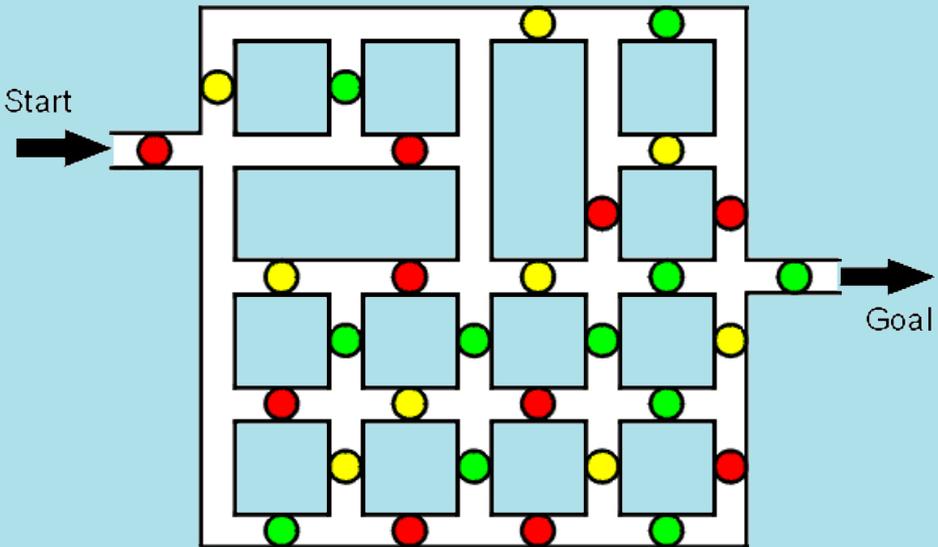




# A TRIBUTE TO ROBERT ABBOTT

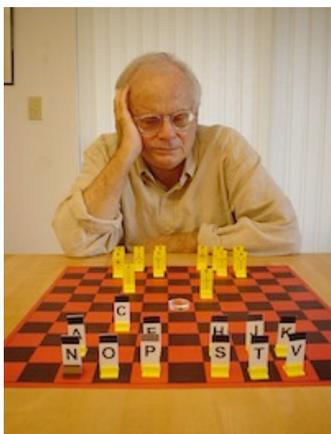
BY SANDY SHARON



## Three-Color Dot Maze from SuperMazes

By Robert Abbott

**Maze Rules:** Travel along the paths from **Start** to **Goal** and go through the dots in the order red-green-yellow, red-green-yellow, and so on.  
U-turns are not allowed.



Robert Abbott working on his game *Confusion*.



Abbott solving his color maze at G4G7.

This booklet was created to pay tribute to Robert Abbott, who inspired generations of all ages to think critically, creatively, logically, and “out of the box.” Abbott had the ability not only to create brilliant and challenging games, but also to make them accessible and fun for others, either on paper, on the computer, or using walk-through mazes!

On March 8, 1959, Abbott wrote to Martin Gardner, introducing himself and describing his card game Eleusis. This started a fifty year correspondence [1]. Mr. Gardner later wrote: “My two columns on Eleusis were among the most popular” [2].

Robert and his wife Ann attended four Gatherings, starting in 1993. At the 1993 Gathering, Bob’s Exchange gift was an article titled A Maze with Rules. At the same time, an exhibit dedicated to Martin Gardner opened at the Atlanta International Museum of Art and Design. To honor Mr. Gardner, Bob designed and helped build a walk-through Arrow Maze. In 2000, at the Gathering, Bob presented the Bureaucratic Maze. At the 2004 Gathering, Bob’s Exchange gift was his booklet Auction 2002 and Eleusis. In 2006, at the last Gathering he attended, Bob gave a talk titled “What Logic is Not” [1] which can be found at <http://www.logicmazes.com/g4g7.html> [3].

# ROBERT ABBOTT'S LIFE

"Robert Abbott was an American game inventor" [4] of creative card games, board games, an equipment game, and logic mazes (mazes with rules). "Fans ...seem to regard him as 'The Official Grand Old Man of Card Games'" [5]. Mr. Abbott was born on March 2, 1933 in St. Louis, Missouri.

