofer. Analysis of a cone-based distributed topology control algorithm for wireless multi-hop networks. In *Twentieth ACM Symposium on Principles of Distributed Computing (PODC 2001)*, Newport, RI, August 2001.

[2] M. T. Hajiaghayi, M. Bahramgiri, and V. S. Mirrokni. Fault-tolerant and 3-dimensional distributed topology control algorithms in wireless multi-hop networks. *Proceedings of the 11th IEEE International Conference on Computer Communications and Networks (IC3N)*, October 14-16, 2002, Miami, Floria. To appear.

5.2 Location services

[1] Jinyang Li, John Jannotti, Douglas S. J. De Couto, David R. Karger, and Robert Morris. A scalable location service for geographic ad hoc routing. In *ACM Mobicom 2000*, Boston, MA, 2000.

5.3 End-to-end communication and routing

[1] David B. Johnson and David A. Maltz. Dynamic source routing in ad hoc wireless networks. In chapter 5 of Tomasz Imielinski and Hank Korth, editors, *Mobile Computing*, Kluwer Academic Publishers, 1996.

[2] Vincent D. Park and M. Scott Corson. A Highly adaptive distributed routing algorithm for mobile wireless networks. In *Proceedings of IEEE INFOCOM'97*, Kobe, Japan, April 1997.

[3] Charles E. Perkins and Elizabeth M. Royer. Ad hoc on-demand distance vector routing. In *Proceedings of the 2nd IEEE Workshop on Mobile Computing Systems and Applications*, New Orleans, LA, pages 90-100, February 1999.

[4] Young-Bae Ko and Nitin H. Vaidya. Location-aided routing (LAR) in mobile ad hoc networks. *ACM/Baltzer Wireless Networks (WINET)*, Vol.6-4, 2000.

[5] Young-Bae Ko and Nitin H. Vaidya. Geocasting in mobile ad-hoc netowrks: location-based multicast algorithms. In *Proceedings of the 2nd IEEE Workshop on Mobile Computer Systems and Applications, (WMCSA)*, New Orleans, LA, February 1999.

[6] Yih-Chun Hu and David B. Johnson. Caching strategies in on-demand routing protocols for wireless ad-hoc networks. In *Proceedings of the sixth Annual International Conference on Mobile Computing and Networking*, Boston, MA, pages 231-242, Aug. 2000.

[7] Brad Karp and H. T. Kung. GPSR: greedy-perimeter stateless routing for wireless networks. In *MobiCom 2000, Proceedings of the Sixth Annual International Conference on Mobile Computing and Networking*, Boston, MA, August 2000.

[8] Xiangchuan Chen and Amy L. Murphy. Enabling disconnected transitive communication in mobile ad hoc networks. In *Proceedings of POMC 2001, Workshop on Principles of Mobile Computing*, Newport, RI, August 2001.

[9] I. Chatzigiannakis, S. Nikoletseas, and P. Spirakis. On the average and worst-case efficiency of some new distributed communication and control algorithms for ad-hoc mobile networks. Invited Paper in *Proceedings of the 1st Workshop on Principles of Mobile Computing (POMC'2001)*, Newport, Rhode Island, USA, August 29-30, 2001.

[10] I. Chatzigiannakis, S. Nikoletseas and P. Spirakis. An efficient communication strategy for ad-hoc mobile networks. In *Proceedings of 15th Symposium on Distributed Computing (DISC'2001)*, Informatics Department, Faculty of Sciences, University of Lisbon, Portugal, October 2-5, 2001, volume 2180 of *Lecture Notes in Computer Science*, Springer-Verlag, 2001.

[11] I. Chatzigiannakis, S. Nikoletseas, and P. Spirakis. An efficient routing protocol for hierarchical ad-hoc mobile networks. In *Proceedings of the 1st IEEE/ACM International Workshop on Parallel and Distributed Computing Issues in Wireless networks and Mobile Computing (PDCIWNMC'2001)*, IPDPS 2001 Workshops, Hyatt Regency, San Francisco, USA, April 23-27, 2001.

5.4 Leader election and token circulation

[1] N. Malpani, Vaidya N., and J. L. Welch. Distributed token circulation in mobile ad hoc networks. In *Proceedings of the 9th International Conference on Network Protocols (ICNP)*, Riverside, CA, November 2001.

[2] Navneet Malpani, Jennifer L. Welch, and Nitin Vaidya. Leader election algorithms for mobile ad hoc networks. In *Fourth International Workshop on Discrete Algorithms and Methods forMobile Computing and Communications (DIAL-M)*, Boston, MA, August 2000.

5.5 Mutual exclusion and resource allocation

[1] Jennifer Walter, Jennifer L. Welch, and Nitin Vaidya. A mutual exclusion algorithm for ad hoc mobile networks. *Wireless Networks*, 9(6):585-600, 2001. Also, In *Second International Workshop on Discrete Algorithms and Methods for Mobile Computing and Communications (DIAL-M workshop)*, Dallas, Texas, October, 1998).

[2] Shailaja Bulgannawar and Nitin H. Vaidya. A distributed k-mutual exclusion algorithm. In *Proceedings of the 15th International Conference on Distributed Computing Systems (ICDCS)*, Vancouver, British Columbia, Canada, pages 153-150, May 30 - June 2, 1995, IEEE Computer Society Press, 1995.

[3] J. Walter, G Cao, and M Mohanty. A k-mutual exclusion algorithm for wireless ad hoc networks. In *Proceedings of the First Workshop on Principles of Mobile Computing (POMC 2001)*, Newport, Rhode Island, USA, August 2001.

5.6 Coordinated robots

[1] J. Walter, J. Welch, and N. Amato. Distributed reconfiguration of metamorphic robot chains. In *Proceedings of the Nineteenth Annual ACM SIGACT-SIGOPS Symposium on Principles of Distributed Computing (PODC 2000)*, Portland, Oregon, pages 171-180, 2000.

[2] J. Walter, J. Welch, and N. Amato. Concurrent metamorphosis of haxagonal robot chains into simple connected configurations. To appear in *IEEE Transactions on Robotics and Automation*, 2002.