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MASTERING PAC-MAN™

KEN USTON

PATTERNS, TIPS, AND STRATEGIES
FOR DOUBLING, TRIPLING, EVEN
QUADRUPLING YOUR SCORE
IN THE GAME THAT'S
SWEEPING THE COUNTRY!

FULLY
ILLUSTRATED

MASTERING PAC-MAN ™

BY
KEN USTON

Revised Edition

To Rae Foy—
thanks for your patience and
your help in whiting out PAC-MAN® dots
and, of course,
to Erroll Garner

Ⓢ

Acknowledgments

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1

INTRODUCTION

When the player puts his first quarter in a PAC-MAN®
machine, he usually doesn't know what to expect. A
cute little electronic tune is played and the first PAC-
MAN board soon appears. Four colored "monsters"
start chasing the player, who is PAC-MAN, a little
yellow fellow who looks like he has a smile on his face.

The player grabs the red control knob (or "joystick")
in front of him, frantically moving PAC-MAN to the
right, left, up, and down. PAC-MAN starts "eating"
some of the many white dots on the board, while mak-
ing a funny gobbling noise. The ever-present monsters
soon catch up with and "eat" PAC-MAN, who slowly
folds his wings and disappears as the machine utters
a little whine in sympathy. Then another PAC-MAN
appears and the process repeats itself two more times
(three more times if a certain score is reached).

When the player is through, he has probably amassed
a score of 600, or perhaps 1,500 if he was lucky. The
game has lasted perhaps one minute, and the player's
quarter is expended.

Yet chances are the player will put another quarter,
and another, into the machine. He will also note that
his ability to maneuver PAC-MAN gradually improves
and his score mounts. If he's playing with another
player, the player with the quicker ability to under-
stand the nature of the game, and with better manual
dexterity, will tend to get the higher score.

The player's scores may increase, to perhaps 5,000
or so. He will note the "High Score" posted at the top

of the screen and wonder how on earth any mortal could have scored 56,800, or 106,500, or even 249,300.

After you finish this book (and invest a few quarters in a PAC-MAN machine) you, too, should be able to achieve these kinds of scores. It's surprisingly easy if a methodical approach is taken. Indeed, the characteristic that attracted me to PAC-MAN is that a predetermined plan is far more important for a high score than is a high degree of physical coordination.

I've spent many dozens of hours in front of a PAC-MAN machine and played well over 1,500 games. At first I played merely because I enjoyed the game. After a while, however, I became hooked when it became evident that the secret to the game was to develop predetermined "patterns" of movement through the PAC-MAN schematic. I drew up PAC-MAN diagrams and spent weeks experimenting to discover new and efficient patterns.

After about a month of play, I discovered three patterns that allowed me to score as much as 182,000. But it was not until several weeks later in San Francisco that I encountered by chance a sixteen-year-old high school junior, Tommy L., who had been experimenting with a variety of advanced PAC-MAN patterns. One pattern in particular, which Tommy calls the "9-Key" (we refer to it herein as Pattern P5), fascinated me, because it allowed the player to move quantum leaps ahead of our earlier knowledge. This very pattern had brought Tommy to his high game of 932,000. Tommy later introduced me to a friend of his, Raymond, who had achieved a score of 1,400,000 on his first "man" before voluntarily quitting in midgame. Raymond, too, spent considerable time with me, introducing me to yet more intricacies of PAC-MAN.

I worked with Tommy and Raymond and spent many hours refining my own skills. I diagrammed and tested all the patterns and gleaned those that, with a minimum of effort, would permit the novice to develop into

what we call a "PAC-Master," a player who can consistently score 150,000 or higher. I tested all the patterns on many machines to ensure they were universally applicable (there are currently two different machine velocities, preset by the technicians on the Standard PAC-MAN model, which I will refer to as the "Slow Game" and the "Fast Game").

I recorded my reactions in learning the patterns, little clues I developed to help in learning the patterns and in overcoming the frustrations of making errors, so that I could pass this knowledge along to others.

The results of this research are included in this book. I have attempted to put together an easy-to-understand guide to learning PAC-MAN, starting with the simple beginning patterns and progressing to advanced ones— all diagrammed in detail on PAC-MAN schematics.

Chapters 2 through 11 all refer to the PAC-MAN model and are equally applicable to either the Slow or the Fast Game. A PAC-MAN type game called New PUC-ONE, has recently been introduced. This model is currently quite rare and is unlikely, I believe, to be encountered by most PAC-MAN players. Since the New PUC-ONE model has a different board and requires different movements, however, I have included a chapter, Chapter 12, on this model and also on another PAC-MAN type game called MAZEMAN™.

Chapter 13 describes various portable PAC-MAN models and contains strategies for playing the particularly well-designed and fun-to-play Coleco model. Chapter 14 on improvising and general tips refers to all models. Because of the recent introduction of a new "computer chip" in some New Jersey machines, I have included in Chapter 15 patterns for handling this chip and a section on how the player may develop new patterns should other chips be introduced.

The dedicated reader should be able to achieve a score of about 7,000 after only a few games. After studying Chapter 8 and putting in perhaps ten hours of play,

the reader should be able to rack up scores of over 100,000, putting him in a (currently) select group of PAC-MAN experts. After studying Chapters 9, 10, and 11, scores of 200,000 and higher will be possible with more practice. Since this book covers every conceivable situation that will be encountered in PAC-MAN, the sky is literally the limit for the player!

2
HOW PAC-MAN™ WORKS

PAC-MAN comes in two models—a console and a table model. The machines work identically. The machine has a screen which alternates with two views: one of the four monsters and their names and nicknames; another with a sample pattern. The control knob or joystick (two knobs on the table model) is located in front of the screen. There is also, of course, a slot where the player may insert his quarter to begin the game. The player then pushes a button to start; he has a choice of two buttons, one for a single-player game, the other for a two-player game in which the players rotate turns.

The player is represented by PAC-MAN, a friendly looking yellow circle with a small wedge missing, which roughly resembles a fish jaw. The player maneuvers PAC-MAN using the joystick, which can move PAC-MAN in four directions: right, left, up, or down. PAC-MAN's jaw faces in the direction he is moving.

The four monsters, each in a different color and each with different movement characteristics, move around the board. Each monster wears a little robe and has two large eyes, which look in the direction the monster is moving. The eyes actually tip off the player about the direction in which the monster will turn, but this interval is so short that it can rarely be exploited. The movement of the monsters is dependent upon (1) the pre-programming of the machine and (2) the movement and location of PAC-MAN. The player may thus move

PAC-MAN in ways which cause monster movements that can benefit him, as we will explain later.

THE MONSTERS

	Color	Name	Nickname
	Red	Shadow	Blinky
	Pink	Speedy	Pinky
	Blue	Bashful	Inky
	Orange	Pokey	Clyde

When any of the monsters "eats" PAC-MAN, PAC-MAN wilts with drooping wings, and an accompanying sympathetic audible whine, and disappears from the board. The player has lost. He is usually given three PAC-MEN (henceforth referred to as "men") before the game is finished; in some games only two men are allowed. If the player reaches a score of 10,000 (15,000 and other scores on some machines), he is awarded an additional man. The player never gets more than four men, no matter how high his score.

The player scores points in several ways:

1. The board is covered with 240 little white dots. Each time PAC-MAN encounters ("eats") a dot, the player gets 10 points, and the dot disappears off the board. Thus one objective is to eat as many little dots as possible.

2. The board also has four larger blinking white dots, one in each corner of the board. These dots are called "energizers." The player is awarded 50 points each time he eats an energizer. The energizers help the player, because when PAC-MAN eats any of the energizers, the monsters all turn dark blue in color (in the earlier phases of the game) and are then subject to being eaten by PAC-MAN. When in their blue state,

the monsters cannot eat PAC-MAN, and the player is safe.

The player gets more points for each consecutive monster he eats after a single energizer is hit. The first blue monster eaten adds 200 points to his score; the second blue monster adds 400 points; the third blue monster, 800 points; and the final, fourth blue monster, 1,600 points. Thus if all four blue monsters are eaten after one energizer has been hit, the player will add 3,000 points to his score (200 + 400 + 800 + 1,600). Alas, it is not often that the player will be able to eat all four blue monsters after hitting an energizer. One key reason for this is that the blue monsters take evasive action, deviously turning corners as they run away from PAC-MAN; some of these moves are predictable, however. After a while, the monsters return to their original colors and become aggressive once again.

Unfortunately for the player, the blue monsters, once eaten, do not disappear forever. The "body" of the monster disappears, but its "soul," in the form of the pair of monster eyes, returns to the center box for "reincarnation" after a short waiting period. The recreated monster leaves the center box and resumes his trip around the board.

When PAC-MAN has eaten all the dots on the board and has hit all four energizers, another board appears, complete with new dots and energizers. The process then begins anew. As we will see, the boards have somewhat different characteristics.

After two boards, the player is given a small intermission. A little tune is played as a monster chases PAC-MAN across the screen from right to left. Then a giant PAC-MAN chases the monster across the screen in the opposite direction. After a few more boards, another intermission scene is shown. The monster, as he chases PAC-MAN across the board, rips his robe, and appears to be embarrassed as he leaves a bit of leg showing. In a subsequent intermission scene (the final

one, which is repeated) the monster actually gets his robe taken off and flees PAC-MAN, naked, carrying his robe behind him. Yes, those programmers do have a sense of humor.

3. Each progressive board, rather than having a number or a name, is identified by a symbol, in most cases a type of fruit. PAC-MAN players refer to the symbol as the "fruit," even though at times it is something else. From now on, we, too, will refer to the symbol in this way. The fruit is shown in the lower righthand corner of the board. Board 1, for example, is designated by two little red cherries. As each board appears, its fruit is shown in the lower righthand corner, to the left of the previous fruit(s).

During each board, the fruit periodically appears in the center of the screen. The fruit stays lit for a period of time. If the player eats the fruit when it is shown in the center of the board, he is awarded points. The fruit appears twice during the course of each board, and thus may be eaten twice during each board.

The value of the eaten fruit increases as the player gets more and more boards. During the first board, the fruit (the two cherries) is worth 100 points to the player when eaten. In later boards, the fruit, when eaten, awards values of 300, 500, 700, 1,000, 2,000, 3,000—and finally a top value of 5,000 points (when the fruit is represented by a blue "key").

The reader can now understand how scores of hundreds of thousands of points are possible. For each board with a "key" fruit, the player has a potential of getting 10,000 points (5,000 twice) for eating the key, 2,600 points for eating the dots and energizers, and theoretically (although not practically) 12,000 points for eating all four blue monsters four times—after each of the four energizers has been hit (3,000 points × 4).

Since the value of the fruit increases so dramatically, from 100 to 5,000 points, it is evident that the key to PAC-MAN is to amass many boards. I have often won-

dered if the designers of the game made the final symbol a key for this reason.

Summary

To summarize, offensively the player amasses points
(1) by eating as many of the small dots as possible
(2) by eating as many of the blue monsters as possible
(3) by eating as many fruits as possible.
He tries to eat all dots and energizers in order to advance to as many new boards as possible.

Defensively, the player must avoid being eaten by the four monsters. He does this by taking evasive action to avoid the monsters or by hitting an energizer to render the monsters helpless, making them subject to being eaten by PAC-MAN.

3

BOARD LAYOUT AND CHARACTERISTICS OF SUCCESSIVE BOARDS

THE BOARD

Let's take a closer look at the PAC-MAN board (Figure 1).

Dots. The board has 240 dots, arranged sequentially in mazelike paths. The paths are created by the strategic location of twenty-seven dividers.

Energizers. There are four energizers, each located in a corner of the board. We will label the energizers, and the quadrant in which each is located, as follows:

Quadrant Number	Energizer Number	Board Location
Quadrant 1	E1	Upper lefthand portion
Quadrant 2	E2	Upper righthand portion
Quadrant 3	E3	Lower lefthand portion
Quadrant 4	E4	Lower righthand portion

Center of the Board. Note in Figure 1 that there is a center box surrounded by four channels without dots (the "center channels"). The center box is where the

"eyes" of the eaten blue monsters return, wait briefly, and return once again to the board as aggressors, through the exit at the top of the center box. The center channels are quite helpful in maneuvering PAC-MAN, either to avoid being eaten by the monsters, or to maneuver the monsters into positions that are desirable.

Figure 1

PAC-MAN® BOARD LAYOUT

QUADRANT 1   QUADRANT 2

E1

E2

THE (S) CHANNELS

LEFT TUNNEL

CENTER BOX

LOCATION WHERE FRUIT APPEARS

RIGHT TUNNEL

E3

●STARTING POINT

E4

QUADRANT 3   QUADRANT 4

Symbol designating Board
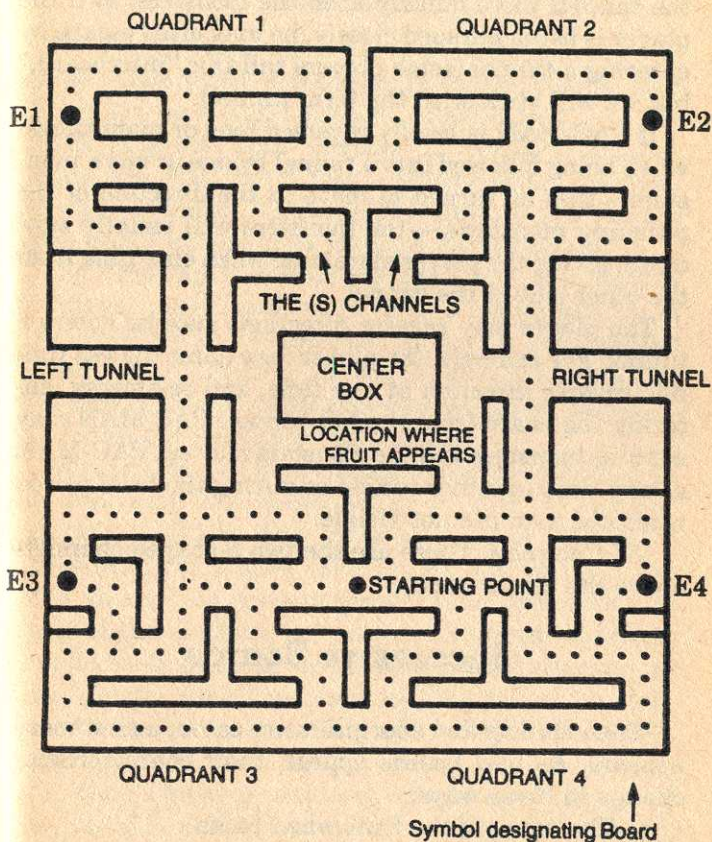
Tunnels. It is possible for PAC-MAN or the monsters to enter each of two tunnels (designated as the "left tunnel" and the "right tunnel") and return to the board on the opposite side through the other tunnel. For example, the player may leave the board through the left tunnel (by pushing the control knob to the left) and return to the board from the right side, through the right tunnel. The monsters also go through the tunnels. Both PAC-MAN and the monsters disappear briefly from sight as they move from the end of one tunnel to the beginning of the other. PAC-MAN moves through the tunnels more quickly than the monsters, so if the player is being pursued closely, he may often escape by entering a tunnel (some players call this "interboard," but we will stick with the term tunnel).

If PAC-MAN is briefly reversed (one or more times) when being followed into a tunnel by one or more monsters—that is, turned to move in the direction of the pursuing monster(s)—the monsters will usually slow down, giving the player more time when emerging from the other side of the tunnel.

The player may reverse directions once he enters a tunnel. For example, the player may enter the left tunnel, reverse direction at any time, and re-emerge, entering the board from the left tunnel. PAC-MAN may eat blue monsters and the monsters may eat PAC-MAN at any time in either tunnel or during the brief period when the men are not visible.

"S" Channels. These are the two S-shaped channels above the center board.