Bob Abbott '51 attended the St. Louis Country Day School (CDS). In the Class Notes, Cliff Saxton (CDS) '64 and Larry Day '51, wrote: "Bob Abbott has never been fond of following the path well-traveled, whether at Country Day or in his later professional life. Instead, his fascination with exploring the mysteries and meanderings of old rights-of-way—highways, railroads, trolley lines, or canals—was instrumental in his becoming the successful inventor, first, of card games, and then of mazes with specific rules that challenge the mind and encourage players' own creativity... Abbott's interest in game design is a pursuit he says was rooted in puzzles represented by plane geometry homework at Country Day" [5].

On March 8, 1959, Bob wrote to Martin Gardner, author of the Mathematical Games column in Scientific American magazine, about his card game Eleusis (pronounced el-you-sis) [6], a game that uses inductive logic [7]. "The original version of Eleusis was first published by Martin Gardner in his Mathematical Games column in the June 1959 Scientific American" [8]. "It was subtitled in Scientific American as 'the game that simulates the search for truth.' The goal of Eleusis is the discovery of a secret rule by which the very game is played, thus enabling its uncoverer to dispose successfully of all the cards on hand" [9]. "This was a life-changing experience for Abbott" [10]. "He was 'discovered' and encouraged by Martin Gardner" [5]. "Eleusis subsequently appeared in Gardner's The 2nd Scientific American Book of Mathematical Puzzles and Diversions and in Abbott's book, Abbott's New Card Games" [8].

"In 2006, John Golden developed a streamlined version of Eleusis, intended to assist elementary school teachers in explaining the scientific method to students" [11]. "Abbott himself considered this version to be a 'great game,' and refers to it as Eleusis Express" [12]. John Golden will lead an Eleusis Express tournament at G4G14! See the rules for play on pages 9-11 of this booklet, at [gathering4gardner.org/remembering-robert-abbott/](http://gathering4gardner.org/remembering-robert-abbott/), and at [logicmazes.com/games/eleusis/express.html](http://logicmazes.com/games/eleusis/express.html). Dr. John Golden is a Professor of Mathematics at Grand Valley State University in Michigan.

"Robert's first logic maze (maze with rules), Traffic Maze in Floyd's Knob, was the first logic maze ever published. It appeared in the October 1962 issue of Scientific American in Martin Gardner's Mathematical Games column" [4].

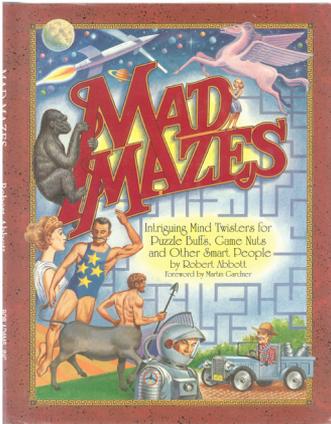
"In 1990, a harder version of this maze under the name, The Farmer Goes to Market, was published in Robert Abbott's book, Mad Mazes" [13]. This maze is on pages 5-6 in this booklet. Abbott created outdoor walk-through logic mazes. "Some have been erected adjacent to cornfield mazes" [5]. "The opening of the first site was on July 4, 1998 in North Carolina" [14].

"Robert lived in Jupiter, Florida with his wife, Ann. There he concentrated on his website, [www.logicmazes.com](http://www.logicmazes.com)" [5]. Ann helped Bob test his mazes before they were published [1]. Abbott was loved by his puzzle fans and by all who knew him. He was a pioneer in making creative card games, board games, and logic mazes. Because he questioned and challenged the conventional rules, he was able to create fascinating games with new rules. Friends and fans feel fortunate to engage with and to be inspired by Robert Abbott's challenging and thought-provoking puzzles and games!

If Robert Frost had known Robert Abbott, Mr. Frost would have written:

Robert Abbott took the path less traveled by,  
And that has made all the difference [15].

Robert Abbott died on February 20, 2018. He is sorely missed. Abbott is survived by his wife, Ann Abbott, of Jupiter, Florida.



