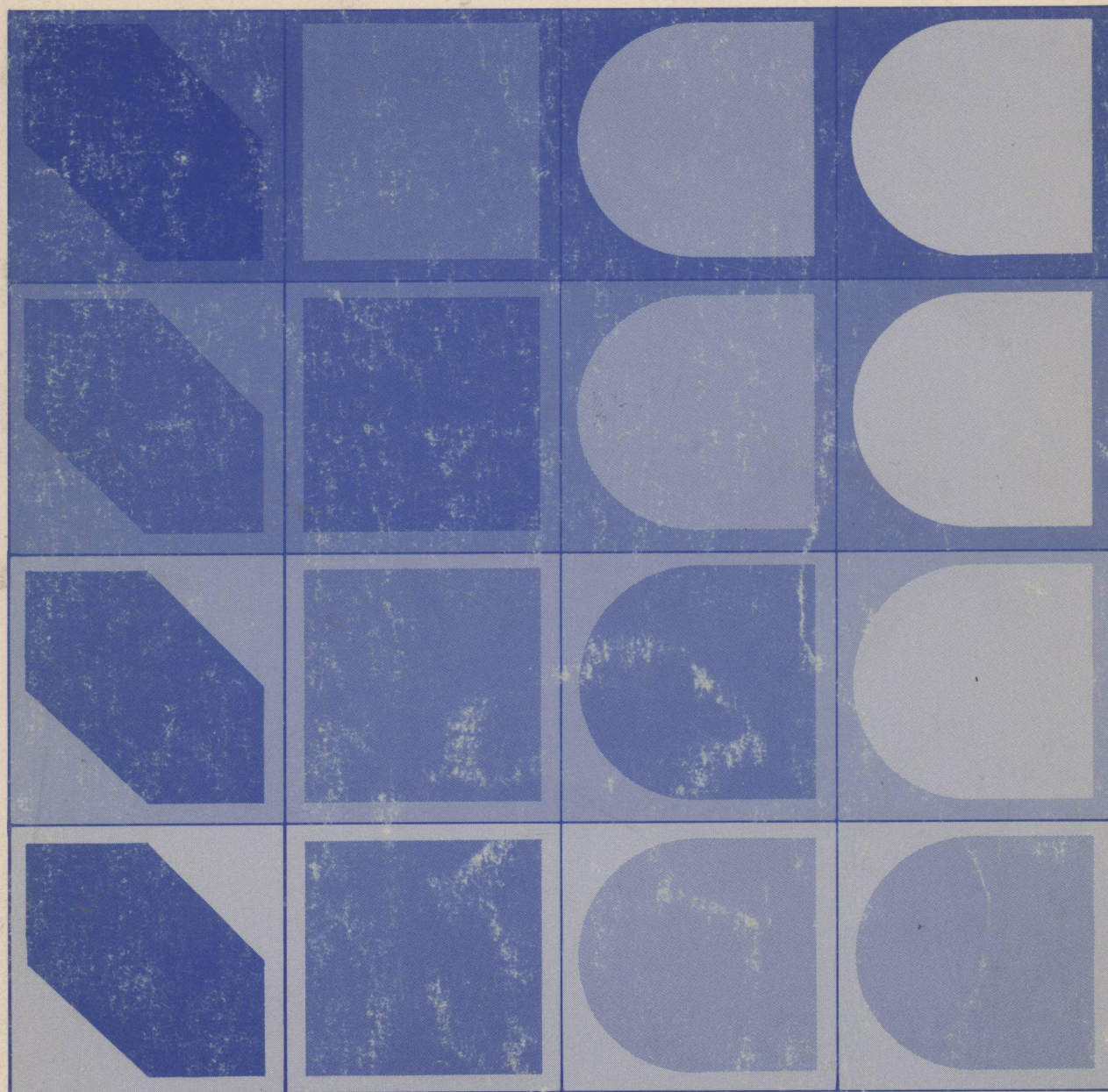


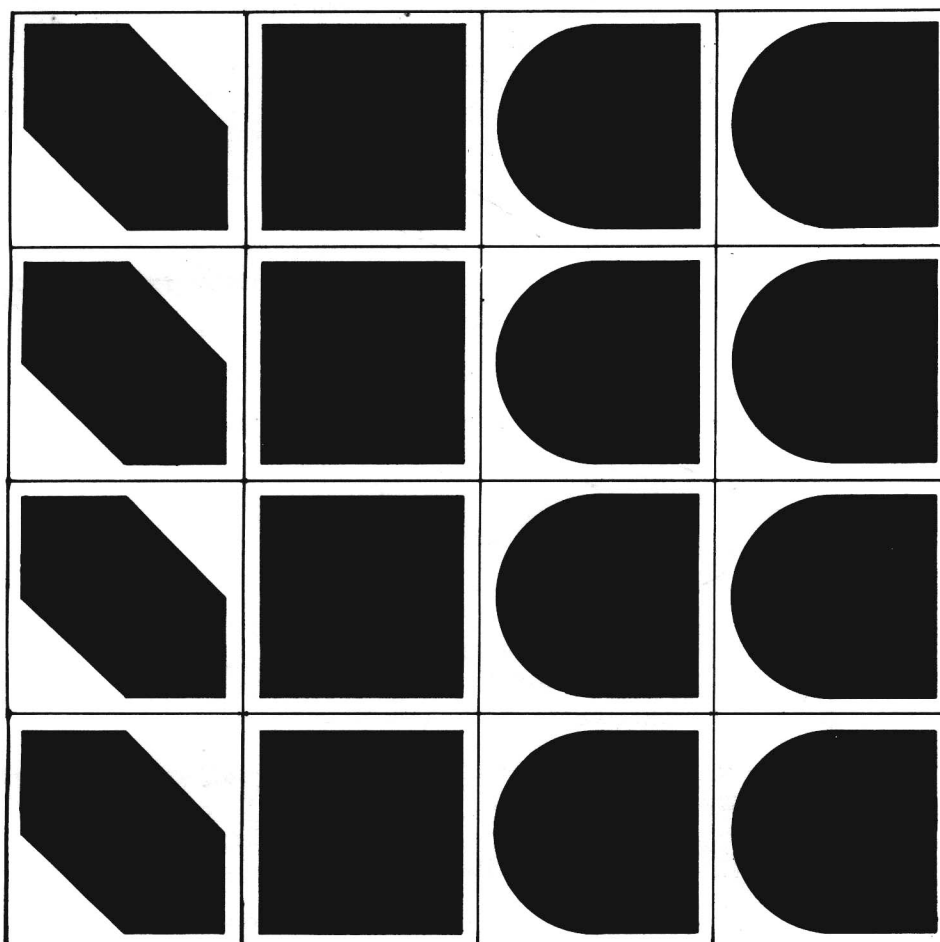
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HOST: Towson State University, Baltimore, Maryland

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EDITED BY

Della Bonnette
University of Southwestern Louisiana
Lafayette, Louisiana

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FOREWORD

This volume of proceedings of the Fifth National Educational Computing Conference (NECC/83), accurately reflects recent research and current trends in the field of computers and education. It embodies the critical thinking of a vast number of experts on topics that are both crucial to the whole society and especially relevant at the present time. The conference shows an excellent balance of reviewed papers, tutorials, panels, project presentations, and other sessions covering the broad spectrum of computers in education. The ideas expressed in these proceedings and in the sessions are a manifestation of the vitality of this field and provide attendees an opportunity to expand their expertise and increase their appreciation of computers in education. We believe that this conference will be beneficial to all participants and that these proceedings will serve as a valuable reference in the future.

The conference and these proceedings are the culmination of a great deal of effort by many individuals. Particular thanks are due to