Successive Boards

When all dots and energizers are eaten, a new board appears. As new boards appear, their characteristics change in three ways:
1. The value of the fruit when eaten

2. The speed of PAC-MAN and the monsters
3. The characteristics of the monsters after ener-
   gizers are eaten.

1. The Value of the Fruit When Eaten

The value of the eaten fruit increases for successive
boards, as shown in Figure 2.

2. The Speed of PAC-MAN and the Monsters

The second characteristic that changes in successive
boards is the speed of the men. In earlier boards, both
PAC-MAN and the monsters move slowly. As the
boards progress, both increase in velocity. In later
boards, the PAC-MAN moves slowly while the mon-
sters move rapidly. The idea, of course, is to make the
game progressively more difficult for the player.

The differing velocities constitute one reason why
the player must learn more than a single pattern of
play. Fortunately, a different pattern is *not* required
for each board. In fact, the player who can memorize
only four or five patterns (and execute them perfectly)
will be able to become a PAC-Master.

Slow Games and Fast Games. The characteristics of
the first board can be pre-set by PAC-MAN machine
technicians. When first introduced, most PAC-MAN
games began at a slow velocity. We will call this the
"Slow Game." As more players became proficient and
occupied the machine for longer and longer periods of
time for their 25 cents, technicians pre-set some games
with a faster initial velocity, making the game more
difficult for the player. We will call this the "Fast
Game."

To date, I have encountered only two settings—and
I've played PAC-MAN across the country, in New York,

Figure 2

Symbols of Each Board
and Maximum and Reasonable Scores

Board Number	Symbol (Fruit)	Symbol Name	Points to Player When Fruit Is Eaten	Maximum Possible Score*	Reasonable Score**
1		Cherries	100	14,800	8,000
2		Strawberry	300	30,000	15,000
3		1st Orange (also Peach)	500	45,600	20,000
4		2d Orange	500	61,200	24,500
5		1st Apple	700	77,200	30,000
6		2d Apple	700	93,200	35,000
7		1st Pineapple (also Grape)	1,000	109,800	43,000
8		2d Pineapple	1,000	126,400	47,500
9		1st Bird (also Phoenix & Galaxian)	2,000	145,000	54,000
10		2d Bird	2,000	163,600	60,500
11		1st Bell (also Beehive)	3,000	184,200	70,000
12		2d Bell	3,000	204,800	78,500
13		1st Key	5,000	229,400	91,000
14		2d Key	5,000	254,000	103,400
15		3d Key	5,000	278,600	115,800
16 and	beyond	Keys	5,000		150,000 to 1,000,000 +

*Unattainable since the player will never eat all four blue monsters four times each board.
**Based on reasonably proficient play of the Fast Game.

New Jersey, California, Oregon, and points in between. If, in the future, the game is pre-set at other velocities, the player will be able to use the information in this book to discover which patterns should be used for each board.

Some games allow only two men initially, with one bonus man. This factor will be of little consequence to the advanced PAC-MAN player.

Figure 3

Slow-and Fast-Game Equivalents, Blue-Monster Time, and Applicable Patterns

Slow-Game Board	Equivalent to	Fast-Game Board	Blue-Monster Duration ("Blue Time")	Applicable Pattern	
1. Cherries		X*	Very Long	P1	
2. Strawberry		1. Cherries	Very Long	P2	
3. 1st Orange		X*	Very Long	P3	
4. 2d Orange		2. Strawberry	Long	P3	
5. 1st Apple		3. 1st Orange	Medium	P4	PK
6. 2d Apple		X*	Very Long		
7. 1st Pineapple		4. 2d Orange	Medium		
8. 2d Pineapple		5. 1st Apple	Short		
9. 1st Bird		6. 2d Apple	Short		
10. 2d Bird		7. 1st Pineapple	Very Long		
11. 1st Bell		8. 2d Pineapple	Medium		
12. 2d Bell		9. 1st Bird	Short		
13. 1st Key		10. 2d Bird	Short		
14. 2d Key		11. 1st Bell	Medium		
15. 3d Key		12. 2d Bell	Short		**
16. 4th Key		13. 1st Key	Short	P4	PK**
17. 5th Key		14. 2d Key	NO Blue	P4-Tunnel	
18. 6th Key		15. 3d Key	Short	P4	
19. 7th Key		X*	NO Blue	P4-Tunnel	
20. 8th Key		X*	NO Blue	P4-Tunnel	
21. and beyond. Keys		16. and beyond. Keys	NO Blue	P5	

* No equivalent on the Fast Game
**Without perfect timing, PK may break down.

There is a direct correlation between the velocities and movements of the men in the Slow Game and the Fast Game. Thus the player may use identical patterns whether playing the Slow or the Fast Game (the one exception to this is the unique pattern required for the first board of the Slow Game).

The relationship between the movements of the men in the Slow and the Fast Game is shown in Figure 3,

as are the appropriate PAC-MAN patterns to be used. The blue-monster durations for each board are also included. Note that the longer the "blue time," the more aggressive the player should be in eating blue monsters:

Blue-Monster Duration ("Blue Time")		Strategy in Eating Monsters
Very Long	over 7 seconds	Aggressive
Long	5–6 seconds	Fairly aggressive
Medium	3–4 seconds	Conservative
Short	under 3 seconds	Do NOT chase

How to Tell the Slow Game from the Fast Game. It is possible to distinguish the Slow Game from the Fast Game by the sample pattern on the board before any quarters are inserted into the machine.

Slow Game. In the sample pattern, PAC-MAN will eat three energizers in sequence, E4, E1, and E3, and end up being eaten by the light-blue monster just *above* E3.

Fast Game. PAC-MAN will eat E4, E2, and finally E1, and then be eaten by the orange monster just *below* E3.

(Note: in the recently introduced "Atlantic City Chip" described in Chapter 15, PAC-MAN eats no energizer in the sample pattern and is eaten by the light-blue monster near E4.)

3. Characteristics of the Monsters After the Energizers Are Eaten

In the early stages of the game (during the earlier boards), the monsters turn blue in color for longer durations when the energizers are eaten. As the game progresses, the blue time tends to decrease, although

there are interesting lapses in this tendency. In later boards, the monsters do not turn blue at all, making completion of the board far more difficult for the average player.

When the monsters are about to change back from blue to their original color, and thus once again become aggressors, the player is usually given a warning—the monsters "blink," alternating between blue and white in color. The number of warning blinks also varies with different boards.

The advanced player should become aware of the blue times and the blinking characteristics of various boards. He should memorize the best strategy for each board of the game he is playing. For example, the strategy to be memorized for playing the Fast Game is—

"Be aggressive during the first board and the 1st pineapple. Be fairly aggressive during the second board. Be conservative during the two orange boards, the 2d pineapple, and the 1st bell. Do not chase blue monsters during any of the other boards."

4

STEPS IN LEARNING PAC-MAN™

As in most other activities involving skill, it is necessary in PAC-MAN to acquire ability in stages. I have designed this book to be "modular," that is, it is divided into sections requiring continuously increasing levels of skill. Thus the reader should be able gradually to build his PAC-MAN skill. The remaining chapters may be categorized into instructional sections, as follows:

Beginning PAC-MAN

Patterns P1 (Chapter 5) and/or P2 (Chapter 6).

The reader will learn to complete the first two boards of the Slow Game (attaining scores of 12,000 to 17,000) or the first board of the Fast Game (scores of 6,000 to 10,000).

Intermediate PAC-MAN

Pattern P3 (Chapter 7).

The reader will learn to complete the first four boards of the Slow Game (scores of 20,000 to 30,000) or the first two boards of the Fast Game (scores of 12,000 to 17,000).

Advanced PAC-MAN No. 1

Pattern PK (Chapter 8).

The reader will learn to complete the first fourteen boards of the Slow Game (scores of 90,000 to 110,000) or the first eleven boards of the Fast Game (scores of 60,000 to 80,000).

Pattern PK is readily learned. It allows a tiny number of timing errors and requires no timing-delay skills on the part of the player. Thus it may be mastered solely through rote memorization.

Indeed, if PK is played perfectly, it will take the player beyond the fourteenth and eleventh boards of the Slow and the Fast Game, respectively. However, with only fraction-of-a-second lapses in timing, the pattern may break down in the advanced boards.

I advise players interested in becoming PAC-Masters to disregard Chapter 8 and learn patterns P4, P4-Tunnel, and P5 in the following three chapters. I have included this chapter on Pattern PK because PK is so readily executed and because I believe that P4 is somewhat more difficult to execute. PK happens to be my favorite pattern—it neatly clears up all dot-paths before eating any energizers and many players seem to be able to execute this pattern without error far more frequently than any other advanced pattern.

Players willing to settle on becoming advanced PAC-MAN players (scores sometimes of up to 180,000 on the Slow Game and up to 127,000 on the Fast Game) can learn Pattern PK and join the ranks of the very best PAC-MAN players.

Advanced PAC-MAN No. 2.

Pattern P4 (Chapter 9).
Pattern P4 is more difficult to execute than PK when

the energizers are cleared up at the end of the pattern. However, mastery of P4 is necessary if the player wants to go on to become a PAC-Master. Executed correctly, P4 will take the player through the eighteenth board of the Slow Game (the 6th Key), except that it will not handle the seventeenth board (the 5th Key). P4 will take the player through the fifteenth board of the Fast Game (the 3d Key), but will not handle the fourteenth board (the 2d Key).

PAC-Master Play

Patterns P4-Tunnel (Chapter 10) and P5 (Chapter 11).

Mastery of Pattern P4-Tunnel will enable the player to complete the first twenty boards of the Slow Game (through the 8th Key) and the first fifteen boards of the Fast Game (through the 3d Key). Those of average agility should be able to master P4-Tunnel after perhaps five to six hours of practice. The reader should *persist;* remember that there's only one more pattern to master on the road to becoming a PAC-Master!!

After mastery of Pattern P5, the player will be able to complete all the advanced boards. P5 is somewhat difficult to learn because it requires timing-delay skills. Theoretically the player will be able to play a PAC-MAN game indefinitely. The reader will be in the ranks of the top players nationally (as of this writing) and be able to rack up scores of hundreds of thousands of points.

Improvising at PAC-MAN and General Tips

Chapter 14 includes numerous tips that will help the player attain higher scores.

How to play without a pattern. Improvisational skill

is essential for handling situations when the player will mistakenly deviate from a pattern—and all players, no matter how skilled, do. This skill will allow the player to complete such "blown" boards so he may revert to the use of the correct pattern on subsequent boards.

How to "hustle." Improvising is a skill essential to "hustling" a PAC-MAN game—that is, attempting to induce others to bet on PAC-MAN games without revealing one's basic skill and knowledge of patterns. While it seems that most arcade betting is in the $1 to $5 range, games have been played for $50 and $100 in certain Las Vegas bars.

The chapter also offers general tips on how to play well—and as a last resort, I've included a list of commonly used alibis in case you blow a game.

Humans versus Computers

In PAC-MAN, remember you are playing an electronic opponent. Computers "think" in thousandths of a second, and even faster—millionths and billionths of a second.

There will be times you think you've played the pattern exactly—with no delays—and yet the monsters move differently than expected. This is because you can never distinguish a millisecond delay (thousandth of a second) in your pattern—but the computers can and do.

One way to minimize human delay in PAC-MAN is to turn the control knob in the desired direction before PAC-MAN enters the intersection at which the turn is to be made. Thus he will turn "immediately" in accordance with the delay time of the PAC-MAN electronics, and there will be no human-delay time. Obviously, if you turn the control knob prematurely, you'll turn too early, at the wrong intersection.

Even using this approach, you will inadvertently cause delays—delays which will seem instantaneous to you but which are interminable to the PAC-MAN computer. Fortunately, small delays can usually be handled by the patterns described in this book. In most cases, you will know when you've delayed by the movement of the monsters. I have included in the patterns, when appropriate, some of the more common delays, as well as advice on how to correct for them—if indeed the delays are correctable.

Summary

All the information you need is here. All you must do now is read each section and master the pattern(s) in each before proceeding further. The earlier sections (patterns P1, P2, P3 and PK) can be learned readily and without the investment of many quarters. P4, P4-Tunnel, and P5 require more time to learn, and thus more quarters. But when you start racking up those astronomical scores—and setting records in arcades and cocktail lounges—you will feel that the effort was well expended.

Now it's up to you. So read, study, practice—and go set some records!!

5

NOTES ON PATTERN PLAY AND PATTERN P1

Notes on Pattern Play

On the following pages are detailed schematics of each of the patterns, drawn on miniature PAC-MAN boards. In all cases, I have been as specific as possible in diagramming the player's actions.

The schematics have several notation codes, as follows:

"!" means the player should eat the energizers and then eat blue monsters. The exact number of blue monsters to be eaten is not designated because slight fraction-of-a-second variations in the player's pattern will alter the exact location of each monster. When the symbol "!" is shown, the player should be able to eat two, three, or sometimes even four monsters. Where the path merely progresses through an energizer without a "!," the player should either avoid eating monsters and finish the pattern, or eat one blue monster if one is nearby and can be safely eaten.

"H" means the player should hesitate or pause. In all cases, the narrative will instruct the player how long to hesitate.

"R" means "reverse." The player should proceed to the point designated in the schematic and *immediately* reverse direction. Reversals are also indicated (some-

times without explanation) as curlicues in the diagram, which look like this:

A, B, C...are points in the pattern to which the narrative will refer. These are usually required when a move is dependent upon the location of one or more monsters at that point (which can vary with only minute variations in the player's reaction time).

F designates the appearance of the fruit symbol on the center channel of the board. The fruit should appear at that point in the pattern and should be eaten by the player.

In short:

"!"	=	Eat energizer and monsters
"H"	=	Hesitate
"R"	=	Reverse
A,B,C...	=	Points I'll explain
F	=	Fruit appears

Conservative Improvisation

When there are only energizers surrounded by a few dots remaining on the board, I will say "improvise conservatively" in the narrative. Please, please follow this advice. When I say conservatively, I mean just eat the energizer and dots and *only* the blue monsters that can be eaten with *total* safety. Do *not* take any chances.

As I write this, I know many of you will tend to ignore this advice. Please try to avoid the very strong temptation to "eat one more monster." In many cases, you will find the blue monster will revert to the original color just as you try to eat him and you, in turn, will be eaten. This will be your primary reason for losing men once you've mastered the pattern. And it is frus-

trating, because it's totally unnecessary. Remember, when I say "improvise conservatively," the *key* is to *clear the board and go on to the next board.* You will score far, far more points from additional boards than you will from attempting, unsafely, to eat up one or two more monsters.

Necessity for Improvisation in Patterns P1 and P2

During patterns P1 and P2 particularly, slight timing deviations can lead to variations in the movements of the monsters. In P1, the player should be able to adhere closely to Charts 1 to 3. When encountering Chart 4, variations may result as the player tries to eat more and more blue monsters after hitting each energizer. Going for additional blue monsters is appropriate, if the player has acquired sufficient improvisational skill to take evasive action. If not, the player should adhere to the patterns shown, settling initially for few blue monsters (but hopefully more boards).

In P2, Charts 1 through 4 should be adhered to; Charts 5 and beyond will apply to most games in which the player's timing is not delayed. Where variations occur, rely on conservative improvisation. The fact that improvisation is sometimes required in the latter parts of P1 and P2 is not critical, because during these two patterns, the monsters move most slowly and are most easy to evade. The more difficult boards handled by patterns P3, PK, P4, and beyond are far more standard and the player will be able to adhere more closely to the patterns as diagrammed.

When clearing up energizers toward the end of P1 and P2, it may be necessary to take evasive action in moving from one quadrant to the next. This evasive action will be:

(1) a delay at the current quadrant until threatening monsters have left the next quadrant to be finished

(or the paths en route to the next quadrant).

(2) a trip through the tunnel to await more favorable positioning of the monsters.

PATTERN P1

Pattern P1 is required only for the first (cherries) board of the Slow Game. Those of you who play only the Fast, New PUC-ONE® or MAZEMAN® Games can ignore this pattern. I suspect that eventually the Slow Game (and thus this pattern) will become extinct as more and more technicians, to increase profits on PAC-MAN, are instructed to convert the machines to the Fast Game.