*Mad Mazes* book by Robert Abbott.



In the foreground is the Arrow maze; in the background is the Color maze.

# REVIEWS OF ROBERT ABBOTT'S BOOK MAD MAZES

"Inventing a new kind of puzzle, not too hard, not too easy, and fun to crack, is a much harder task than solving such puzzles. Robert Abbott is one of those rare individuals who has the knack of creating such puzzles. How he does it is a mystery.

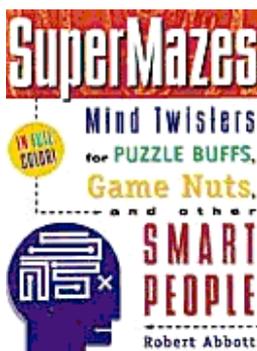
No one has been as creative as Bob in devising bizarre mazes that are unlike any you have seen before. These mazes, let me add, also have an affinity with scientific method. What is science if not the trying of every possible path that can lead to the solution of a puzzle posed by Nature? When researchers reach a blind alley, they sigh and turn back to try other paths."

—Excerpts from Martin Gardner's Foreword to *Mad Mazes* [2]

### Go a mazing with this amazing book!

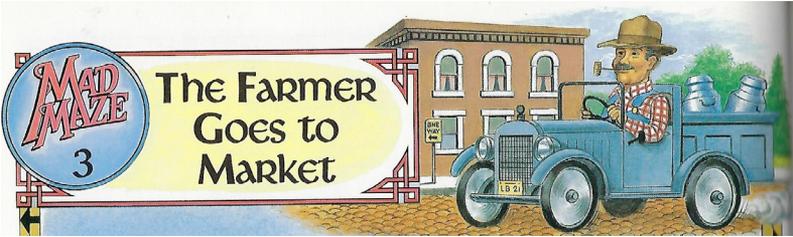
"Looking for the perfect gift for that puzzle buff friend of yours? Look no further. *Mad Mazes* is a delightful book of 20 different mazes, each with its own rules for traveling through the maze. Each maze is challenging and fun and, if you solve it, you will shout Eureka! In this book, you see the genius of Robert Abbott at work and at play! We call him the O. Henry of puzzles as his solutions often have a surprise or twist to them. Each maze is preceded by a fun story which gives the rules for traveling through the maze. So, whether you are 7 or 107, if you enjoy challenging puzzles, this treasure of a book is for you. The good news is that Robert Abbott has written a wonderful sequel to *Mad Mazes*. It is called *SuperMazes*."

—Review by Sandy Sharon



# ROBERT ABBOTT'S MAZES

(HINTS AND SOLUTIONS ON PAGES 14-15)



**The Farmer Goes to Market** is Maze 3 in Robert Abbott's delightfully challenging first book *Mad Mazes*, consisting of "mazes-with-rules."

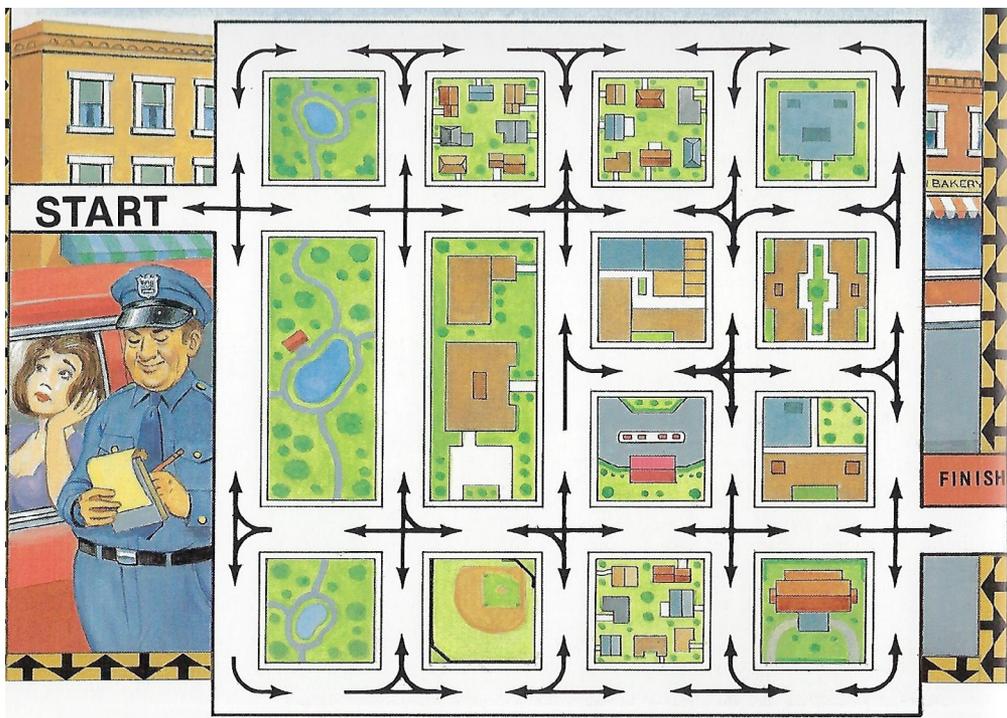
**Maze Rules:** Enter town at Start, on the road at the left and exit at Finish, on the road at the right.

