

no. A-162



path tactics

instructional computing courseware
for the **apple® II** computer



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for the **apple**® II computer

This manual is compatible
with
the Path Tactics diskette

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3490 Lexington Avenue North
St. Paul, MN 55126

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TABLE OF CONTENTS

Introduction	1
Description	2
Learning Objectives	2
Program Preview	3
Program Management Option	7
Use in an Instructional Setting	
Preparation	8
Using the Program	8
Follow-up	8
Student Handout, "Thinking about Strategy"	10
Appendices	11
A. Credits	12
B. MECC Services	13

INTRODUCTION

Path Tactics, a mathematics game for kindergarten through sixth grade students, is designed to reinforce mathematics computation skills. The program tests students' ability to use basic mathematics operations with whole numbers and also challenges their ability to use strategy.

Students can choose to play against a friend or against the computer. Each student can choose a different level of play and still compete on an equal basis.

At each of the seven levels of play, students are given a set of three numbers. By using their mathematical abilities and skillfully positioning the numbers, players control the actions of their robot on the game board. Players try to outsmart their opponent and help their robot reach the finish line first, earning the title "Path Master."

The program includes animated, step-by-step instructions. "Winners' lists" record the success of the top ten players at each level of play.

A Program Management Option is available for the teacher's use. Using this option, the teacher can select the mathematic operations for individualized instruction or erase student names from the winners' lists.

To end a game or other activity, press the Escape (Esc) Key twice at any time when the computer is waiting for a response.

To use Path Tactics, you will need a Path Tactics program diskette, a 64K Apple computer, a monochrome or color monitor, and a disk drive.

DESCRIPTION

Path Tactics is a challenging game of strategy and skill that provides students with an opportunity to practice the use of whole numbers and basic mathematics operations. Students use whole numbers, solve mathematics equations, and exercise their problem-solving abilities to move a robot on a game board. Students compete with each other or with the computer in a race to the finish line.

Path Tactics has seven levels of play. In each game, the student or teacher can select problems from these areas:

Counting	Dividing
Adding	Adding and Subtracting
Subtracting	Subtracting (negative results allowed)
Multiplying	

Curriculum Area: Mathematics

Topic: Counting, Whole-Number Operations,
Basic Facts

Type: Educational Game

Reading Level: 5 (Fry)

Grade Range: K-6

Classroom Use: One or Two Students

LEARNING OBJECTIVES

Using this courseware, students will reinforce their ability to:

- recall the basic facts of addition, subtraction, multiplication, and division (numbers 0-9);*
- recognize the symbols +, -, x, ÷;*
- recognize when a particular strategy is appropriate;*
- use an appropriate strategy in selected problem situations;*
- enjoy doing mathematics at their level of ability.*

*Some Essential Learner Outcomes in Mathematics (Revised Edition), Minnesota State Department of Education, 1981, St. Paul, Minnesota.

PROGRAM PREVIEW

Starting a Game

After "Path Tactics" (Option 1) is selected from the main menu, these events will take place:

1. The student decides to play against the computer or a friend (Figure 1). (Note: The computer **can** be beaten!)
2. The players enter their names.
3. If the teacher has not specified a level using Option 5, "Program Manager" (see page 7 for a description of the Program Management Option), each player selects one of the seven levels of play shown in Figure 2. Note that each player can choose to use a different operation.

