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Artificial Intelligence Programming on the Macintosh

Dan Shafer

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Artificial Intelligence Programming for the Macintosh®

Dan Shafer

Howard W. Sams & Co.
A Division of Macmillan, Inc.
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Preface

Artificial Intelligence (AI) has fascinated me from the first time I heard about it. My first exposure to it came on a tour of the Stanford Artificial Intelligence Laboratory (SAIL). I was entranced at the work the people at SAIL were doing with computer music generation, robotics, and problem-solving. This book is the beginning of the fulfillment of my intense desire to be part of what is happening in that community.

I also wanted this book to fill what seemed to me to be a rather large gap in the literature of AI. I have searched fruitlessly for a book that did not assume the reader was already knowledgeable about programming in an esoteric language such as LISP and aware of such fundamental computer science ideas as heuristics and search mechanisms. I hope this book takes a small step toward filling the need of interesting more and more people in the field of AI.

Few would argue with the proposition that AI is the next frontier in the world of computers. In the past two years, real AI development tools and languages have become available on microcomputers, making hands-on experimentation with and exploration of this fascinating field accessible to millions who otherwise would have had to content themselves with reading about the subject.

The growing importance of AI is enough of a *practical* reason for you to spend your time reading this book, examining the programs it contains, and exploring AI with the book as a guide. But the value of learning more about intelligence—artificial or natural—transcends even the practical benefit of learning about a field that promises to have a tremendous impact on our daily lives.

Who This Book Is For

On one level, this is an introductory book about AI programming techniques. To read the first part of each chapter in Part I and all of Part II requires no programming background in particular, though a nodding acquaintance with some of the basic ideas of computers and programming would be useful. On another level, the book abounds with examples and complete AI programs written in ExperLogo® from ExperTelligence of Santa Barbara, California. To make full use of these programs, you should have some Logo programming knowledge (though Chapter 10 may give you enough of an introduction to the language), access to an Apple Macintosh® computer, and a copy of ExperLogo®.

If you use ExperLogo® on your Macintosh®, you'll also find that an external drive is extremely helpful and a printer almost a requirement.

Two Decisions

Two aspects of this book deserve an explanation. Why did I focus on the Macintosh® and why did I choose Logo as the principal language?

The Mac, with its desktop, icons, and windows, comes closer to what most AI researchers view as a "rich and supportive" programming environment than any other machine on the market. As you program the examples in this book, you will be doing so in an environment that is quite similar to that enjoyed by professional AI workers. In addition, the Mac is fun to use and seems more accessible to those new to computers than any other computer.

Logo is an excellent compromise selection between LISP, which is clearly the AI language of choice but is difficult to learn and not readily available on the Mac, and BASIC, which is far more available but not well suited to AI programming. I deal with the issue of language selection at some length in Part II of this book.

Besides, Logo is easy to learn and is gaining increasing acceptance in the educational community as a superb language for the exploration of new ideas. And that is precisely what I wish for you: exploration of new ideas.

DAN SHAFER

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Acknowledgements

As I was developing the ideas for this book, I was fortunate enough to find myself involved with a small group of programmers and AI fans who helped me to focus the content, the direction, and the approach of the book. I am grateful to these people—Chuck Blanchard, John Worthington, Jason Christofilos, Mike VanHorn, and my editor, Robert Lafore—for helping to brainstorm the book and for believing in it.

Along the way, I have had the chance to discuss the book and its contents with some truly helpful, even inspirational, AI workers. A special vote of thanks goes to Steve Lurya of Santa Barbara, a former ExperTelligence programmer who made a particular contribution to Chapter 7 and also helped me grapple with some of the ideas of AI and AI programming and thus helped improve the book as a whole.

ExperTelligence personnel—notably, President Denison Bollay, Marketing VP Tony Uhler, and programmer-engineer Robert Reali—have also been very helpful in aiding my understanding of their fine products, ExperLogo and ExperLisp.

As usual, my editorial associate and research aide Don Huntington made a major contribution to this work. I am grateful to him for tightened sentences, crystallized thinking, and organizational help.

My editor, Robert Lafore, has been a source of continuing support and inspiration as this book has grown from a collection of Mac programs about AI into a cohesive introductory book on AI techniques and languages. In brainstorming sessions and in editing discussions, he has questioned, probed, prodded, and cajoled me into making this book as good as I could possibly make it.

Ken Schieser is a remarkable young man with an excellent grasp of Logo who wrote two of the more intriguing programs in this book: "Micro Blocks World" and the "Intelligent Maze." He is the first person I've met who is as good as he is at programming yet doesn't want to make it a career.

Finally, my family has continued, as they have with all of my previous writing efforts, to be supportive and patient with me. I appreciate their love and closeness—even when that closeness is to the back of my head or through a closed office door—more than words can express.

