

19th Annual Symposium on

FOUNDATIONS OF COMPUTER SCIENCE

(Formerly called the Symposium on
Switching and Automata Theory)

October 16–18, 1978

The Holiday Inn West, Ann Arbor, Michigan

Sponsored by the IEEE Computer Society
Technical Committee on Mathematical Foundations
of Computing in cooperation with the ACM Special
Interest Group for Automata and Computability
Theory and The University of Michigan

PROGRAM

SUNDAY, OCTOBER 15

Registration and Social Hour: 7:00 pm–11:00 pm

MONDAY, OCTOBER 16

Session 1: 9:00 am–12:30 pm

Chair: S. Ginsburg, USC

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| 9:00 | Description and Analysis of an Efficient Priority Queue Representation
J. Françon, G. Viennot, and J. Vuillemin, IRIA |
| 9:30 | A Dichromatic Framework for Balanced Trees
L. Guibas, Xerox PARC; R. Sedgewick, Brown University |
| 10:00 | Should Tables Be Sorted?
A. Yao, Stanford University |
| 10:30 | COFFEE BREAK |
| 11:00 | A Data Structure for Orthogonal Range Queries
G. Lueker, University of California (Irvine) |
| 11:15 | Complexity of Solvable Cases of the Decision Problem for the Predicate Calculus
H. Lewis, Harvard University |
| 11:30 | GO is Pspace Hard
D. Lichtenstein and M. Sipser, University of California (Berkeley) |
| 12:00 | The Complexity of Checkers on an $N \times N$ Board
A. Fraenkel, Weizmann Institute; M. Garey and D. Johnson, Bell Laboratories; T. Schaefer, CALMA; Y. Yesha, Weizmann Institute |
| 12:30 | LUNCHEON |
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Session 2: 2:00 pm–5:30 pm

Chair: S. R. Kosaraju, Johns Hopkins

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| 2:00 | One-Way Log-Tape Reductions
J. Hartmanis, N. Immerman and S. Mahaney, Cornell University |
| 2:15 | Halting Space-Bounded Computations
M. Sipser, University of California (Berkeley) |
| 2:30 | Two Theorems on Random Polynomial Time
L. Adleman, MIT |

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- 3:00 **Improved Bounds on the Problem of Time-Space Trade-Off in the Pebble Game**
R. Reischuk, Universität Bielefeld
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- 3:30 **COFFEE BREAK**
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- 4:00 **Alternating Pushdown Automata**
R. Ladner, University of Washington;
R. Lipton, Yale University; L. Stockmeyer,
IBM
- 4:30 **On Tape-Bounded Probabilistic Turing Machine Transducers**
J. Simon, UNICAMP
- 5:00 **On Alternation**
W. Paul, E. Prauss and R. Reischuk,
Universität Bielefeld

TC-MFOC Business Meeting: 9:00 pm

TUESDAY, OCTOBER 17

Session 3: 9:00 am–12:30 pm

Chair: E. P. Friedman, UCLA

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- 9:00 **Equality Languages, Fixed Point Languages and Representations of Recursively Enumerable Languages**
J. Engelfriet, Technical University of Twente; G. Rozenberg, University of Antwerp
- 9:30 **Computable Nondeterministic Functions**
A. Chandra, IBM
- 10:00 **On the Power of the Compass**
M. Blum, University of California (Berkeley); D. Kozen, IBM
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- 10:30 **COFFEE BREAK**
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- 11:00 **Limited Subsets of a Free Monoid**
I. Simon, Universidade de São Paulo
- 11:15 **Lower Bounds on Information Transfer in Distributed Computations**
H. Abelson, MIT
- 11:45 **An Optimal Lower Bound on the Number of Total Operations to Compute 0-1 Polynomials Over the Field of Complex Numbers**
J. Van de Wiele, IRIA
- 12:15 **Strassen's Algorithm Is Not Optimal**
V. Pan, IBM
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- 12:30 **LUNCHEON**
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PROGRAM