The concept behind Pattern P1 is:

1. Clear most dots in the lower portion of the board (quadrants 3 and 4).

2. Make a hasty run up the lefthand vertical channel of the board.

3. Clear a few dots in Quadrant 2, getting the monsters to follow you.

4. Advance to Quadrant 1, eat E1 and three or four blue monsters.

5. Clear the remaining dots in Quadrant 1.

6. Clear the two "S" channels.

7. Finish up Quadrant 2, go south and finish Quadrant 4, and complete Quadrant 3.

Since the monsters move so slowly during the first board of the Slow Game, you should have no trouble mastering this pattern in several attempts. The trickiest part of P1 comprises the moves in Chart 1. If you delay in making these moves, your northward run up the board in Chart 2 may be stopped by the pink monster. Try to make the Chart 1 moves fast, turning the joystick before entering each intersection so PAC-MAN turns immediately upon entering the intersection. Since PAC-MAN, too, moves slowly during this board,

you should be able to master this skill after only several attempts.

Point A in Chart 2. Be sure the monsters following you pass point "x" on Chart 2—as they go from left to right. If they do, it is safe for you to turn left at Point A and double back to Quadrant 1.

If your timing is too slow, monster(s) may turn "up" (north) at intersection "x." If they do, merely turn right at Point A, eat E2 and blue monsters, and then proceed to Quadrant 1. This, however, is only an emergency measure. In properly learning P1, you should be able to follow the pattern exactly as indicated on the charts.

After successfully finishing this pattern (and thus the first board), you should have a score of from 6,000 to 7,000.

Point B in Chart 4. Sometimes it may not be possible to go through the right "S" channel en route to E2. If so, traverse east through the center channel and then go north to E2, picking up the dots in the "S" channel after eating E2. The route plotted on Chart 4 will be possible if the player is conservative in eating blue monsters in Quadrant 1.

Point C in Chart 4. The correct route to eat E2 can vary with minute changes in the player's timing. The route depicted is most readily available. Sometimes deviations may be required in approaching E2, such as first clearing additional dots. The important point: be conservative—get to eat E2, eat a few *safe* blue monsters, and proceed to E4 and then to E3, as shown on Chart 5.

Fine Point

As the player becomes more proficient at improvisation and more familiar with the layout of the paths of the board, he will be able to eat more and more blue monsters safely and take evasive action to avoid being eaten. When this is the case, the best routes after eating

energizers will often be dictated by the position in which the player finds PAC-MAN after eating the last blue monster.
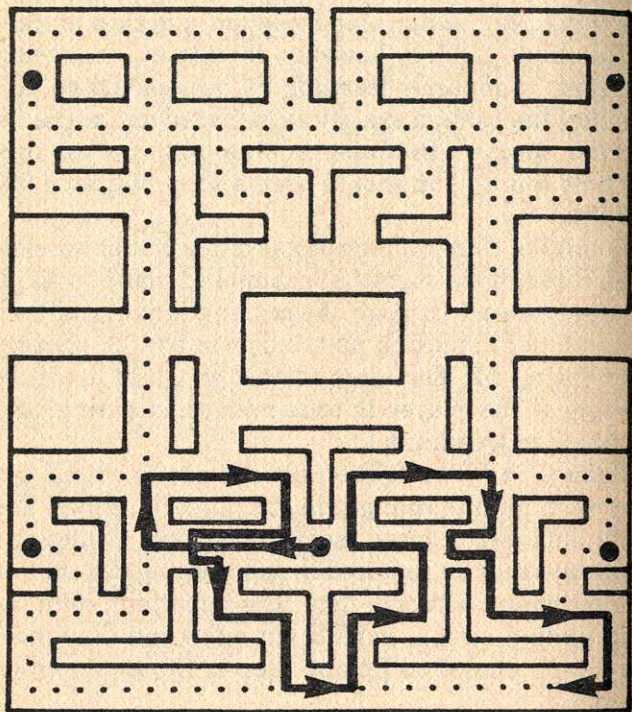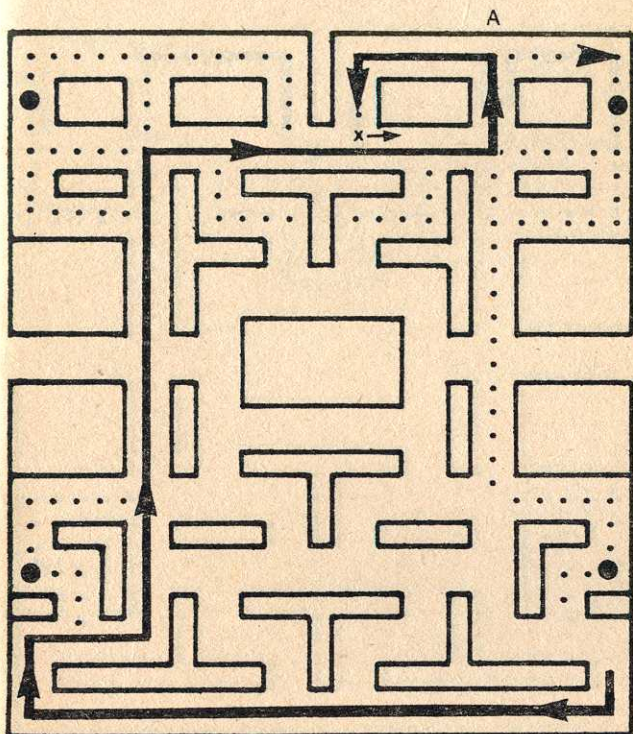
PATTERN P1
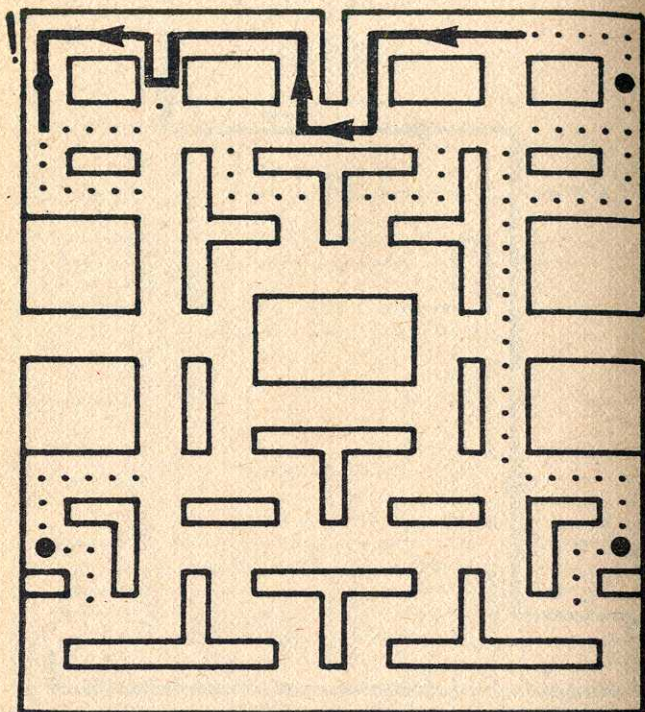
CHART 1

CHART 2
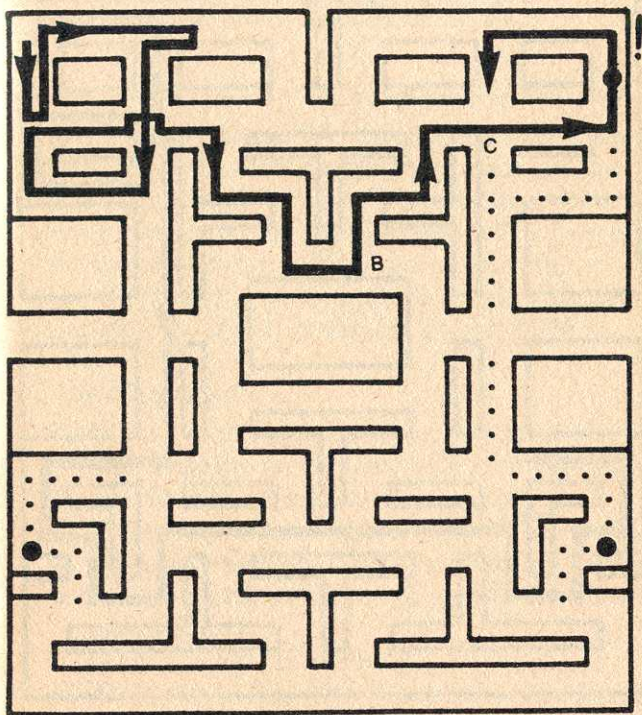
CHART 3

CHART 4

CHART 5
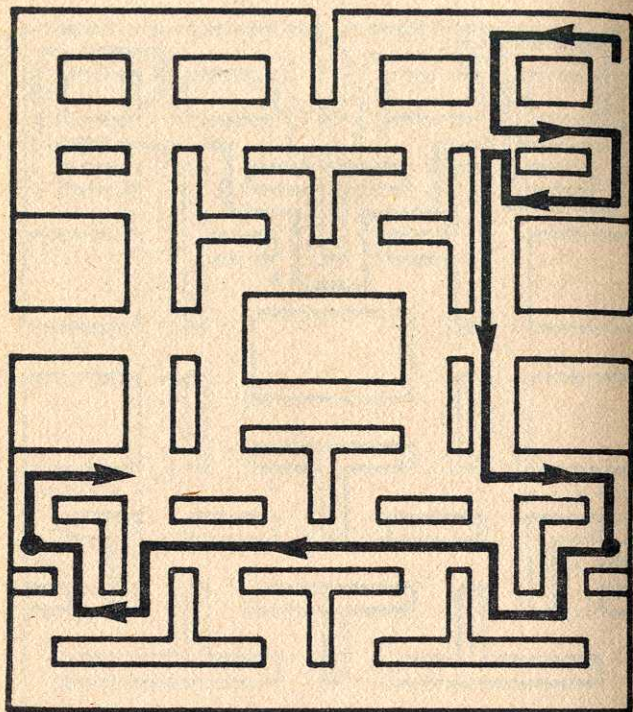
6

PATTERN P2

Pattern P2 is designed for the first board of the Fast Game and the second (strawberry) board of the Slow Game. It is simple to learn because the monsters are moving slowly during these boards. P2 is designed to yield the player fairly high scores from these boards since, if properly executed, all four blue monsters are eaten after E4 is hit, giving the player 3,000 in bonus points.

The P2 concept:

1. Clear out most of the lower portion of the board and converge on E4 just before the monsters do.
2. Hit E4 and eat all four blue monsters.
3. Proceed north and eat the right "S" channel.
4. Proceed to Quadrant 3, clear all dots, and eat E3.
5. Proceed north to Quadrant 1, clear the quadrant, eating E1.
6. Clear the left "S" channel.
7. Finish up at Quadrant 2 and eat 2 and the seven dots in Quadrant 4.

Notes on P2

Point B in Chart 3. With undelayed timing, all four blue monsters should be eaten when Point B is reached. Delayed movement will make it necessary to move to the left and/or right of Point B to eat all the monsters. That's OK—these moves won't throw off the timing of P2.

Point A in Chart 2. Sometimes a *very* slight hesitation is required to entice the monsters a little closer — just prior to eating E4. This will help to ensure that all four blue monsters may be eaten after E4 is hit.

PATTERN P2

CHART 1

CHART 2

CHART 3

B
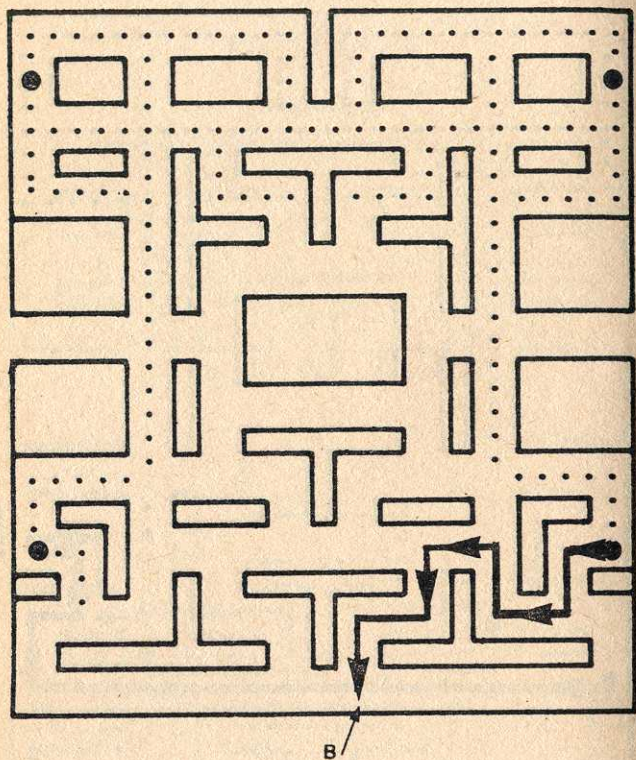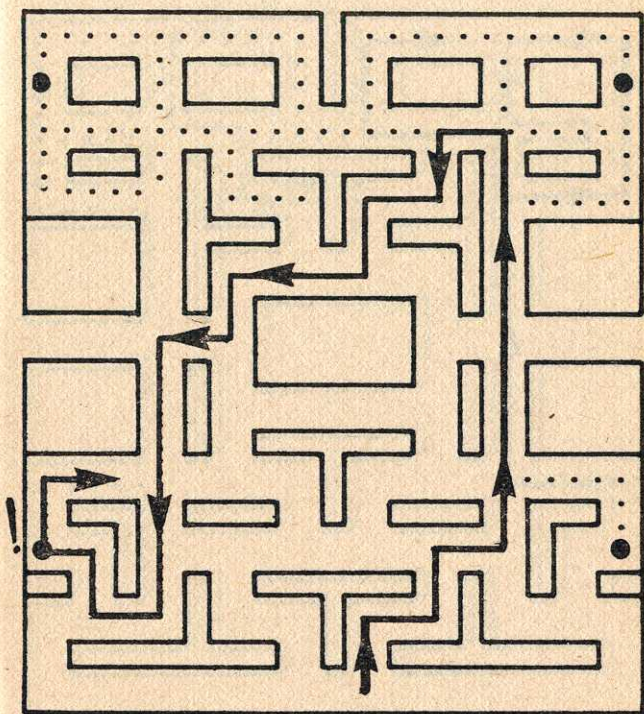
CHART 4
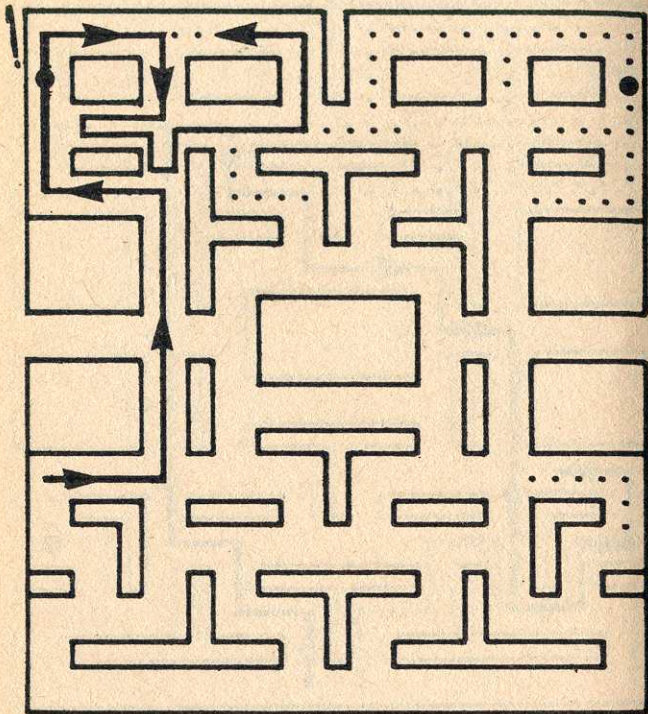
CHART 5
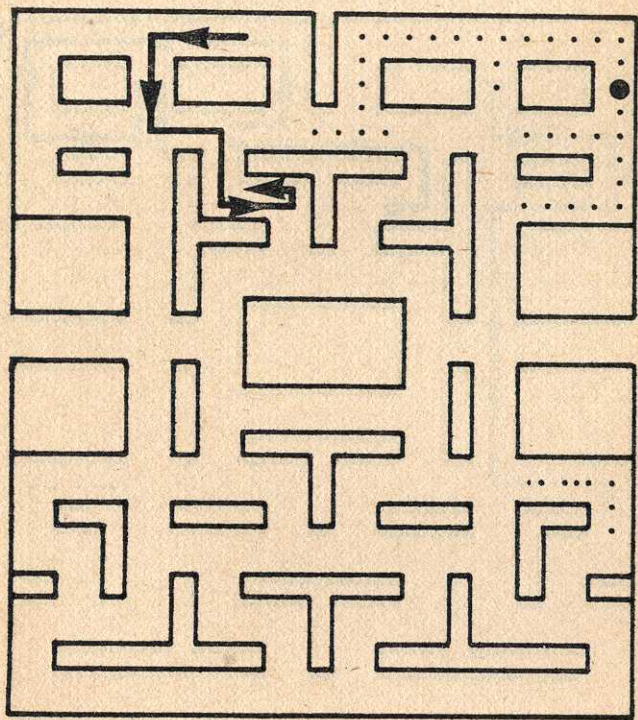
CHART 6