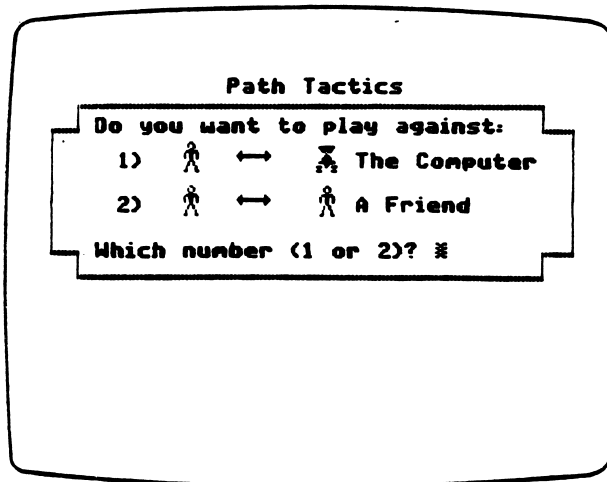


Figure 1

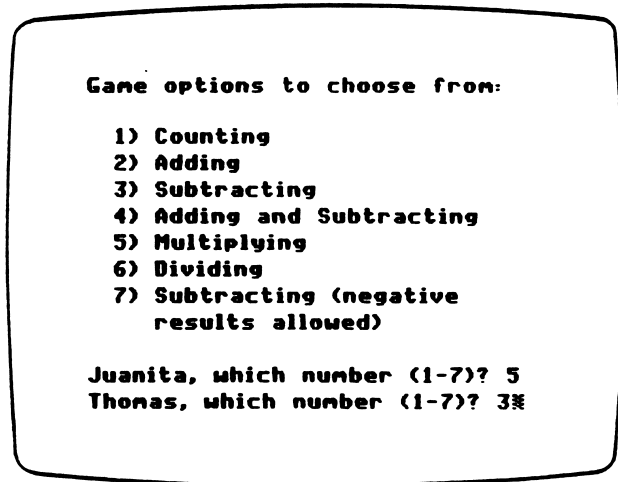
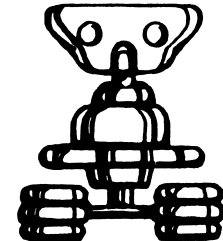
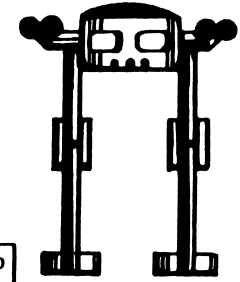
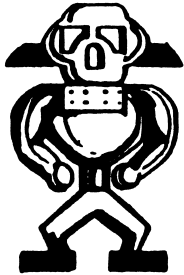


Figure 2

4. The players, if they so choose, view instructions for the game.
5. The players select a robot to be their "game piece" on the screen.
6. "Robby the Random Robot" decides which player starts the game.
7. The game begins.

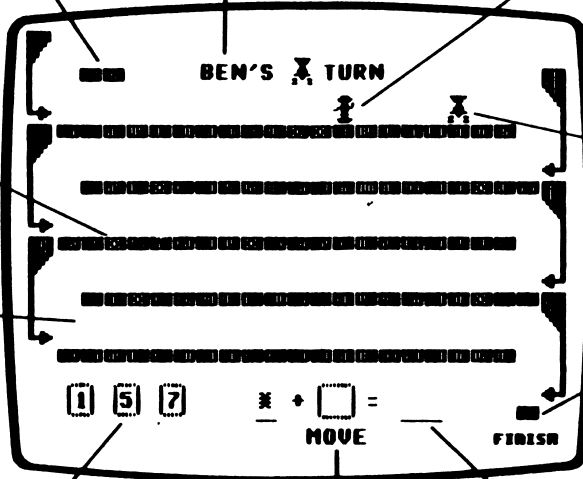
The Ten Robot Rules of Path Tactics



The name of the person currently playing is displayed at the top of the screen.

At the beginning of the game, both robots start here.

If this robot moves five spaces, it will bump Ben's robot back ten spaces.



Each space displaying an "X" is a trap door.

If Ben's robot moves five spaces, it will fall through a trap door to the level below.

The robots move along each level in the direction of the arrows.

The first robot to reach the FINISH is the winner.

You choose from three numbers to set up the problem.

The robot will move only if you solve the problem correctly.

The number that you place in the MOVE box is the number of spaces the robot will move.

PROGRAM PREVIEW (continued)

Levels of Play

In all seven levels of play, numbers that are typed into the equations can be changed. The Left-Arrow Key or the Delete Key is used to back up and retype numbers before the Return Key is pressed.

Option 1, "Counting"

$$\boxed{4} \quad \boxed{2} \quad \boxed{6} \quad \square$$

MOVE

The student chooses one of the numbers, types it into the MOVE box, and presses the Return Key. The robot will move the number of spaces chosen.

Option 2, "Adding," and Option 5, "Multiplying"

$$\boxed{4} \quad \boxed{2} \quad \boxed{6} \quad _ _ + \square = _ _ \quad \boxed{4} \quad \boxed{2} \quad \boxed{6} \quad _ _ \times \square = _ _$$

MOVE

The student chooses one of the numbers and types it into the first space. He or she then chooses another number and types it into the MOVE box. After adding or multiplying the two numbers chosen, the student types an answer in the last space and presses the Return Key. If the problem is answered correctly, the robot will move the number of spaces entered in the MOVE box.