This book is dedicated to Albert and Mary Lee Hunton. Your natural common sense and wisdom about how the world and people work far exceed any intelligence—real or *artifical—I know about. God bless you both.*

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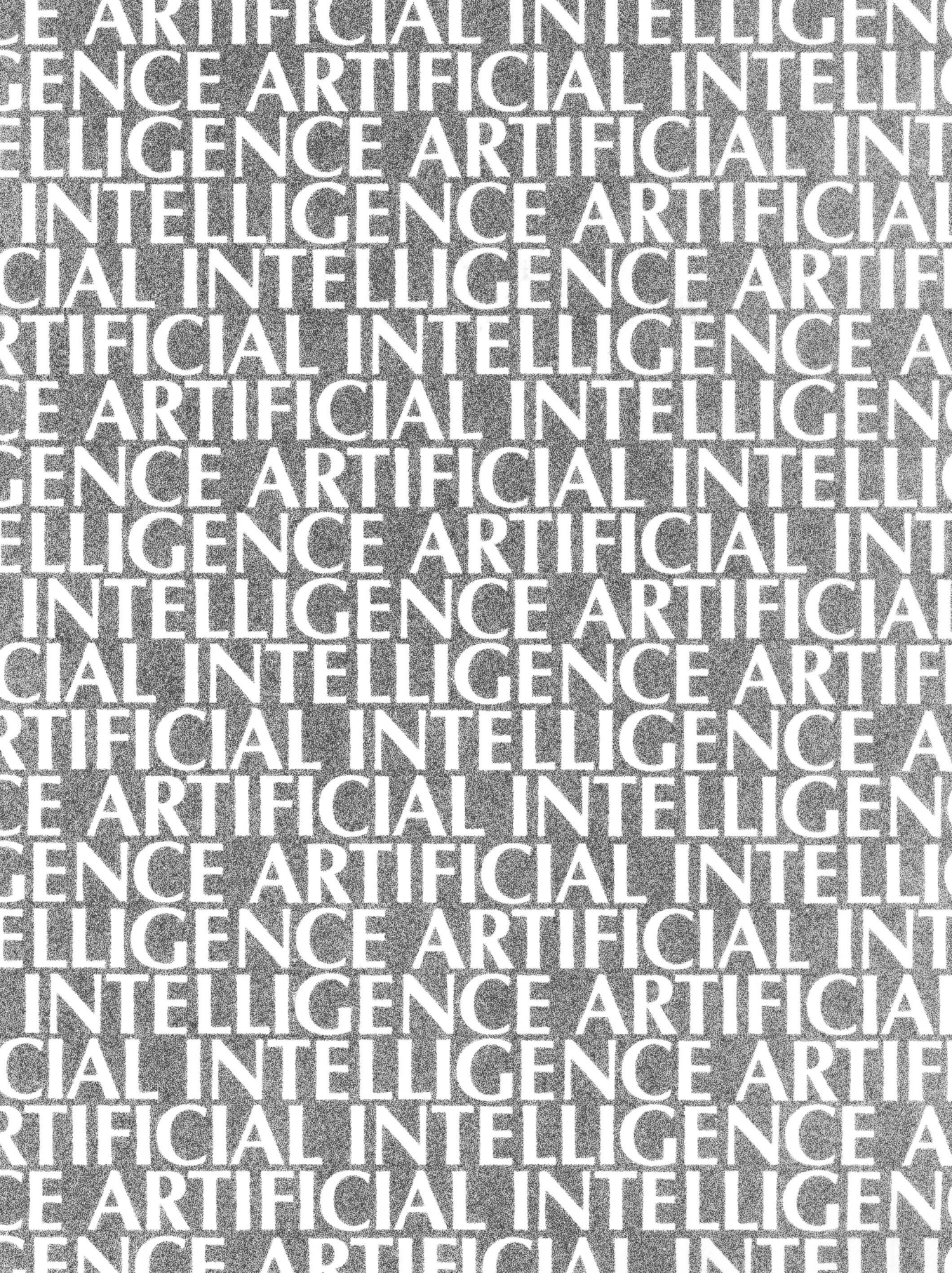
I

Artificial Intelligence Programming Techniques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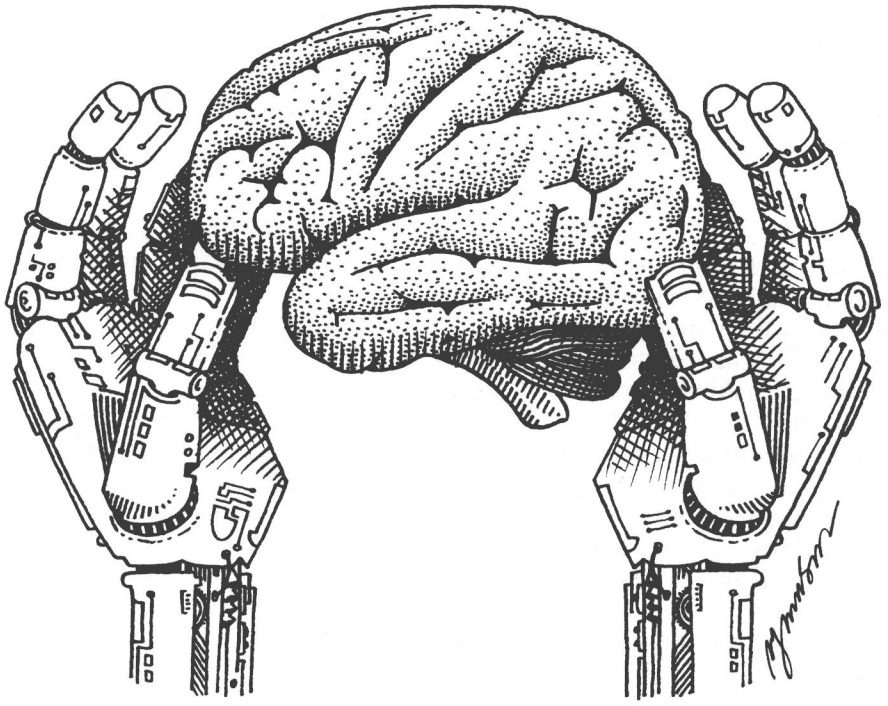

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