CHART 7

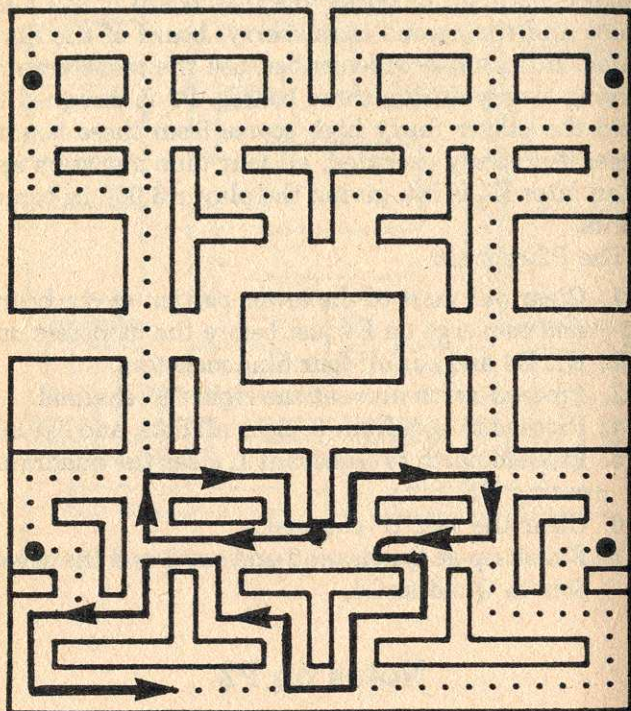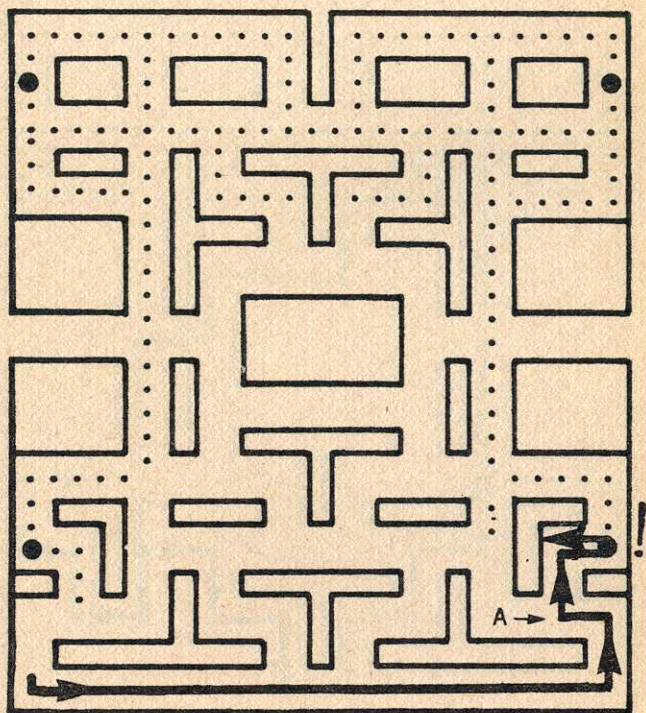**CHART 8**
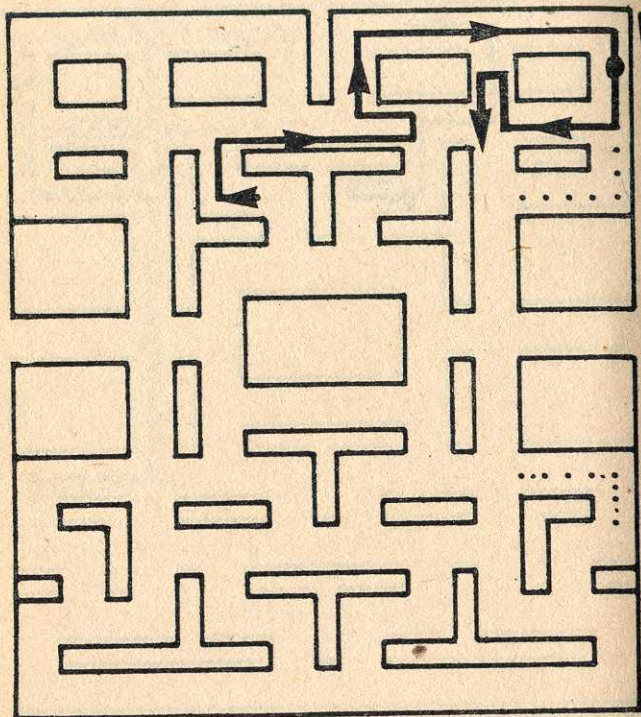
7

PATTERN P3

Pattern P3 is designed for the second (strawberry) board of the Fast Game and the third and fourth boards (1st and 2d oranges) of the Slow Game. P3 is the pattern that players tend most consistently to finish perfectly. There are few close calls throughout the pattern. The player who has mastered P3 will find it fairly easy to learn Pattern PK since many of the moves of P3 and PK are identical. This is why we call P3 the "PK Strawberry" pattern.

Notes on P3

Point A in Chart 4. After eating E1, reverse direction. If you follow the moves on Chart 4, you should be able to eat all four blue monsters most of the time (sometimes you'll eat only three as one monster heads off to Quadrant 2). Note that P3 requires three reverses here:

1. After eating E1, reverse, going north.

2. At the first intersection, make a slight southward movement to eat the second blue monster, who will move south (with perfect timing this reverse isn't necessary).

3. At the end of the channel, after eating the fourth monster, reverse to the left to resume clearing out Quadrant 1 (as shown in Chart 5).

With delayed timing, the fourth monster may escape being eaten by entering either the center channel or

Quadrant 1. If this happens, eat only three monsters (do not chase the fourth) and continue following the pattern.

Point H in Chart 5. Hesitate at H until the orange monster, coming across the center channel (from right to left), passes point "x" and moves southward.

When cleaning up the board, hitting E3, E4, and finally E2 (Charts 5 and 6), be *conservative*. Don't try to eat blue monsters unsafely. Remember, your goal now is to *finish this board*.

PATTERN P3

CHART 1
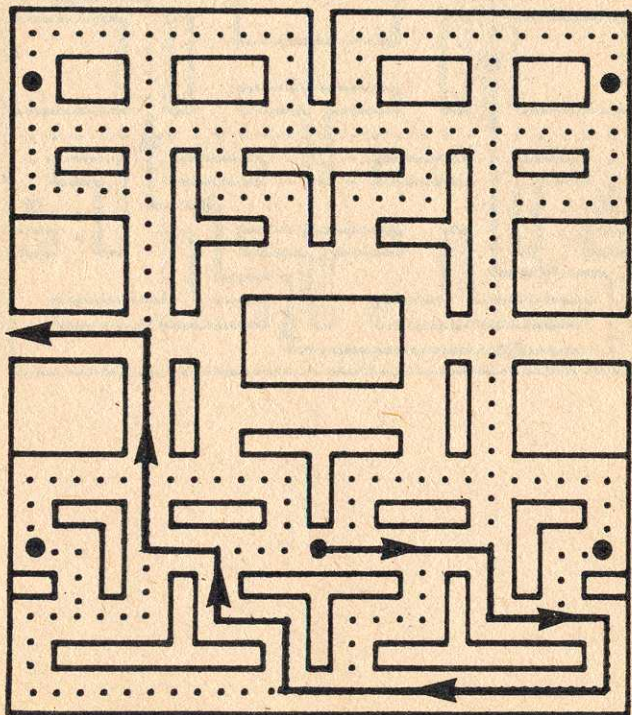
CHART 2
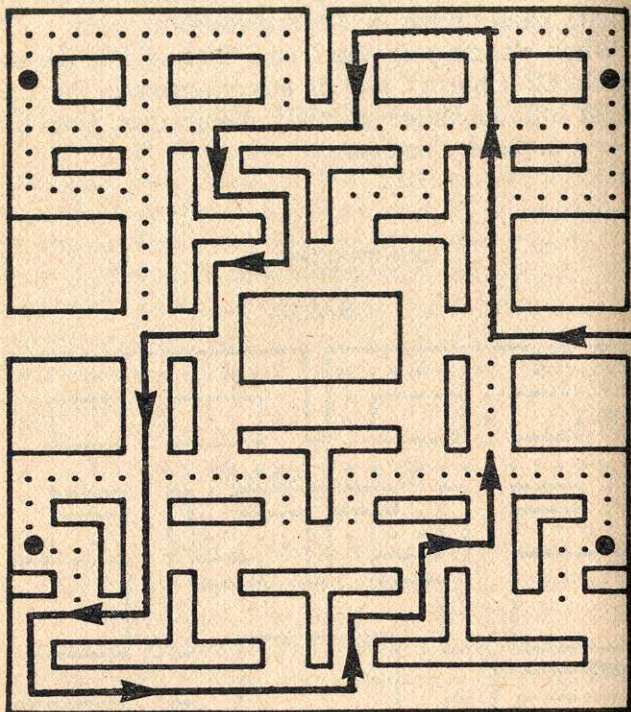
CHART 3
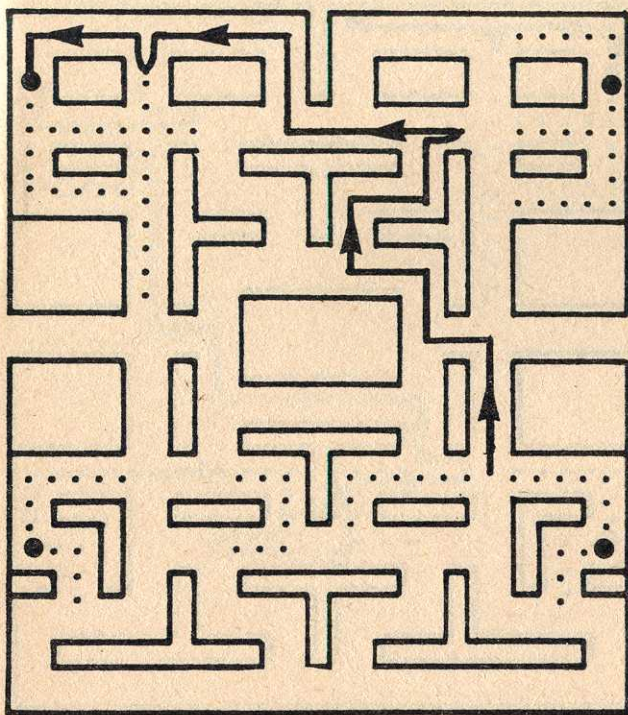
CHART 4

CHART 5

CHART 6
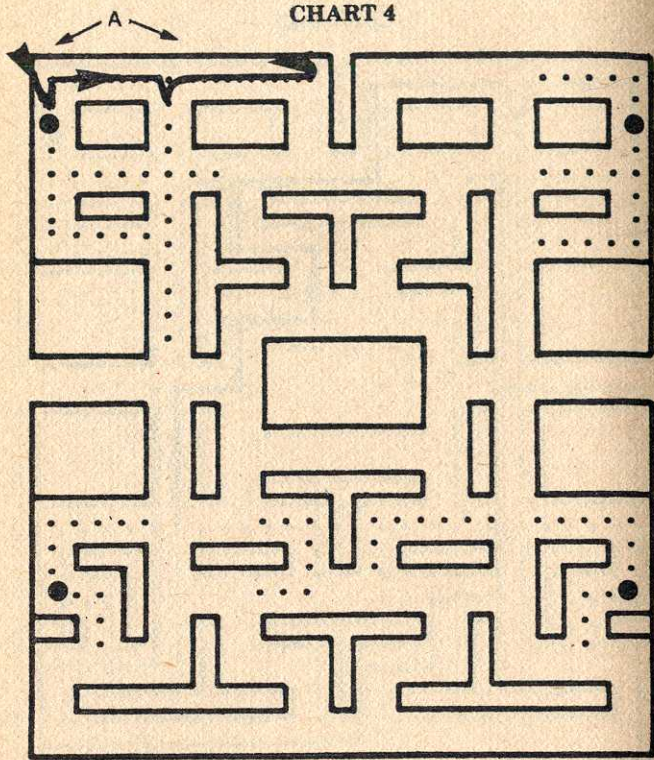
8

PATTERN PK

When executed correctly, Pattern PK handles boards 3 through 11 of the Fast Game (through the 1st bell) and 5 through 14 on the Slow Game (through the 2d key) with no problem. PK can also clear boards 12, 13, and 15 (the 2d bell and 1st and 3d keys) of the Fast Game and boards 15, 16, and 18 (the 3d, 4th, and 6th keys) of the Slow Game. If the player delays imperceptibly on the later boards, the pattern will break down.

PK can yield scores of 180,000 on the Slow Game and 127,000 on the Fast Game if executed perfectly and with some improvisation on the latter boards (particularly board 14—the 2d key—of the Fast Game and board 17—the 5th key—of the Slow Game—when the monsters do not turn blue).

This is the pattern with which I first became proficient at PAC-MAN and it remains my favorite. Thus it's called "PK"—yes, the "K" is for Ken.

I recommend this pattern to:

• players who will be satisfied with the scores mentioned above and who want to spend only a few hours learning a pattern, and

• players who have made a sincere attempt to learn P4 but are having recurring problems in clearing energizers at the end of P4.

For readers who are interested in becoming PAC-Masters, and who are willing to put in twenty hours or more of practice, I recommend skipping this chapter and studying patterns P4, P4-Tunnel, and P5.

Notes on PK

Point H in Chart 4. Hesitate at Point H until the monsters are just on the other side of E3. Then hit E3 and eat as many blue monsters as you can (usually two or three). During boards with short blue times, don't chase the blue monsters; they will often turn color and eat PAC-MAN.

Point H in Chart 5. Hesitate at Point H until the red monster is just behind you. Then, after eating E4, you may reverse to eat that monster. It's best to do this only with boards with "very long" or "long" blue times.

Point H in Chart 6. Hesitate at Point H until the monster (usually the light-blue one) has left Quadrant 1. This is because, after you hit E2, you will proceed to Quadrant 1—and if a monster is hanging around there, he may eat PAC-MAN.

Notes on Boards 12, 13, and 15—the Fast Game—the 2d bell and the 1st and 3d keys (boards 15, 16, and 18 of the Slow Game).

With even imperceptible delays, the player will run into difficulty in two places:

• when moving southward in the far right channel in Chart 3, the red monster can catch up to PAC-MAN. To avoid this, forget about the two reverses just before you enter the center channel to eat the fruit (Chart 3). You can pick up these dots later.

• after eating the fruit in Chart 3, the light-blue monster may come toward you in the center channel. There's no evasive action you can take. Just watch your delays when doing PK the next time.