Option 3, "Subtracting," and Option 6, "Dividing"

$$\boxed{4} \quad \boxed{2} \quad \boxed{6} \quad \underline{8} - \square = _ _ \quad \boxed{4} \quad \boxed{2} \quad \boxed{6} \quad \underline{24} \div \square = _ _$$

MOVE

The student chooses one of the numbers and types it into the MOVE box. After solving the subtraction or division problem, the student types an answer in the last space and presses the Return Key. If the problem is answered correctly, the robot will move the number of spaces entered in the MOVE box.

Option 4, "Adding and Subtracting"

$$\boxed{4} \quad \boxed{2} \quad \boxed{6} \quad _ _ + \square - _ _ = _ _$$

MOVE

The student chooses one of the numbers and types it into the first space. He or she then chooses a second number and types it into the MOVE box. The third number is typed into the last space. To solve the problem, the student adds the first two numbers and subtracts the third one. If the problem is answered correctly, the robot will move the number of spaces typed in the MOVE box.

PROGRAM PREVIEW (continued)

Option 7, "Subtracting (negative results allowed)"

$$\boxed{8} \quad \boxed{6} \quad \boxed{0} \quad _ _ - _ _ = \boxed{} \\ \text{MOVE}$$

The student chooses one of the numbers and types it into the first space. He or she then chooses another number and types it into the second space. The student solves the subtraction problem. If the answer is positive, the student must type the answer into the MOVE box and press the Return Key. If the answer is negative, the student must type the minus sign before the number. If the problem is answered correctly, a positive answer moves the robot forward and a negative answer moves the robot backward.

The Winners' Lists

The player who first reaches the "Finish" space ends the game and is declared to be a "Path Master" (Figure 3). The program keeps "winners' lists" that contain the names of the ten most recent winners and the number of moves each Path Master needed to win. By selecting Option 3, "Winners' Lists," from the main menu, the teacher or student can choose to view any of the lists (Figure 4). The first list shows the names and scores for the ten most recent winners for any of the seven levels. The second list shows the names of the top two winners from each of the seven lists.

(Note: The lists can be erased using Option 5, "Program Manager," from the main menu. See the next page for a description of the Program Management Option.)

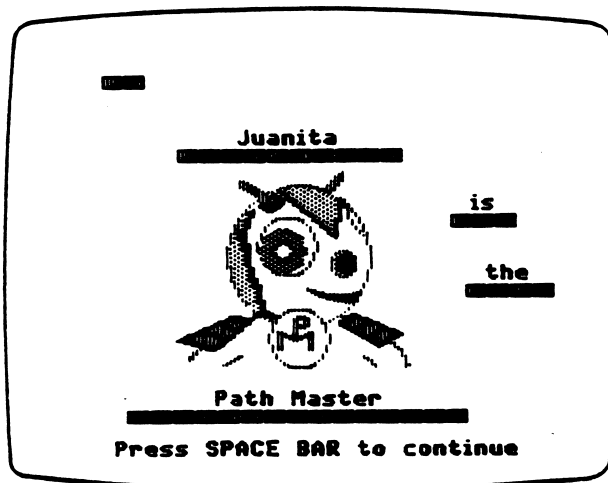


Figure 3

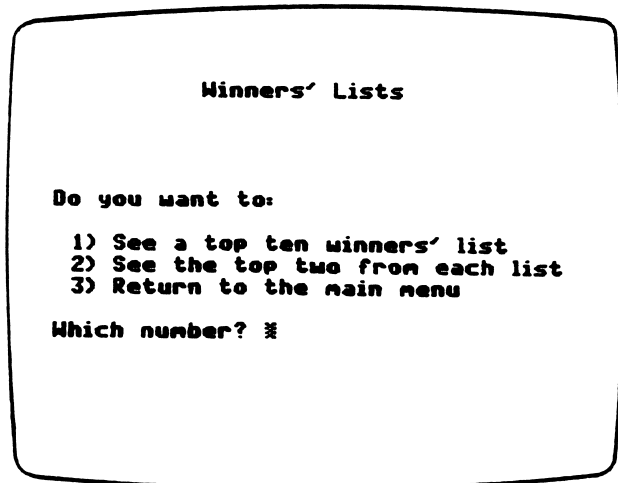


Figure 4

PROGRAM MANAGEMENT OPTION

The Path Tactics Program Management Option allows you to select the mathematics operation you want your students to use and to erase student names from the winners' lists. To use the Management Option, select Option 5, "Program Manager," from the main menu.