- the National Educational Computing Conference Steering Committee for guidance and support, especially those who advised and encouraged the conference committee;
- all authors who submitted papers for review;
- the referees for their considerable efforts in reviewing the papers and for making the frequently difficult decisions of whether to accept or reject papers;
- the organizer of panel and tutorial sessions;
- A. J. (Joe) Turner (Clemson University), who so ably chaired the Program Committee and had the awesome task of coordinating the review of papers;
- Jean Rogers (University of Oregon), who with diligence and skill coordinated society sessions, tutorials and suggested sessions;
- William Ryan (Swarthmore College), who organized the project presentation sessions;
- William Dorn (University of Denver), who with discriminating sense (flair) organized the invited sessions;
- James Adams (Association for Computing Machinery), who with energy and imagination handled the publicity for the conference;
- Gerald Leach-Lewis (IEEE Computer Society), who worked creatively to expand the quantity and quality of the exhibits;
- Alan L. Roecks (San Antonio, ESC), whose superb evaluation of NECC/82 gave us excellent ideas for this years conference;
- Ralph Lee (University of Missouri, Rolla), who organized a splendid array of pre-conference workshops;
- Francis Edwards (Towson State University), who worked effectively on the broad range of local arrangement tasks;
- David Stonehill (University of Rochester), who organized the Birds of a Feather sessions;
- Robert Caret (Towson State University), who was always willing to assist and support the activities of the conference;
- Carol Edwards (Towson State University), who with good humor coordinated the processing of nearly 100,000 pieces of mail;
- Iva Thommen (Towson State University), who handled all secretarial tasks cheerfully and expeditiously;
- Donna Feldmann (Towson State University), who as the student assistant for NECC intuitively saw what needed to be done and efficiently did it;
- All attendees who made the efforts worthwhile;
- Della Bonnette (University of Southwestern Louisiana), who made this volume of proceedings possible, through her skills as an editor, her patience in dealing with the authors, and her ability to accomplish it all on schedule.

Doris K. Lidtke
General Chairperson, NECC/83
Towson State University
Baltimore, Maryland 21204

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THE ROLE OF LANGUAGE IN TEACHING PROGRAMMING

Stephen J. Garland
Dept. of Mathematics and Computer Science
Dartmouth College

ABSTRACT

When teaching students how to write, we must teach them how to write in a specific language such as English or French. When teaching them how to program, we must teach them how to program in a specific language such as Basic or Pascal. In both cases, a language is the vehicle, not the object, of instruction.

Teaching a language involves instruction in vocabulary, spelling, grammar, and punctuation. Teaching writing or programming, on the other hand, also involves instruction in logic, organization, expression, and style.

The reason language becomes an issue in teaching programming is simply that we have a choice. Students have learned their native tongue much before they learn to write, but generally they must learn a programming language when they learn to program.

A good programming language should enhance our ability to teach programming, not distract our attention from that task. It should:

be easy to learn, so that we can devote time to teaching programming and not just to teaching the language;

enable us to say what we want naturally and easily, so that we can write programs to fit problems, not to fit the language;

help us organize and convey our thoughts, so that we can understand and be understood;

be used in a uniform manner by many programmers, so that we and they can share our knowledge.

No programming language is perfect by these criteria. Basic is easy to learn, but most of its common dialects cause programmers to obscure, rather than illuminate, the structure of their programs. Pascal has fewer divergent dialects, and it allows us to express many constructs quite nicely; yet it can make other constructs extremely awkward.

The best teaching strategy is to turn this lack of perfection into an asset. Teaching the limitations of a language along with its virtues illustrates dramatically that programming transcends language.

APPROACHES TO REQUIRING MICROCOMPUTERS OF UNDERGRADUATES

Chaired by: Jane Caviness
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ABSTRACT: Approaches to Requiring Microcomputers of Undergraduates

The use of microcomputers is growing rapidly, while the age of the users and the cost of the microcomputers have been decreasing. Secondary schools are discovering that many of their students have acquired microcomputers and desire some general computing instruction. Colleges and universities are discovering that many entering students already have computing experience, most often with microcomputers, and they wish to continue using microcomputers. This presents a challenge to those involved in Computing Services, since they are accustomed to providing services through the use of timesharing on medium to large scale machines. How are they to deal with the change in the type of demand for computing services?

Answers to this challenge cover the spectrum from ignoring the problem totally, to turning it around and requiring undergraduates to have their own microcomputers. The panel members are all from institutions that have taken the latter approach. They will discuss many aspects of such an action: the decision to do so, the planning involved, the choice of hardware, the costs involved, the expected benefits, the difficulties of implementation, student reactions, and perceptions of first experiences. Discussion and questions from the floor are encouraged.

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