Notes on Board 14 of the Fast Game
(Board 17 of the Slow Game)

Improvisation is required since the monsters don't turn blue. Hover around the center channels and use the tunnel in order to evade the monsters. The board is still completable—largely because the monsters will still run from you briefly after you've hit energizers, even though they don't turn blue.

PATTERN PK
CHART 1

CHART 2

CHART 3

CHART 4

CHART 5

CHART 6

9
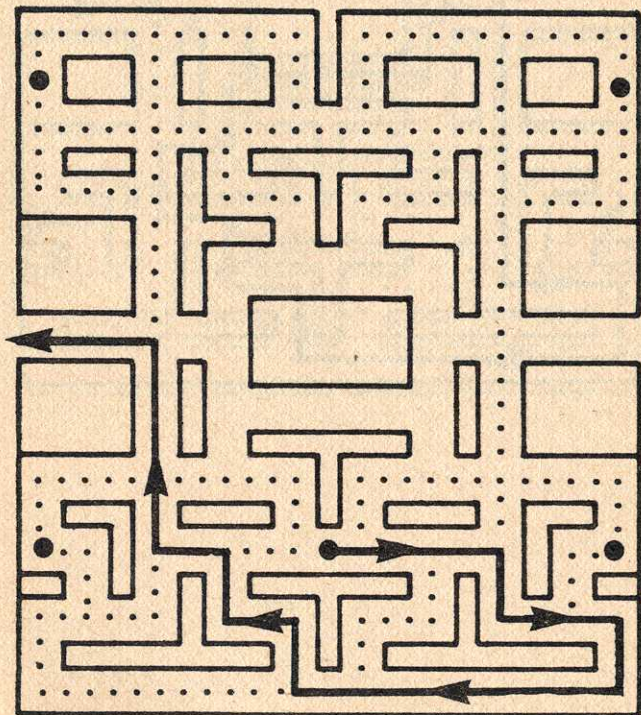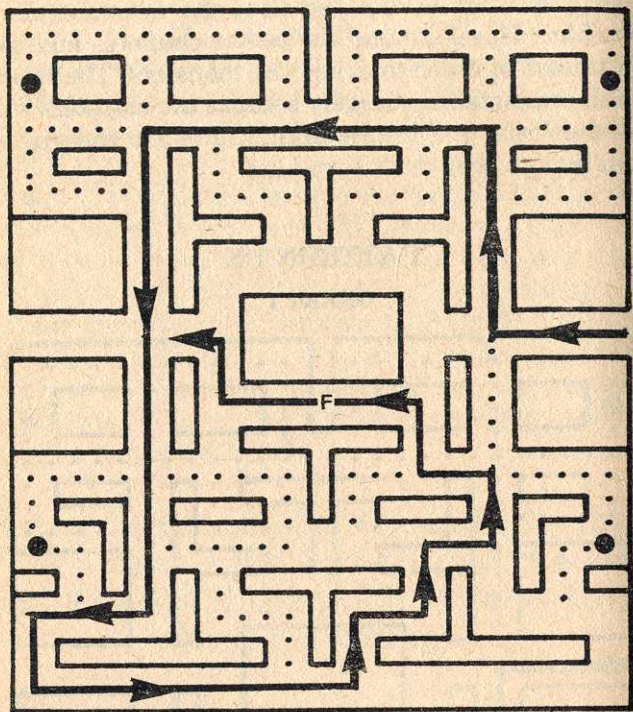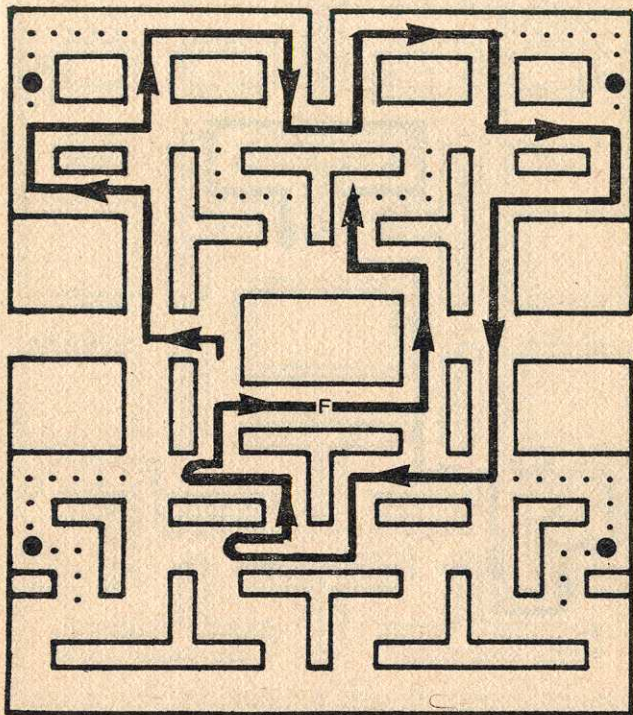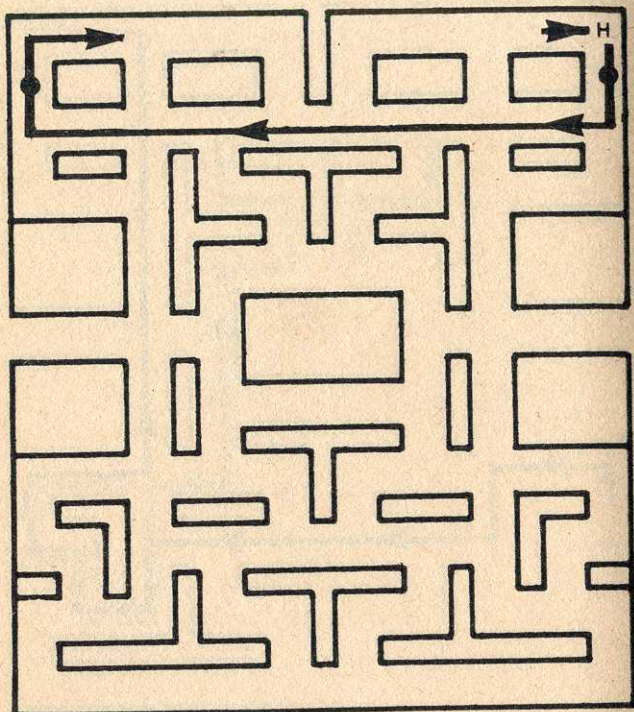
PATTERN P4 ("The Square")

Pattern P4 is called "The Square" because a large square (actually rectangular) movement is made around the board in the middle of the pattern. While P4 is a bit more difficult to execute than PK, it handles more boards than does PK and is necessary as a tool before going on to learn P4-Tunnel and P5. I would advise the potential PAC-Master to skip over the previous chapter on PK, concentrate on learning P4, and then move on to the following chapters on P4-Tunnel and P5.

P4 will take the player through the eighteenth board of the Slow Game (the 6th key), except that it will not handle the seventeenth board (the 5th key) in which the monsters do not turn blue.

P4 will take the player through the fifteenth board of the Fast Game (the 3d key), but will not handle the fourteenth board (the 2d key) during which the monsters do not turn blue.

The Concept Behind the Square Pattern

The square pattern starts out similar to PK in that the player goes to the righthand bottom portion of the board. Instead of going through the left tunnel as in PK, he goes through the two "S" channels, eats the fruit, makes a large square around the board, hits two corners in Quadrant 2, eats the fruit a second time, hits two corners in Quadrant 1, and then finishes up eating the energizers.

Notes on P4-c

Point A in Chart 2. Do not be alarmed if the pink monster is following closely at this point—you will outrun him if your timing is correct. Strangely, the better your timing, the closer behind you the pink monster will be.

Point B in Chart 4. Do *not* hesitate here. You may suspect that you will hit the pink monster, but he will turn into the left tunnel. Proceed immediately out of the center channel and go north to the first quadrant.

Point C in Chart 5. You will sort of be playing ring-around-the-rosie with the red monster in most boards here. That's fine—just hit E1, eat a monster or two, and proceed south to Quadrant 3.

Point D in Chart 5. Delay here until the monsters are just on the other side of E3. Then hit E3 and eat a blue monster or two.

As in other patterns, when clearing energizers, wait before hitting a given energizer if there are monsters in the quadrant to which you plan to proceed. This will ensure that after you hit the energizer, the blue monsters do not revert to their original color and threaten you in the next quadrant.

With knowledge of only P4 (and the previous patterns, excepting PK), you should be able to score well into six figures. You are now ready to advance to the PAC-Master level of play.

CHART 2

CHART 3

CHART 4

CHART 5

CHART 6

10
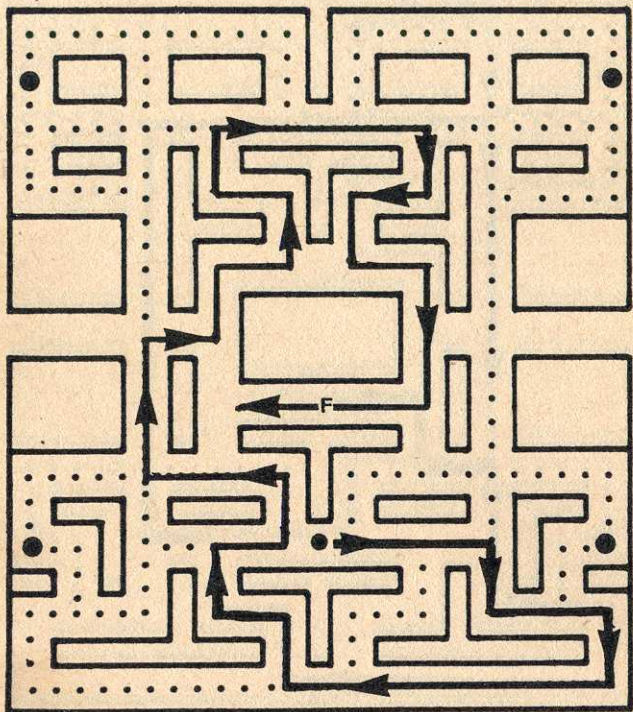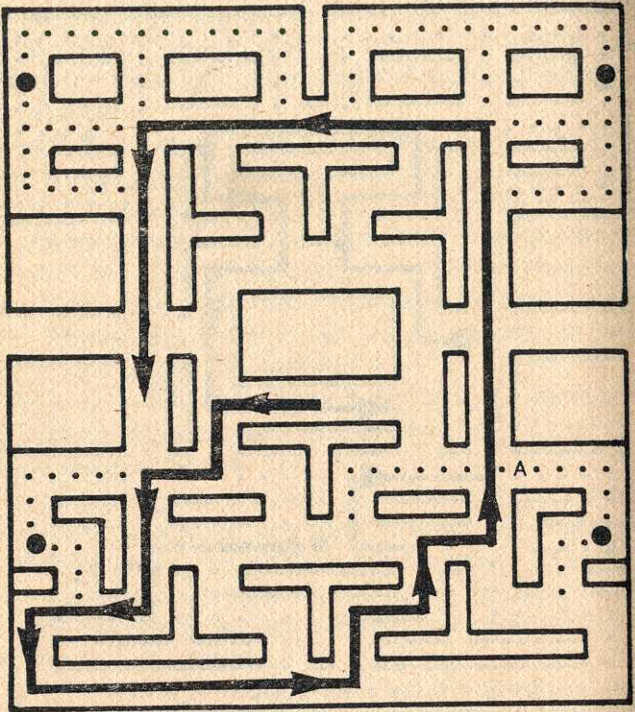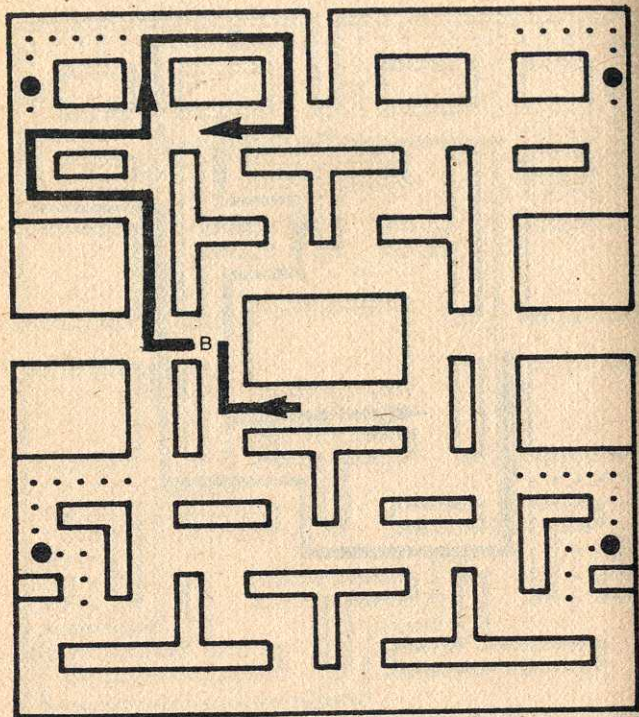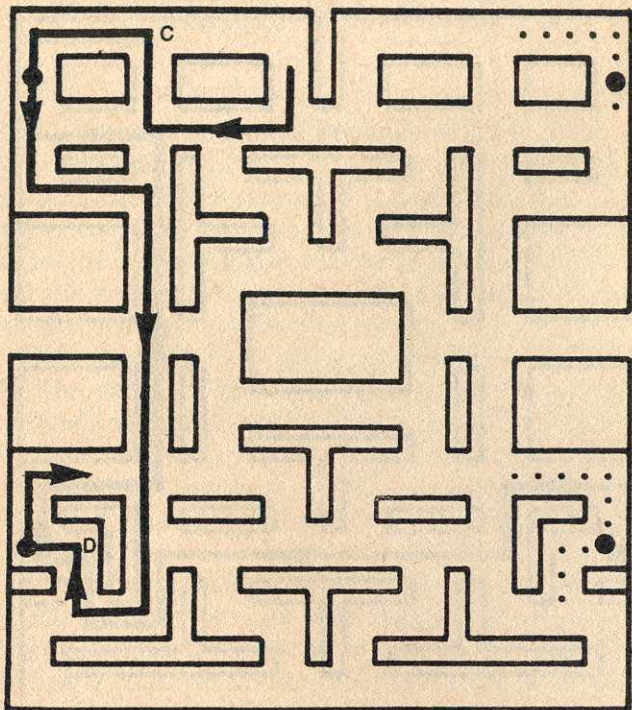
PATTERN P4-TUNNEL

This pattern is so-named because, while it starts exactly like Pattern P4, it ends with a variation which requires use of the tunnel. This pattern applies to the earlier boards in which the monsters do not turn blue—namely the fourteenth board (2d key) of the Fast Game and the seventeenth, nineteenth, and twentieth (5th, 7th and 8th keys) of the Slow Game.

Note that Charts 1 and 2 are identical to Pattern P4. The variation begins in Chart 3, when the corner in Quadrant 1 is eaten. Then the player progresses to eat the fruit a second time and goes into the right tunnel (Chart 4). Coming out of the tunnel, the player eats E3 (Chart 5), and then finishes up E1, E2, and finally E4 (Chart 6).