— At each intersection you must follow one of the arrows. That is, you may turn in a given direction only when there is a curved line in that direction, and you may go straight only when there is a straight line to follow. You may leave an intersection only at the head of an arrow. No U-turns or backings-up are allowed.

— As you can see, at the first intersection you can only go straight. At the second intersection you encounter, you can again only go straight. At the third intersection, you can go straight or turn north. Suppose you turn north. At the next intersection you can only turn east. True, there is a line that curves to the west, but there's no arrowhead pointing west, so you can't leave that intersection in a westerly direction.

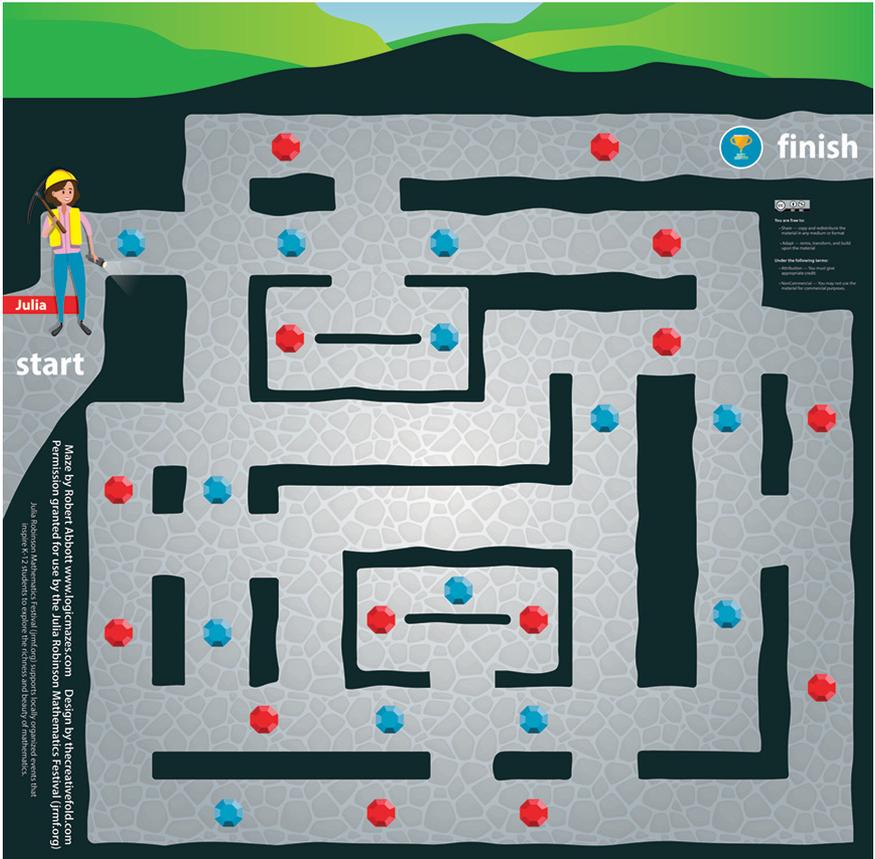
— In this map, there are driveways drawn inside the blocks. The driveways are only decorative; you can't use them as part of your route through a maze.