Session 4: 2:00 pm–5:30 pm

Chair: N. Pippenger, IBM

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- 2:00 **A Decidability Result for a Second Order Process Logic**
R. Parikh, MIT and Boston University
- 2:30 **Consistent and Complete Proof Rules for the Total Correctness of Parallel Programs**
L. Flon, University of Southern California; N. Suzuki, Xerox PARC
- 3:00 **Model Theoretic Aspects of Computational Complexity**
R. Lipton, Yale University
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- 3:30 **COFFEE BREAK**
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- 4:00 **On Recursive Equations Having a Unique Solution**
B. Courcelle, IRIA
- 4:30 **On the Algebra of Order**
D. Lehmann, University of Southern California
- 5:00 **Data Types as Initial Algebras: A Unification of Scott's and ADJery**
A. Kanda, University of Warwick

Reception: Wine and Cheese Tasting, 9:00 pm

WEDNESDAY, OCTOBER 18

Session 5: 8:30 am–12:00 noon

Chair: R. Rivest, MIT

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- 8:30 **A New Algorithm for the Maximal Flow Problem**
Z. Galil, Tel-Aviv University
- 9:00 **A Fast Algorithm for Single Processor Scheduling**
B. Simons, University of California-Berkeley
- 9:30 **Selection and Sorting with Limited Storage**
J. Munro, University of Waterloo; M. Paterson, University of Warwick
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- 10:00 **COFFEE BREAK**
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- 10:30 **Improving the Bounds on Optimal Merging**
C. Christen, Université de Montreal

11:00 Lifted Problems from the Theory of Linear Orders

C. Yap, Yale University

11:30 The Average—Case Complexity of Selecting the kth Best

A. Yao and F. Yao, Stanford University

LOCATION:

All technical sessions will be held at the Holiday Inn West, Ann Arbor, MI 48103. The Inn is located at Exit 172 off I-94 at Jackson Road, 2 miles west of downtown Ann Arbor. Phones: (313) 665-4444, (800) 323-9050.

A block of rooms has been reserved at the Inn at the rate of \$22/day (single) and \$27/day (double). Students may reserve for triple occupancy at \$10/person. Reservations submitted for students with fewer than 3 persons will be pooled. Make reservations directly with the hotel using the enclosed form (or facsimile) in order to get the conference rates.

TRANSPORTATION:

The Holiday Inn West is served by airport limousine from Detroit Metro Airport. The limousine leaves every half hour and the cost is \$5.50/person. Ann Arbor is about 20 miles from the airport. The city also has Amtrak and Greyhound stations; these are about 2–3 miles from the hotel.

CLIMATE:

Ann Arbor enjoys a typical northern fall season. Foliage should be nearing its height, and crisp weather (50–60° high) is likely. Rain is, however, definitely possible.

FEES:

Members of IEEE Computer Society or ACM-SIGACT or EATCS	\$50.00 (\$55.00 after October 5)
Nonmembers	\$65.00 (\$70.00 after October 5)
Authors, co-authors, session chairs	\$45.00 (\$50.00 after October 5)
Students	\$10.00 (\$11.00 after October 5)

Except for students, fee includes two luncheons, a pre-meeting social hour, a wine and cheese tasting, coffee breaks, and a copy of the Proceedings. Student fees include coffee breaks and a copy of the Proceedings.

Early mail registration is advised.

Full fee must accompany application. Make checks payable to

“FOCS SYMPOSIUM.”

Fee refunds will be granted if requests are post-marked on or before October 13, 1978.

THINGS TO DO:

The Holiday Inn has arrangements with local clubs for tennis, racquetball and golf. Ann Arbor, with the University of Michigan campus, is definitely worth a walking tour. The Huron River flows through town and canoes can be rented for varying length trips. Greenfield Village in Dearborn is an hour's drive from Ann Arbor.

INFORMATION:

The Local Arrangements Chairman may be contacted at the following address.

Professor William C. Rounds
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