A somewhat safer alternative is for the player to return to the left tunnel after eating E3 (in Chart 5). After emerging from the other side, he may proceed to E2 and then finish the board. This is safer because the monsters fall behind PAC-MAN when entering the tunnel, particularly if the player gives PAC-MAN a reverse flick or two.
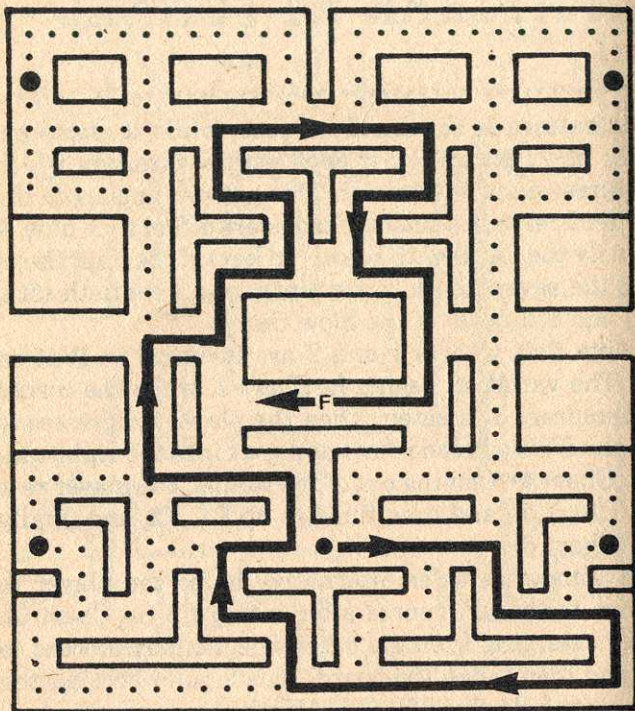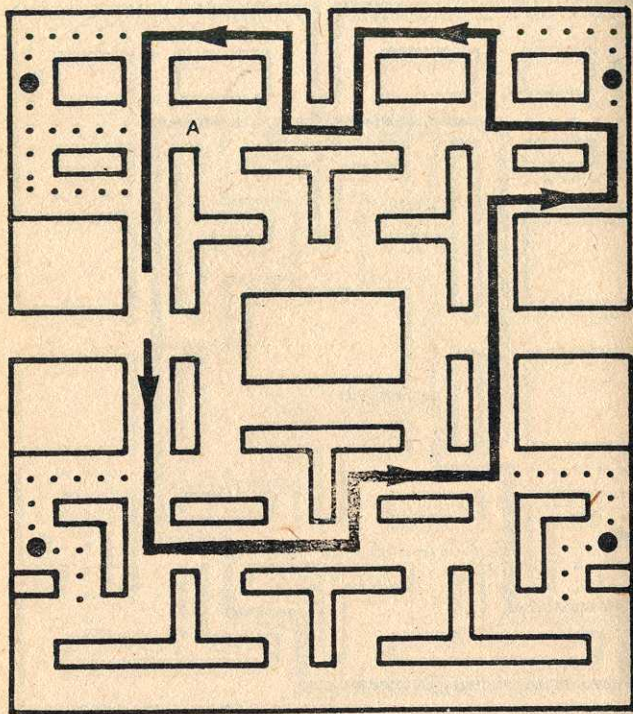
CHART 2

CHART 3

Point A: For the 7th and 8th keys of the show game enter the center through a safe S channel, eat the fruit and enter a safe tunnel. Then entering the tunnel before approaching each quadrant is safest.

CHART 4

CHART 5

CHART 6

11
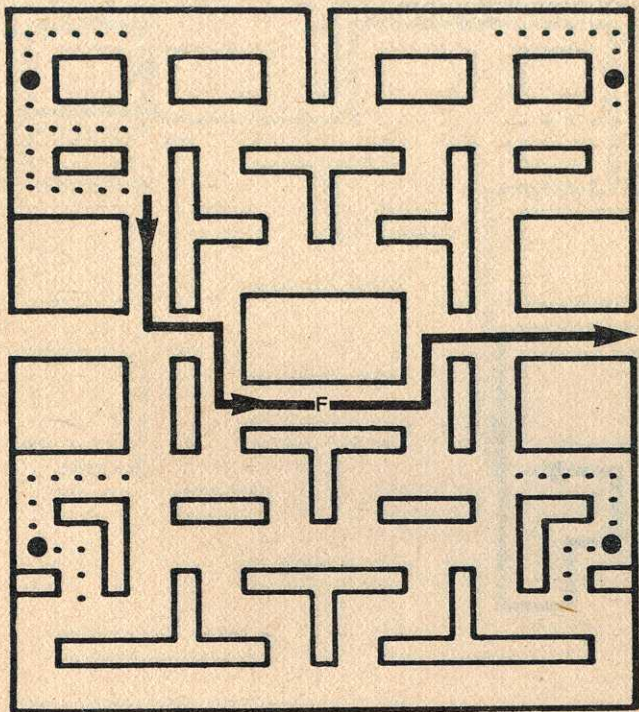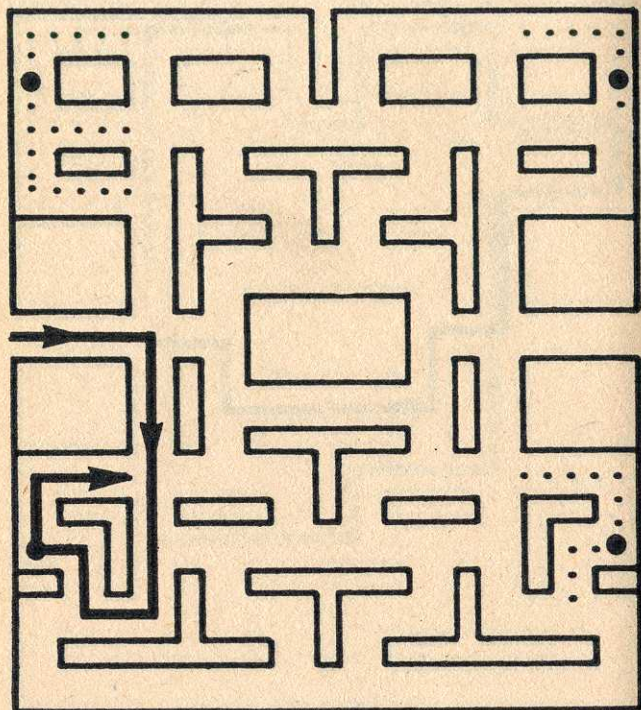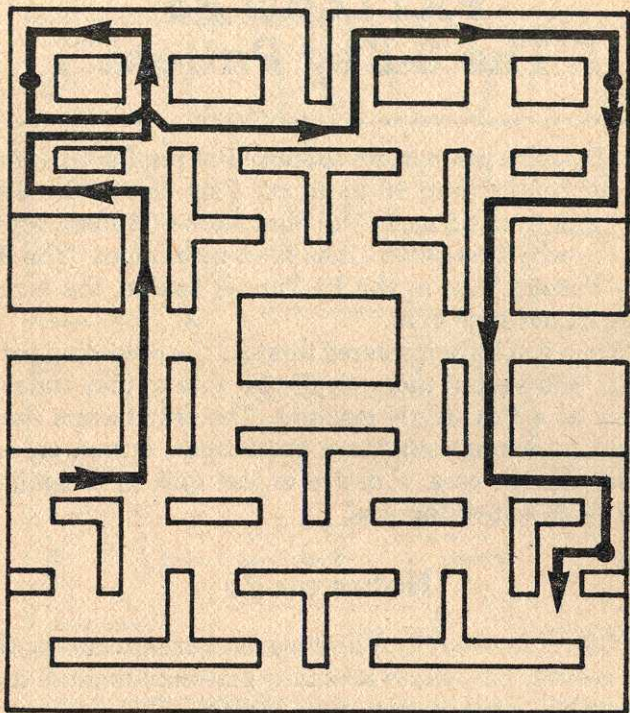
PATTERN P5
("The 9-Key Pattern")

Finally—the last pattern to learn! Pattern P5 will handle *all* boards from 16 on in the Fast Game (the 4th key) and from 21 on in the Slow Game (the 9th key). This is why this pattern has been nicknamed "The 9-Key Pattern." As in the P4-Tunnel boards, the monsters do not turn blue.

When you have mastered this and the preceding patterns, you should theoretically be able to play indefinitely at a PAC-MAN machine. The only factors that might interrupt your game are fatigue, errors, or, as in Raymond's case, a desire to just quit in midgame and go do something else.

Notes on P5

Point H in Chart 1. A brief pause, perhaps one-tenth of a second. This pause is readily mastered because the player has some leeway in its length.

Point H in Chart 3. Another slight pause. This pause is not difficult to master because the pattern will not break up with small variations in its duration.

Point A in Chart 3. An immediate reversal back through the left "S" channel.

Point R in Chart 4. Flick PAC-MAN in reverse once to slow the monsters down and entice them into the tunnel.

Point R on Chart 5. Another quick reverse flick to slow the monsters down and ensure that they follow you into the tunnel.

PATTERN P5

CHART 1

CHART 2

CHART 3

CHART 4

CHART 5

CHART 6

CHART 7

CHART 8

12
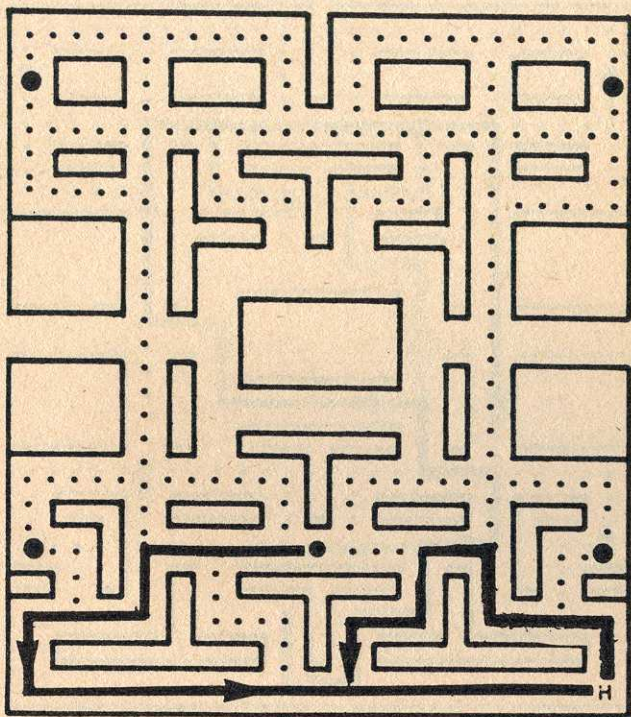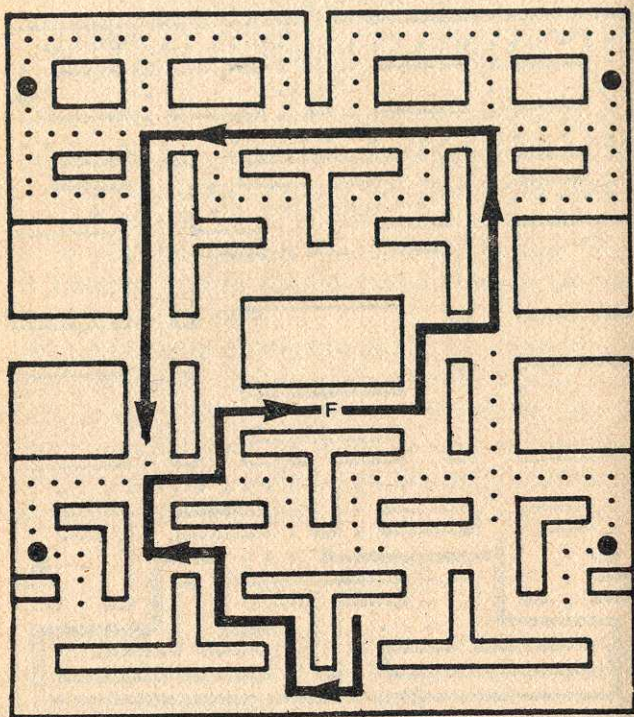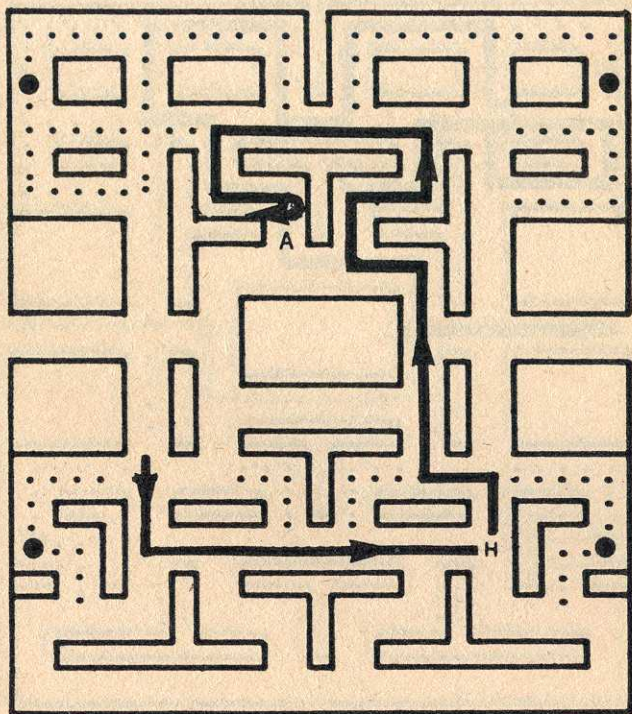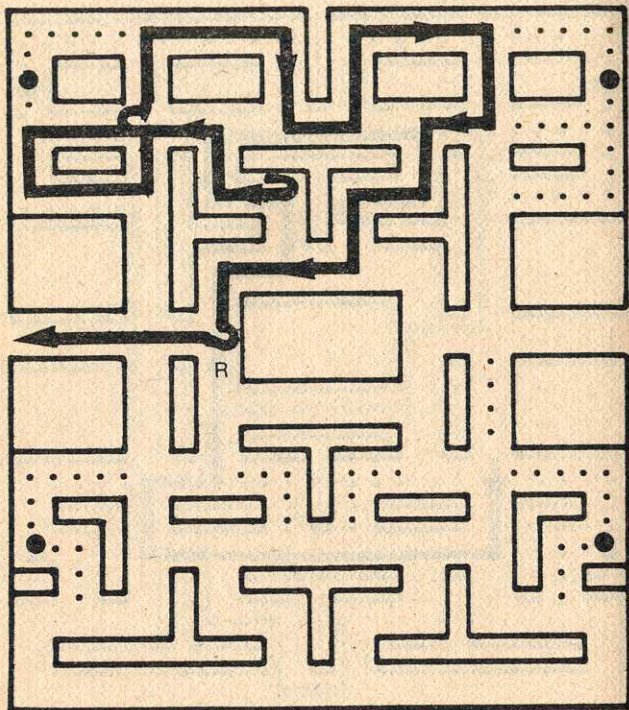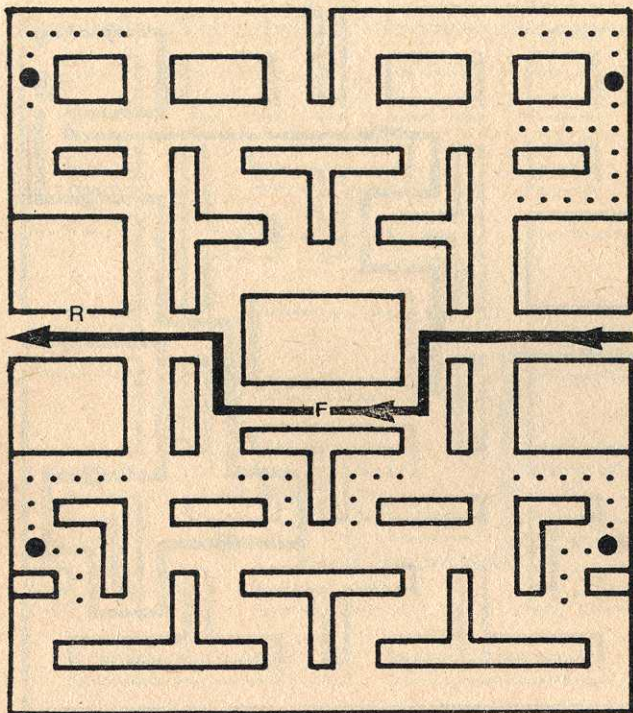
New PUC-ONE,™ MAZEMAN,™ AND MS. PAC-MAN™

As of this writing, the New PUC-ONE game is available in a limited number of outlets and accounts for perhaps 1 percent or less of the PAC-MAN type games available. Although the game is undeniably more complicated, there are several offsetting features that may make New PUC-ONE scores as impressive as those from the PAC-MAN game.