# A TRIBUTE TO ROBERT ABBOTT



On this and the next page are the Julia Robinson Mathematics Festival renditions of Robert Abbott's mazes. The first maze is from the book *Mad Mazes* and the second maze is from [www.logicmazes.com](http://www.logicmazes.com)

**Cave Escape! Maze Rules:** Can you find a way Julia can escape by stepping over gems, alternating **blue**, **red**, **blue**, **red**, etc.? U-turns are not allowed.



# A TRIBUTE TO ROBERT ABBOTT

**Jumping Julia Maze Rules:** Help Julia get from **Start** to **finish**. Begin on the square in the upper left. Make a series of jumps that will take you to the square marked **finish**. The number on each square indicates how far you move—horizontally or vertically (your entire move must be horizontal or vertical), not diagonally—when you bounce off the square.

<b>Start</b> 4	2	2	3	3
2	2	2	2	2
3	2	2	2	2
1	2	3	2	3
3	2	2	2	<b>finish</b> finish icon

© 2008  
The end of the maze is marked with the number 1. The number on each square indicates how far you move horizontally or vertically. The number on the square you are on is the number of squares you must move horizontally or vertically to reach the square marked with the number 1. The number on the square you are on is the number of squares you must move horizontally or vertically to reach the square marked with the number 1.

Maze by Robert Abbott www.logicmazes.com Design by thecreativefold.com  
Permission granted for use by the Julia Robinson Mathematics Festival (jrmf.org)

**Nancy Blachman**, founder of the **Julia Robinson Mathematics Festival (JRMF)**, became interested in creating maze mats after she acquired Robert Abbott's No-Left Turn maze mat ([www.logicmazes.com](http://www.logicmazes.com) – click on Five Easy Mazes) from the Museum of Mathematics. She searched online and found Robert Abbott's mazes and book *Mad Mazes*. Nancy called the phone number on the website [www.logicmazes.com](http://www.logicmazes.com) and found out from Ann, his wife, that Robert had passed away less than a year earlier. Ann gave permission to the JRMF for the use of Robert's mazes, but she didn't have rights to the illustrations that appear in *Mad Mazes*. So Nancy hired a graphic designer to create new illustrations, two of which are included in this booklet.

The **Julia Robinson Mathematics Festival** designed over a half-dozen maze mats based on Robert's mazes and created a booklet, which can be found on the website [www.jrmf.org](http://www.jrmf.org). JRMF supports locally organized events to engage and inspire K-12 students to think critically. Through the website [www.jrmf.org](http://www.jrmf.org), JRMF offers resources for free to help anyone to host a Festival.



## ELEUSIS EXPRESS

Original Eleusis by Robert Abbott is at [logicmazes.com/games/eleusis/](http://logicmazes.com/games/eleusis/)  
Express variation by John Golden is at [gathering4gardner.org/remembering-robert-abbott/](http://gathering4gardner.org/remembering-robert-abbott/) and at [logicmazes.com/games/eleusis/express.html](http://logicmazes.com/games/eleusis/express.html).  
John's contact information: [goldenj@gvsu.edu](mailto:goldenj@gvsu.edu), [@mathhombre](https://twitter.com/mathhombre), [mathhombre.blogspot.com](http://mathhombre.blogspot.com)

Eleusis is a card game of inductive reasoning, invented by Robert Abbott in 1956, introduced by Martin Gardner in his Mathematical Games column in the June 1959 *Scientific American*. In 1963 it appeared in *Abbott's New Card Games*. It was later revised and extended by Abbott, and Gardner introduced Abbott's new version in the October 1977 *Scientific American*. Express is a considerable simplification of that game. Robert pronounced the name "Eleusis" as "el-you-sis."