Setting the Level

Select Option 1, "Set the level," from the program management menu (Figure 5). This option allows you to focus the students' attention on a single level (for example, multiplication). After selecting the "Set the level" option, a second menu will appear (Figure 6). When you select a level from this menu, only the problems in the level selected will be presented when the students use Path Tactics. For instance, if you select Option 5, "Multiplying Only," students will see only multiplication problems when they run Path Tactics. If you want students to be able to select any level, select Option 8, "Children choose the operation."

```
Program Management

Do you want to:

1) Set the level
2) Erase the names from the
   winners' lists
3) Return to the main menu

Which number? #
```

Figure 5

```
The diskette is currently set at
option #8. Which one of the
following options do you want?

1) Counting Only
2) Adding Only
3) Subtracting Only
4) Adding and Subtracting Only
5) Multiplying Only
6) Dividing Only
7) Subtracting (neg. results
   allowed) Only
8) Children choose the operation
9) Return to Program Management
   menu

Which option (1-9)? #
```

Figure 6

Erasing the Winners' Lists

To erase the lists of Path Masters, select Option 2, "Erase the names from the winners' lists," from the program management menu (Figure 5). When you answer "yes" to the question "Do you really want to erase the winners' lists?" **all** winners' lists will be permanently erased.

USE IN AN INSTRUCTIONAL SETTING

Preparation

1. Students need to be assigned levels of play from Path Tactics that are appropriate to their skill level. (You may want to use the Program Management Option to set the level of play. See page 7.) Path Tactics does not teach basic mathematics concepts, but presents a game format in which to practice mathematics skills.
2. Students not familiar with the keyboard may need help finding the numeric keys.
3. Students using the counting option should be able to recite the numbers one through nine in sequence. Students should also be comfortable with the ordinal usage of numbers, using a number to specify the position or standing of a thing in some ordering. They should also know that certain symbols (numerals) represent these numbers.
4. Review the meanings of the addition, subtraction, multiplication, and division symbols.

Using the Program

1. Help students as they view the instructions for the first time. Answer questions and help them begin their first game. Although the written instructions will not be useful to pre-readers or beginning readers, they can with assistance quickly learn to play the game and run the program on their own. Have experienced students tutor classmates who are playing the game for the first time.
2. Provide basic fact tables, scratch paper, counting chips, or other aids to help students think about calculations before entering numbers at the keyboard. Remind the students that the Left-Arrow Key or the Delete Key can be used to back up and retype numbers.
3. When students play the subtraction option in which negative numbers can be entered in the MOVE box, suggest that they use paper and pencil to construct a number line for each problem. Students can use the number line as a tool for making calculations that result in negative numbers.

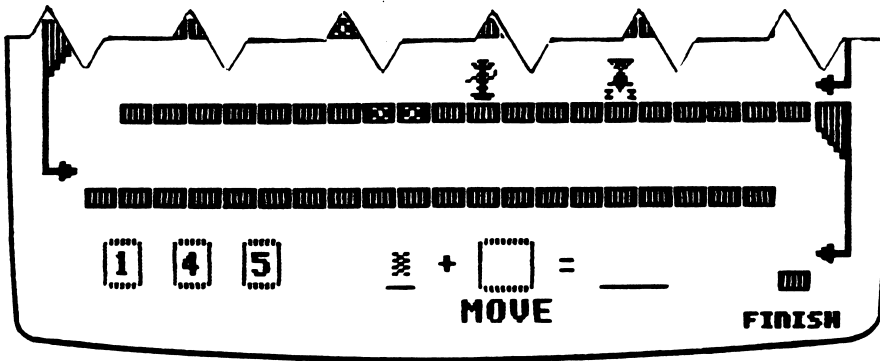
Follow-up

1. Provide students with additional arithmetic skill practice with assignments from packages in MECC's **Mastering Math** series.

