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Introduction

LogoWorks: Challenging Programs in Logo is for beginning and advanced Logo programmers who want suggestions of things to do that go beyond an introductory level. The projects touch on diverse areas of interest: from graphics and video games to word games, language extensions, and development of new languages. Each project is intended for your exploration and to suggest other worlds you can build yourself.

We think this book will draw attention to Logo as a general-purpose programming language as well as a powerful tool for thinking. *LogoWorks* demonstrates that Logo is not only good for young children, but also provides people of all ages with compelling and challenging worlds to explore.

We have tried to show a diversity of projects and programming styles as well as ways of talking about the projects. The descriptions of the various projects vary in their details and their points of view. To help in meeting our goal, we encouraged many people to contribute to the book. This eventually presented us with a problem: we did not want to obscure the individual personalities represented in each of the projects. We see this as an important and necessary element in the rich development of Logo computer cultures. On the other hand, we wanted to maintain a consistency in the quality of each project. To do this, a group of us met to discuss each project that was submitted to us for inclusion in the book. The core group consisted of Margaret Minsky, Cynthia Solomon, Brian Harvey, Michael Grandfield, Lauren Young, and Susan Cotten. Again, within this group there was a wide range of interests and expertise as well as personal preferences. We think this diversity has enriched the book.

Many of the projects reflect the personal interests of their creators. For example, Michael Grandfield is a dancer and has a fascination with body movements that influenced the leaping figures in Jack and Jill. Brian Harvey, an educator and systems programmer, has contributed several projects, for instance, Drawing Letters, which draws upon interesting ideas in computer science and shows clever ways of expressing them. Susan Cotten, Lauren Young, and Annette Dula are recent Logo enthusiasts, and their projects reflect both their enthusiasms and their more recent experimentations with Logo.

Some Advice About Using LogoWorks

The chapter divisions are intended as a rough guide to the projects. In each chapter there is a common theme. Nevertheless, many projects overlap chapter boundaries thematically. For example, Animal Game is in the

"Wordplay" chapter, but it is also a game. Jack and Jill is in the "Stories" chapter, but it is also an example of turtle geometry. Furthermore, although we have not grouped the material within a chapter into levels of difficulty, there is a natural tendency to put content of particular interest for beginners toward the start of each chapter.

We assume that you are already comfortable with the elements of Logo and are looking for new challenges. Thus we expect that you have gone through the *Introduction to Programming Through Turtle Graphics*, which is part of the Atari Logo package.

For those of you familiar with Logo, but not aware of the special features Atari computers bring to the language, a chapter at the end of the book highlights special features of Atari Logo. These include four dynamic turtles, sound generation, demons, and detection of events like one turtle bumping into another or a turtle colliding with a line drawn on the screen. These features, unique to the Atari computers, are fully explored in many projects throughout this book.

We anticipate that you will want to use many of the projects without looking at the detailed explanations of how they were made. For this reason we have included complete program listings at the end of each project.

Using the Projects

There are several ways you can use the projects in this book.

- You can use a project as it appears. For example, some of the projects are games that you can play without having to do any Logo programming yourself.
- You can start with one of these projects and add to it. Some sections have explicit suggestions for ways the project might be extended; others do not. In either case, we expect you will think of your own improvements.
- A project in this book may spark an idea for a completely new project of your own.
- Some of the projects in this book are *utility* procedures, which can be used as part of a larger project. (See, for example, Towards and Arctan). You may find these procedures useful in your own projects, even if you don't understand how the procedures themselves work.

The projects in this book are written in Atari Logo. If you have another version of Logo, you will find that most of the projects are easy to adapt to your system; others depend on special features of Atari Logo and will need more effort to adapt.

Acknowledgments

Although a book of this sort has been in the planning stages for several years, this particular book owes its flavor to the fact that we were part of Atari Cambridge Research, and so Atari Logo became a focus for us. Some of the programs were adapted for the Atari computer from previous work, and others were developed to help debug Atari Logo. Some were developed while working with kids, and others were developed by kids for their own pleasure.

One of the joys of creating this book was that new and old friends contributed their programming projects. Their contributions reflect not only different programming styles, but also different ways of talking about the process of translating ideas into working programs. The list of these contributors can be found in a separate section of the book. At the beginning of each project, credit is given to the people who worked on it. We thank them collectively and individually.

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