Characteristics of New PUC-ONE

All of the characteristics of PAC-MAN described in Chapter 2, "How PAC-MAN Works," apply to New PUC-ONE, with two exceptions:

1. The player is awarded 20 points for each white dot eaten and 80 points for each energizer eaten (versus 10 and 50 points, respectively, for the Standard game).

2. The value of each fruit eaten is higher than for the Standard game, starting with 500 points for eaten cherries (versus 100), 700 points for the strawberry (versus 300), and 1,000 for eaten oranges (versus 500).

All of the characteristics of PAC-MAN covered in Chapter 3 also apply to New PUC-ONE, with several exceptions. There are still 240 dots (although the number of dots seems greater because of changes in the configuration of the board), four energizers, and a similar center board and "S" channels.

The New PUC-ONE board has several subtle changes which in fact lead most people to believe not only that are there more white dots, but that the board is larger. In fact, the number of dots is identical and the New PUC-ONE board has similar dimensions to the PAC-MAN board.

A rendering of the New PUC-ONE board is shown as Figure 4. Let's take a look at the basic differences between the New PUC-ONE board and the PAC-MAN board:

1. Note that there are four more tunnels. An upper left tunnel has been created just below E1. There is also an upper right tunnel below E2, a lower left tunnel below E3, and a lower right tunnel below E4. We will continue to refer to the center tunnels as the left and the right tunnels. The new tunnels provide both good news and bad news to the player.

The good news is that there are four more escape routes for the man when he is fleeing the pursuing monsters.

The bad news is that the two upper channels are not exactly in line with the paths leading to them. This means that the player must make an annoying and awkward one-dot turn either (1) when entering the tunnels from these paths, or (2) when exiting from the tunnels into these paths. The need for this one-dot turn can lead the neophyte player to be eaten by the pursuing monsters.

2. Note at Point A on Figure 4 that the divider has been altered so that the upper horizontal path is no longer a straight line as in the Standard game (see Figure 1, Chapter 3). Thus the player must now make an awkward one-dot traverse when moving between Quadrant 1 and Quadrant 2.

3. Note at Point B on Figure 4 that the dividers have been altered so that the lower horizontal path is no longer a straight line as in the Standard game (Figure 1, Chapter 3). The player must also make an awkward

Figure 4
New PUC-ONE® BOARD

QUADRANT 1   QUADRANT 2

E1

E2

THE (S) CHANNELS

A

LEFT TUNNEL

RIGHT TUNNEL

F1   D1   CENTER BOX   D2   F2

LOCATION WHERE
FRUIT APPEARS

E3   •STARTING POINT   E4

C1   B   C2

QUADRANT 3   QUADRANT 4

Symbol designating Board ↗
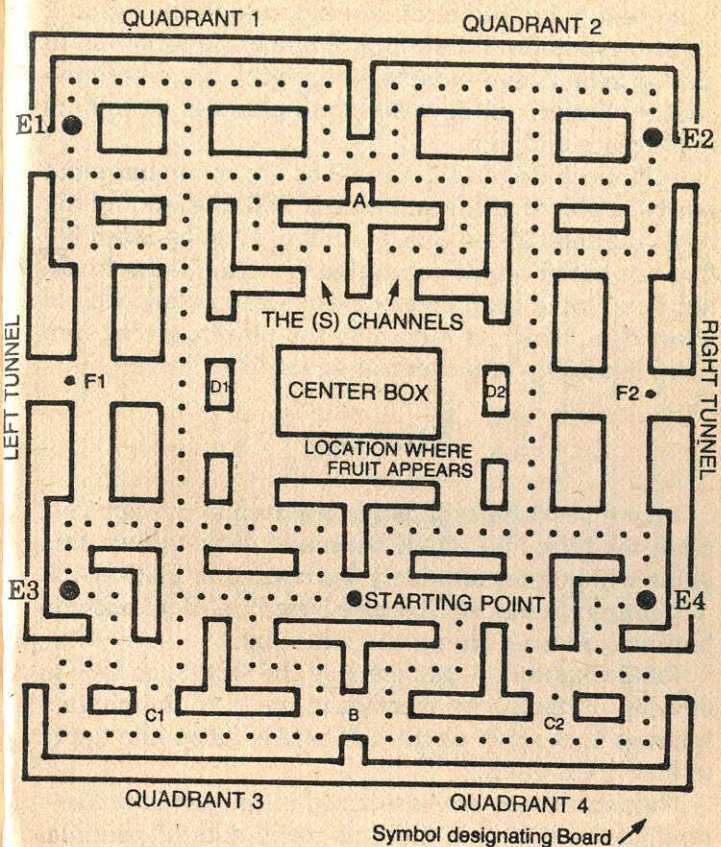
one-dot traverse when moving between Quadrant 3 and Quadrant 4 along this path.

4. Note at Points C1 and C2 on Figure 4 that the standard dividers have been split into two dividers and a dot has been placed one space below the level of the horizontal path. This awkwardly placed dot requires either a one-dot traverse to be eaten, or the movement

of the man along yet another path, thereby complicating the completion of the board.

5. Note at Points D1 and D2 on Figure 4 that dividers have been placed to block direct access to the left and right tunnels from the center channel. Thus access to the tunnels (if, say, escaping monsters) or access to the center channel (if, say, attempting to eat a fruit) is made more difficult.

6. Note at Points F1 and F2 on Figure 4 that a dot has been placed at the entrance to both the left and the right tunnels. These dots, of course, must be eaten before the board can be completed. Vertical paths (without dots) have been created above and below each of these dots, which is a boon to the player, giving him more flexibility of movement around the board.

Strategy

I have not done exhaustive research to develop patterns for New PUC-ONE because I don't believe this game will become as widely distributed as PAC-MAN.

For any readers who become New PUC-ONE addicts, however, I would advise the following:

Read Chapter 15, particularly the section on how to develop patterns. As mentioned, most of the characteristics that apply to the PAC-MAN game also apply to New PUC-ONE.

Note in the patterns described in the previous chapters that it is best to clear as many dots as possible, leaving the energizers for last. This goal is particularly furthered when dots from one quadrant are cleared and a long run is made up one of the long vertical paths to another quadrant. This technique, utilized in nearly all the PAC-MAN game patterns, is equally applicable to the New PUC-ONE.

Figure 5 presents replicas of the New PUC-ONE board for those interested in drawing patterns thereon.

Figure 5
New PUC-ONE™ Schematics

CHART 1
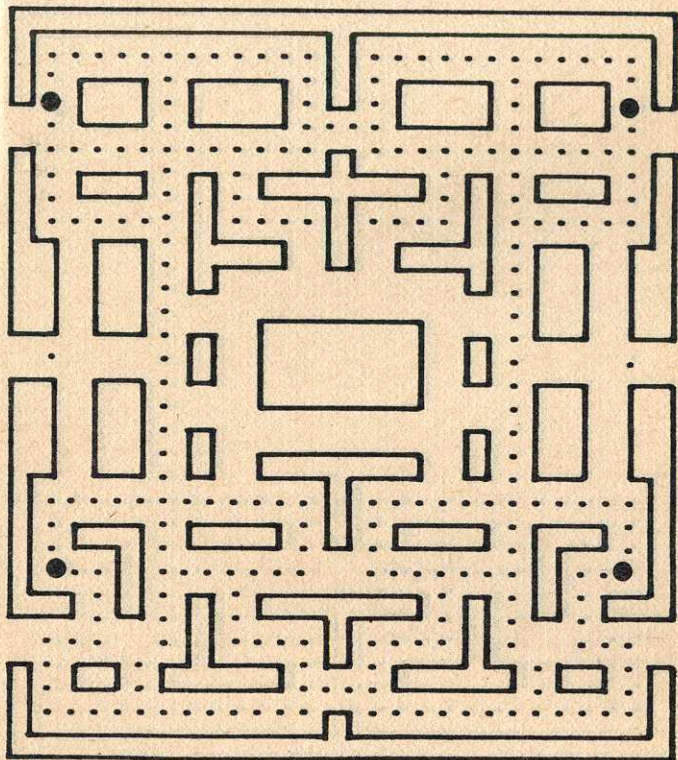
CHART 2
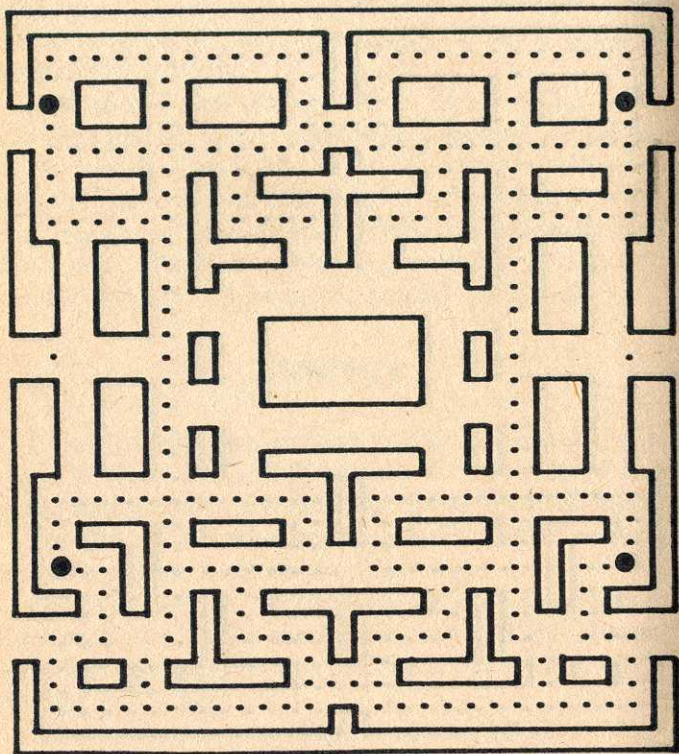
CHART 3
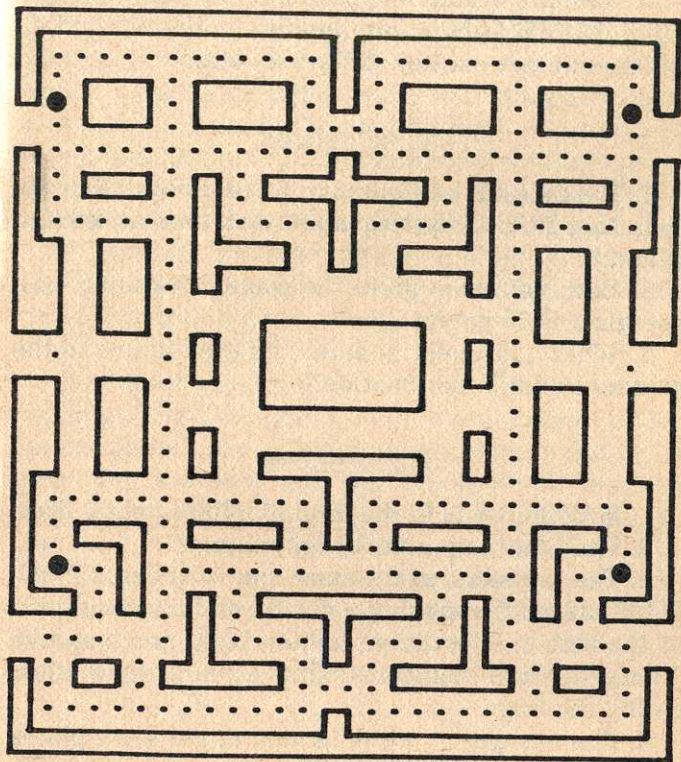
MAZEMAN™

A second PAC-MAN-type game is entitled MAZE-MAN. MAZEMAN is very similar to the New PUC-ONE; yet there are key differences also.

Similarities

1. The dot-path configuration is essentially the same as in New PUC-ONE with minor variations as detailed below.
2. Each dot eaten gives the player 10 points; each energizer is 50 points.
3. When a monster is eaten, its eyes return to the center box for "reincarnation."

Differences

1. MAZEMAN is in the form of a little yellow frog.
2. The "dots" are actually little hearts.
3. The monsters, in the same four colors as in PAC-MAN, are a different shape, narrow at the top and wide at the bottom. They seem to have jowls and look like "Richard Nixon monsters." They actually chew when eating the frog.
4. The energizers, while located at the same places in the board, are in the form of beer mugs (representing, I guess, an oasis, in this case with beer instead of water—and perhaps also suggesting a beer-guzzling macho image for what are presumed to be primarily male players).
5. The fourth eaten monster, instead of awarding the player 800 points, is worth a healthy 5,000 points! This feature obviously puts a premium on taking more chances while eating monsters to get to the fourth monster.

6. The board has four more tunnels than even the New PUC-ONE. Thus, all told, there are ten tunnels. The four extra tunnels are located at points A, B, C, and D in Figure 6—the third dot south, four spaces— of E1 and E2; and the second dot north of E3 and E4.

7. The fruit values are higher than in PAC-MAN. For example, the first fruit, looking like a cross between a spaceship and a couple of rectangular boxes, is worth 1,000 points. The second fruit, a watermelon, is worth 2,000 points; the third and fourth fruits, a pair of bananas, are worth 3,000 points; the fifth and sixth, apples, are worth 4,000 points, etc.

8. Last, but not least, there's a shelf on top of the machine for the player's drink and a little slot on the console to hold the player's spare quarters.

The experienced PAC-MAN player should have no trouble with MAZEMAN after a few games. On my second game I scored 50,000 points, largely just by improvising, and having a "feel" for where the monsters tend to go—their movements are similar to those of the PAC-MAN monsters. Better use can be made of the ten tunnels to avoid being eaten. Further, the good improviser should be able to maneuver well in order to catch and eat the fourth, 5,000-point monster.

The machine is manufactured by "UCI 1981."

Figure 6
MAZEMAN™ BOARD
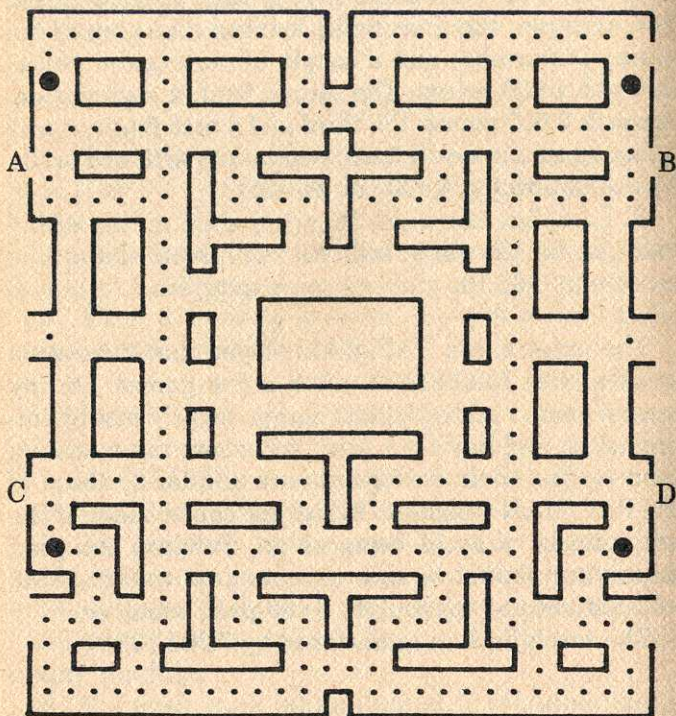
MS. PAC-MAN™

Midway has come out with an imaginative sequel to PAC-MAN, called MS. PAC-MAN, I would guess, to appeal to the many women who became addicted to the original game. While many of the features of MS. PAC-MAN are identical to the first version, there are significant differences which require revised playing strategies.

Basic Objective

As in PAC-MAN, to eat dots and avoid monsters. But the dots are laid out in several different mazes rather than in a single configuration.

Scenario

The player is now represented by a *female* yellow circle which gobbles dots just as rapaciously as PAC-MAN. Our heroine has a little bow in her head, flirtatiously long eyelashes, and dark-red lipstick.

Both games have brief intermissions after several boards have been completed successfully.