**The idea:** One player has a secret rule for which cards can be played.

*Example:* a card has to be a different color from the card before it. Other players lay down cards they think might fit the pattern. If a player lays down a card that works, that player can try to guess the rule. Determining the rule is the ultimate goal.

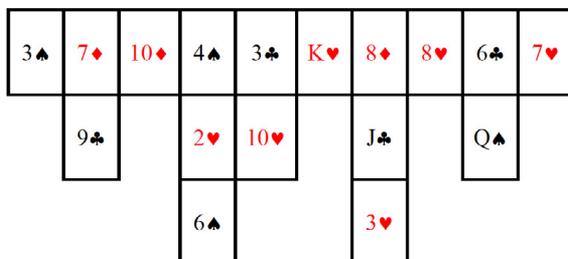
**Number of players:** Eleusis Express is a game for three or more players, and probably best with four or five. Feel free to add decks for larger games of six or more people – the card backs don't matter.

**The stock:** An ace is low, and has the number value 1. Jack=11, Queen =12, and King=13.

Assume, for the description on pages 9-11, that all players are male.

**Object:** A game consists of one or more rounds (hands of play). A different player is chosen as the dealer/rule maker for each new round. All plays are made to a central layout that grows as the round progresses. An example is shown on the next page. A layout consists of a horizontal *mainline* of cards that follows a certain pattern. Below this are vertical *sidelines* of cards that did not work. The *sidelines* are incorrect cards for the next play, rather than for the current play. Players do well by getting rid of the cards in their hands. They get rid of cards by playing ones that are accepted on the mainline of the layout. The dealer/rule maker of a round does not play a hand. (His score is based on the scores of the other players, if you're keeping score.)

## A TRIBUTE TO ROBERT ABBOTT



In this example, the card flipped over was the 3♠, and the 7♦ was a correct play. For the next play, the 9♣ was incorrect, but the 10♦ worked. For the next play, the 4♠ was a correct play following the 10♦. For the next play, the 2♥ and the 6♠ were incorrect. The 3♣ was correct. What might the rule be? As you think, use both the cards that fit the pattern and those that don't!

**The secret rule:** Each round has a different rule that determines which cards are accepted on the mainline and which are rejected. At the beginning of a round, no player knows this rule except the dealer. A rule should allow for several cards to be played at any given time, but not too many. *Examples:* Too restrictive – the next card must be one higher and a different suit. Too permissive – the next card must be a different number from the previous card. A rough rule of thumb is  $\frac{1}{4}$  to  $\frac{1}{2}$  or so of the deck should be playable at any given moment. Every card should be playable after some previous card. Avoid exceptions or wild cards, like “face cards are always correct” or “an ace can be high or low.” Worth noting: whatever the rule, it will often be harder to guess than one might expect. The rule in the example is “If black, play odd; if red, play even.”

**Set up:** The dealer chooses or writes down his secret rule. After shuffling, he deals seven cards to each of the other players. The dealer flips over the top card of the deck. Players can play with their hands open or hidden. Open hands are better for people learning the game.

**Play:** The player to the left of the dealer chooses a card to try to play. The dealer says whether it's in or out. If in, it goes next on the mainline. If out, it goes below the last card on a sideline. If a player plays a card that's out, that player draws another card.

If a player thinks he has no card to play, he can show his hand. The dealer checks – if the player is right, the player can play one of his cards out on the sideline. If the player is wrong, the dealer plays one of the player's cards on the mainline and the player draws a card.

After a correct play on the mainline (or a correct 'no play'), the player can try to guess the rule. A correct guess of a rule equivalent to the dealer's rule ends the hand. On an incorrect guess, the player draws a card and play continues.

**Ending the hand:** After a player guesses a rule, the dealer must decide whether the player is right or wrong. (Dealer: try not to give clues when judging a rule!) The dealer must decide if the player's proposed rule is *equivalent* to his; that is, whether it would have the same effect for each card. Equivalent rules will often be worded differently. If the guess is correct, the hand is over. If the rule guess is incorrect, the player draws a card, and play continues. It's only polite for the player to share how he guessed the rule. (Note that if players are keeping score, a player might want to keep going, even after he knows the rule, to get rid of more cards.) If the rule is never guessed, the hand ends after the last card is drawn. If someone gets to zero cards in hand, he has to make a guess of the rule.