USE IN AN INSTRUCTIONAL SETTING (continued)

2. After students have played Path Tactics, use the problems on the Student Handout, "Thinking about Strategy" (page 10), to begin a discussion of the points concerning game strategy shown below. Then have students play the game again, keeping in mind the following strategies:
 - putting largest number in the MOVE box;
 - dropping through a trap door space to fall to the next level, increasing the number of spaces moved;
 - putting a small number in the MOVE box to fall short of a trap door, providing another chance to land on it;
 - answering a problem incorrectly to have another chance to land on a trap door space;
 - landing on the same space as an opponent to move them back ten spaces;
 - in the subtraction option in which negative results are allowed, moving backward in order to approach a trap door or to land on the same space as an opponent, moving them back ten spaces;
 - remembering that moving an opponent back ten spaces may allow them to drop through a trap door (see the second problem on the Student Handout).
3. Discuss other games that require use of logic and strategy, such as checkers, Chutes and Ladders, Parcheesi, Scrabble, Mastermind, Boggle, and programs from the MECC courseware packages Elementary Volume 1, Problem-Solving Strategies, The Market Place, Oh, Deer!, and others.
4. Extend the Path Tactics theme in these curriculum areas:
 - Mathematics - Design a new mathematics strategy game.
 - Physical education - Have students invent "robot dances" while listening to electronic music. Discuss strategies in familiar games. Create and play a new strategy game.
 - Art - Have students design, paint, draw, or construct robots. Design and create a game board.
 - Social studies - Discuss the use of robots in industry and compare those uses to the popular depiction of robots in cartoons, television, movies, and popular literature. Discuss the impact of the introduction of robots at the workplace.
 - Language arts - Conduct research on the origin of robots and their current uses. Have students write shape poems or revise lyrics to familiar songs using robots as a theme.

THINKING ABOUT STRATEGY



1. What six forms can the problem take?

$$\square + \square = \square$$

MOVE

$$\square + \square = \square$$

MOVE

$$\square + \square = \square$$

MOVE

$$\square + \square = \square$$

MOVE

$$\square + \square = \square$$

MOVE

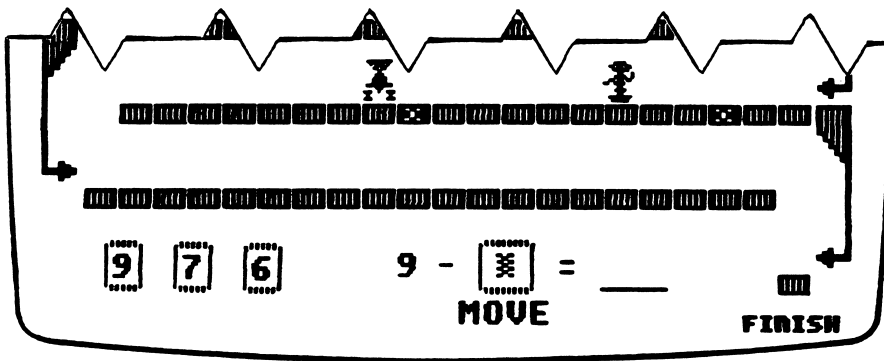
$$\square + \square = \square$$

MOVE

2. You are .

What number would you put into the MOVE box? _____

Why? _____



1. What three forms can the problem take?

$$9 - \square = \square$$

MOVE

$$9 - \square = \square$$

MOVE

$$9 - \square = \square$$

MOVE

2. You are .

What number would you put into the MOVE box? _____

Why? _____

APPENDICES

CREDITS

Path Tactics was designed and developed by a MECC team consisting of Gene Breault and Craig Solomonson, Designers, and Frederick Steinmann and H. Bill Way, Programmers. The Path Tactics package was classroom tested at Island Lake Elementary School, Shoreview, Minnesota, with the help of Steve Zehm and Sherri Hoffmann. The manual was written by Roger Seeling, Designer.

TO THE READER:

MECC has made every effort to ensure the instructional and technical quality of this courseware package. Your comments—as user or reviewer—are valued and will be considered for inclusion in any future version of the product. Please address comments to:

MECC Courseware Development
3490 Lexington Avenue North
St. Paul, MN 55126

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(General Information: 612/481-3500)