**Ending the game:** If time allows, everyone gets to be the dealer the same number of times. When the last person has had his last turn playing dealer, reminisce about the clever rules and great feats of inference. If playing for points, then total scores to determine the winner.

**OPTIONAL - Scoring:** Players get a number of points for how many cards are left in their hand. If a player guessed the rule, they get an extra -3. The dealer scores the same as the second lowest player. Low score wins at the end of the game. Example: at the end of a hand, Bob has 3 cards and scores 3. Ted has 6 cards and scores 6. Adam has 7 cards, guessed the rule, and scores 4. As John was the dealer, he scores 4 also, since it's the second lowest score. Scored games should have each player as the dealer/rule maker the same number of times. Lowest score wins the game.



Robert Abbott's book, *Abbott's New Card Games*, which includes Eleusis

# A TRIBUTE TO ROBERT ABBOTT

## CREDITS

The information about Robert Abbott is condensed from the tribute page entitled "Remembering Robert Abbott" on the Gathering 4 Gardner website. You can find more about Robert Abbott, his games, his puzzles, and his life on this tribute page.

I thank Ann Abbott for providing valuable information about Robert Abbott, both in this tribute booklet and in "Remembering Robert Abbott" on the Gathering 4 Gardner website. Pictures are Courtesy of Ann Abbott.



Ann & Bob, first entering, and then in, a cornfield maze.

I thank Nancy Blachman for her idea of creating this tribute to Robert Abbott and for giving me the honor of writing this booklet. I am grateful to Ms. Blachman for her many wonderful ideas, excellent advice, attention to every detail, constant guidance and support, valuable feedback of suggestions for improvement, and encouragement throughout the creation of this booklet. I also thank Ms. Blachman for providing information about the Julia Robinson Mathematics Festival.

I thank George Hart for his excellent suggestions, encouragement and help, many editing and formatting improvements, careful proofreading, and for making the booklet look so elegant!

I thank John Golden for writing excellent, detailed, and clear instructions (on pages 9-11 of this booklet) for Eleusis Express, a game he invented as a streamlined version of Robert Abbott's card game Eleusis.

I thank Alice Peters for providing very helpful edits and suggestions.

I thank Mark Saul for proofreading the final draft and providing valuable corrections, thereby greatly improving the clarity and readability of the booklet.

I thank Freddy Bendekgey for doing an excellent job, using his creativity and graphic-design skills, of turning my final draft into such a professional looking, beautiful booklet!

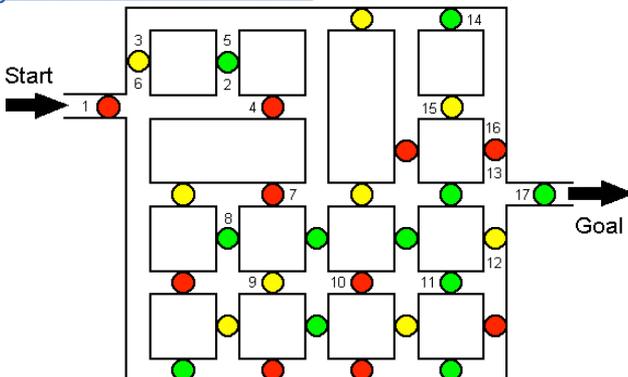
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## MAZE HINTS AND SOLUTIONS

**Hint for the Three-Color Dot Maze** on this booklet cover is here, in SuperMazes by Robert Abbott, and at <https://logicmazes.com/super.html>. Abbott writes: "Most of the tricky part of this maze happens at the beginning. Notice there are two small blocks at the upper-left corner of the maze. You must begin the maze by looping around these two blocks until you can travel through the yellow dot at the upper-left heading north" [16].

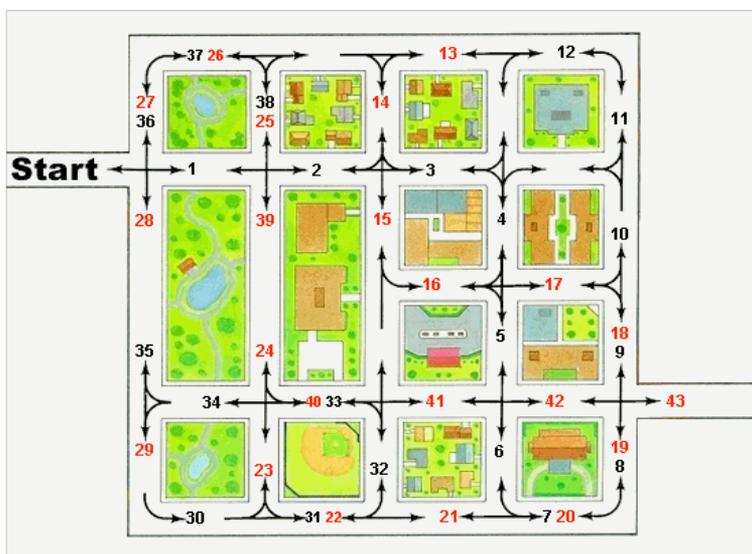
**A Solution for the Three-Color Dot Maze** is here, in SuperMazes, and at <https://logicmazes.com/soludot.html>



## A TRIBUTE TO ROBERT ABBOTT

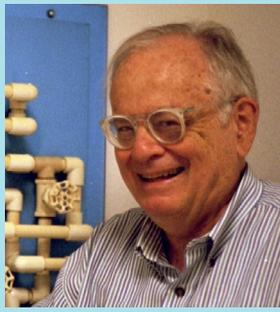
**Hint for The Farmer Goes to Market Maze** on pages 5-6 is here and in Mad Mazes. At [www.logicmazes.com/hintcity.html](http://www.logicmazes.com/hintcity.html), Abbott writes: "There are certain roads that you have to travel first in one direction then later in the opposite direction. The trick is finding a way to get yourself turned around. The rules say that U-turns are not allowed. But there are loops, if you can find them, that you can follow to get turned around."

**A Solution for The Farmer Goes to Market Maze** on pages 5-6 is here and in Mad Mazes. At [www.logicmazes.com/solucity.html](http://www.logicmazes.com/solucity.html), Abbott writes: "Exit from the intersections in the order indicated by these numbers. The colors of the numbers have no meaning."



**Hint for the Cave Escape Maze** on page 7 is here and in Robert Abbott's book Mad Mazes. He writes: "At the bottom of the maze, in the middle, there is a vertical pathway that goes up to a small loop—the loop with two red areas and one blue area. That loop is cleverly designed to look like it doesn't lead anywhere, but only by traveling through it can you reach the goal. To solve the maze, take any route that will get you to the loop, go around the loop, then take any of several routes that will get you from there to the goal" [17].

**A Solution for the Jumping Julia Maze** on page 8 is at [www.logicmazes.com](http://www.logicmazes.com) Click on Five Easy Mazes. Go to Easy Maze 2,3,4,5. Play online. Click for the Solution.



## ROBERT ABBOTT

“THE OFFICIAL GRAND OLD MAN OF CARD GAMES”

“Think of Bob’s mazes as a model of a tiny portion of a perhaps infinite universe—out there, independent of you and me—with uncountable labyrinths waiting to be explored.”

— Martin Gardner

“Bob was a master at finding ways to make deductive logic fun, both in his mazes and in his games. I’ll miss him.”

— Wei-Hwa Huang

“Robert Abbott’s book [*Abbott’s New Card Games*] is for lovers of the unfamiliar challenge, and historical precedent warns that Mr. Abbott may have to wait a few hundred years before his games yield glory to his memory.”

—Albert Morehead

“The best compliments I have received have come from people who said they wanted to build similar [logic] mazes in their back yards. The mazes work for all ages—young children are happy to wander around among the hay bales, and their parents can also be in the maze, attempting to discover the solution.”

— Robert Abbott

**“No greater glory, no greater honor, is the lot of man departing than a feeling possessed deep in his heart that the world is a better place for his having lived.”**

**—Robert Abbott**