As in the Atlantic City pattern for boards 3 and 4 of the Manhattan chip use a variation of P4, entering the right "S" tunnel first and then descending into the left "S" tunnel.

The MS. PAC-MAN Interludes

These intermissions are real show biz—a director's clapboard introduces each of them; they're labeled Act I, Act II, and Act III.

Act I: "They Meet." PAC-MAN and MS. PAC-MAN, total strangers, are separately walking down the street, pursued by their respective monsters. They approach each other, the two monsters bump heads, and the two PAC-persons continue on, arm in arm.

Act II: "The Chase." MS. PAC-MAN wildly chases PAC-MAN all over the screen, more frantically than any monster ever did (and it's not even Leap Year).

Act III: "Junior." First we see a large stork. Then there's Mr. and (I presume) Mrs. PAC-MAN with Junior, a tiny yellow PAC-child.

Novice, Good, and Expert Scores

- Novices score around 1,000 to 3,000 points.
- Good players score less than at PAC-MAN (because patterns don't work), from 10,000 to 30,000 points.
- Experts can still get into 6 figures, from 100,000 to around 150,000 points.

Controls

Complexity rating: Low.
A single four-directional joystick.

Figure 7–1
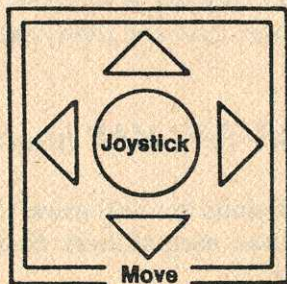
The Board

The configuration of the board changes every two boards. Not only that, but the monsters move differently in a given board. For this reason, improvisational ability is exceedingly important to rack up high scores at this game.

The configuration of the first boards are shown in the Strategies section.

Characteristics

SCORING

Each dot eaten:	10 points
Each energizer eaten:	50 points
Eating the 1st monster after an energizer is hit:	200 points
Eating the 2nd monster:	400 points
Eating the 3rd monster:	800 points
Eating the 4th monster:	1,600 points

The points awarded for eating the symbol in successive boards varies from PAC-MAN, as follows:

Board no.	Symbol	Points
1	🍒 Cherries	100
2	🍓 Strawberry	200
3	🍊 Orange	500
4	🥨 Pretzel	700
5	🍎 Apple	1,000

(continued)

Board no.	Symbol	Points
6	◊ Pear	2,000
7	◖ Banana	5,000
8	❓ Random	100 to 5,000

In board 8 and beyond, any one of the seven symbols may appear. The player receives points for eating the symbol in accordance with the values for each symbol, as shown above.

Most machines are set to award an extra man—uh, I mean, woman—at 10,000 points.

How You Lose

When MS. PAC-MAN is eaten by one of the monsters.

Facts You Should Know

During each board, the symbol appears in various locations and travels slowly around the board.

The board configurations change every two boards, as follows:

Board no.	Symbols	Board Configuration	Tunnels
1 & 2	Cherries & strawberry	Pink	4 tunnels, two at the top, two at the bottom

Board no.	Symbols	Board Configuration	Tunnels
3 & 4	Orange & pretzel	Blue	4 tunnels, two at the very top row of the board
5 & 6	Apple & pear	Orange	2 tunnels in the center
7 & 8	Banana & ?	Blue #2	4 tunnels

The board configurations require different strategies.

Strategies

Pink board. This board is the easiest of the configurations. Predetermined patterns can still not be worked out, because the monsters move in random ways—a key difference from PAC-MAN. During the pink board the player should concentrate on clearing out the large square around the board (Figure 7–2). In many of the pink boards, the player will be able to clear the entire square, if he starts at the very beginning of the board and moves in a counterclockwise direction. On occasion, his path will be intercepted by a monster. The player should take evasive action and, at the earliest opportunity, return to the "square" and complete clearing the dots.

The next order of business in the pink board is to clear the channels at the bottom of the board. To the extent possible, save the energizers for the end of the board. The exception to this is when three or four monsters are grouped together and MS. PAC-MAN is near

Figure 7-2
Pink Board
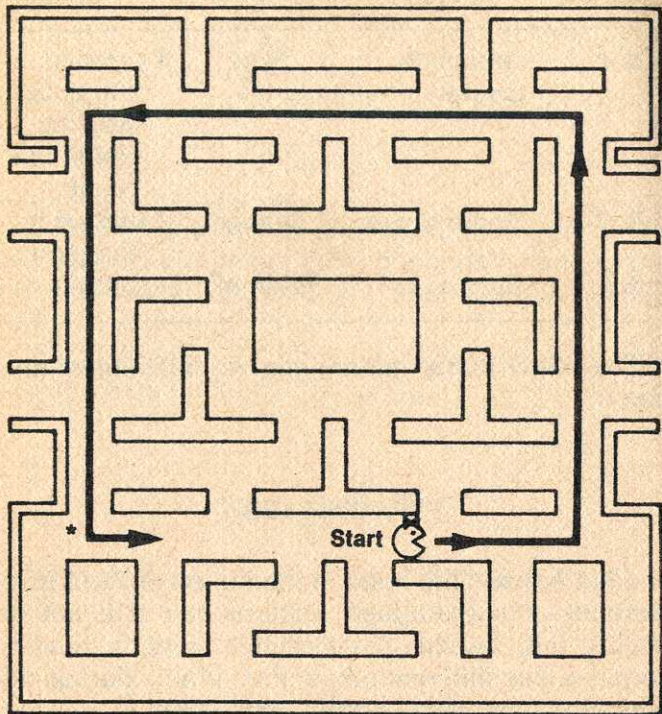
*Large Square

an energizer. Eat the energizer and as many monsters as you can (safely) for lots of bonus points.

Blue board (Figure 7-3). This is the most difficult of the boards to complete. Four tunnels appear, but two are on the very top row of the board. This row is far from readily accessible and cannot be used very frequently as a safety valve—notice how the paths are quite restricted at the top of the board. The player can easily get caught in one of these restricted paths and be eaten by a monster meeting him from the other side.

For these reasons, the player should be defensive

Figure 7–3
Blue Board
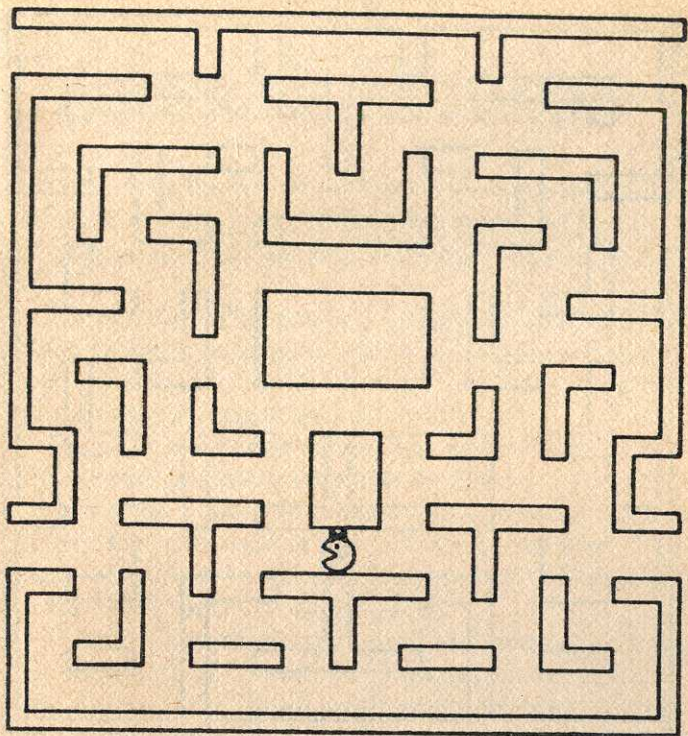
when ascending to the top of the board. Be sure that you have a clear path either to one of the two top energizers or to the tunnels. If you are pursued by monsters as you're improvising, stay in the lower portion of the board for your evasions. A high percentage of players' men are eaten in the upper portion of the blue board.

Orange board (Figure 7–4). The monsters move quickly and turn blue for shorter periods during the orange board. While the configuration of this board is not as difficult as the previous one, there are only two

Figure 7–4
Orange Board
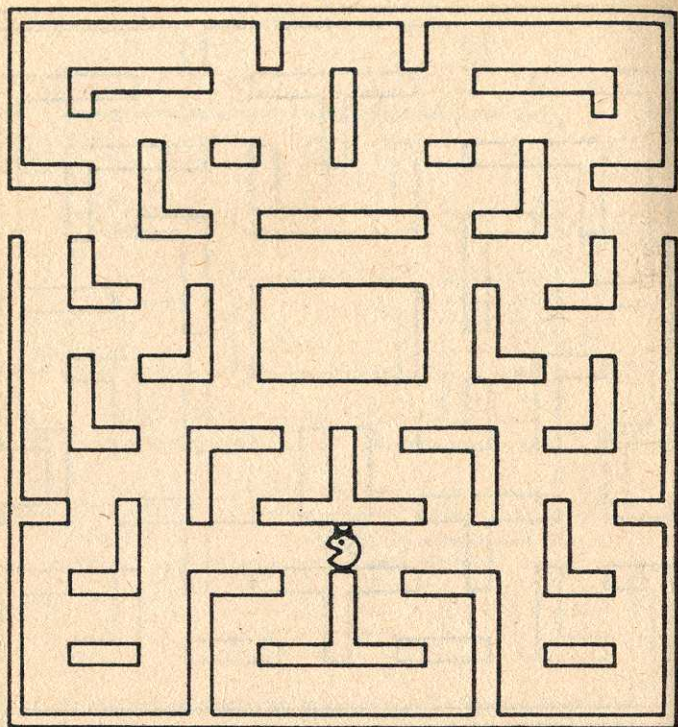
tunnels. The tunnels fortunately are centrally located and provide an accessible escape hatch.

Because the movements of the monsters vary widely in any given board, improvisational skill is essential to high scores at MS. PAC-MAN. Remember that the monsters may be outrun by using the tunnels and by making a series of quick turns. Continually bear in mind also that the monsters reverse directions when you eat an energizer; you can sometimes make them move where you want them to just as they turn blue, for easy and frequent gobbling.

13

PORTABLE PAC-MAN™

Because of the spread of PAC-Mania, manufacturers have come out with portable and home versions of PAC-MAN.

Tomytronics. This game is a highly simplified PAC-MAN game. The console, instead of having a joystick, has four buttons, one for moving PAC-MAN in each of four directions: right, left, up, and down.

Entex. This version offers the conventional PAC-MAN game and allows the player to choose how many monsters he wants to evade in his game. A second player can also control the attacking monster. This game was voted by *Omni Magazine* (December 1981) as the third "best Christmas game."

Coleco. An ingenious game has been put together by the engineers of Coleco, a toy manufacturer in Hartford, Connecticut. Their neatly packaged portable replica of the arcade PAC-MAN game is available at toy and other retail stores. The game is light, compact (about 8″ by 8″ by 6″), and runs on four "C" batteries (alkaline recommended).

The Coleco game has two joysticks (one for each of two players) which operate in an identical fashion to the arcade-game joysticks. In addition to conventional PAC-MAN programs, Coleco has two PAC-MAN variations: "Head-to-Head™ PAC-MAN" and "Eat & Run™ PAC-MAN," both of which are described in this chapter. The left joystick is also used to select the game preferred by the player. Coleco also has a skill lever, which pre-sets the games to one of two skill levels built

into the machine. The remainder of this chapter describes the three Coleco PAC-MAN games and how to play them.

The Coleco
Portable PAC-MAN

Similarities to Arcade Game

The Coleco portable game adheres closely to the arcade version of PAC-MAN:

1. The game allows the player three PAC-MEN. They move in a manner similar to the arcade PAC-MAN, that is, in any of four directions.

2. Dots are arranged in mazes. There are 64 dots, rather than the 240 dots in the arcade game.

3. The machine has four energizers, which are in the form of red dots, rather than blinking white dots. After the energizers are eaten, the monsters become subject to attack by PAC-MAN as in the arcade game. Rather than turning blue, the monsters lose their "bodies," but retain their eyes. When the monsters are in blue mode, a different sound is generated by the machine (in most cases) so the player knows when it is safe to attack the monsters.

4. After a period of time, the monsters revert to their original aggressive mode, as their "bodies" return to them.

5. The scoring is similar to that of the arcade game. The player is awarded 10 points for each dot eaten and 50 points for each energizer. However, he receives only 100, 200, 400, and 800 points for each consecutive blue monster eaten after an energizer has been hit (half of the arcade-game point values).

6. After a board is cleared, the game begins anew and the player's task is to clear the next board.

Differences from the Arcade Game

1. There are no fruits in the portable game. Thus each board offers the player the same number of potential points.

2. The board configuration is different, not only in terms of number of dots, but also in general layout (see Figure 8). Thus the patterns presented in earlier chapters do not apply to portable PAC-MAN.

3. There are two levels of skill, requiring different approaches to the game.

How to Play Portable PAC-MAN, Conventional Game

As in other electronic games, the longer a player experiments, the more adroit he will become. Fortunately, in portable PAC-MAN it is not necessary to put quarters into the machine. Once the game is purchased, all games are free, as long as the player has a supply of batteries.

The skillful PAC-MAN arcade player will find his skill is applicable to portable PAC-MAN. Although the arcade patterns are not usable and in fact some of the characteristics of portable PAC-MAN vary from the arcade game, the arcade PAC-MAN player will find that his ability, particularly at improvising, will help him to excel in the portable game.

After experimenting with the portable PAC-MAN prototype, I developed patterns that will get the player through the first board of both skill levels on the first game after the machine is turned on.

Skill Level 1

Figure 8 presents the three charts of the pattern to complete the first board of the Skill Level 1 game. The

Figure 8

**COLECO PORTABLE PAC-MAN™
—SKILL 1 PATTERN**

CHART 1
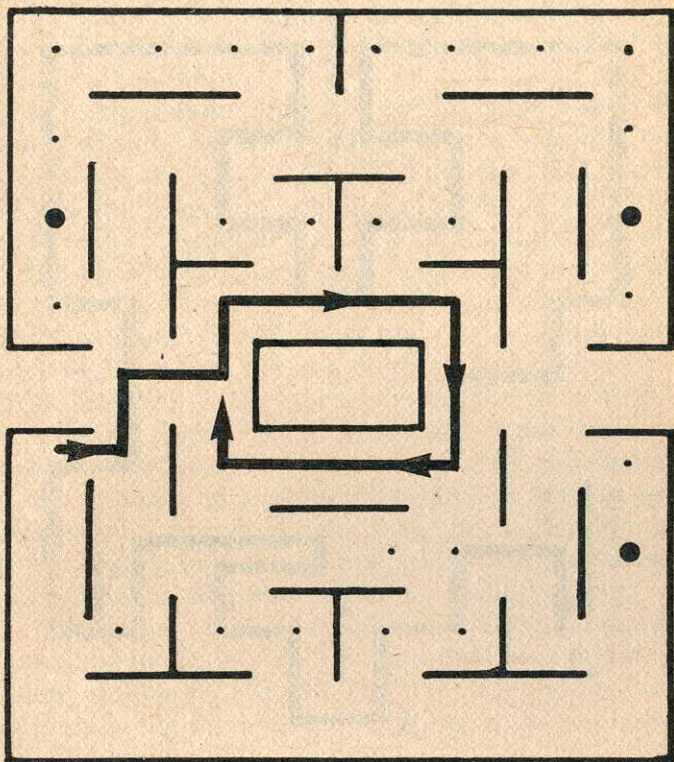
CHART 2

CHART 3

concept behind this pattern is:

1. Chart 1—clear the outer rims of dots and the long bottom line and eat energizer E3.

2. Chart 2—go around the center channels in a clockwise direction.

3. Chart 3—Eat E1, finish the top line and both "S" channels, eat E2, eat E4, and clear the dots around the bottom of the board.

As in the arcade game, it is important to make the moves with the joystick *in advance* of reaching the intersections, so that the delays in moving PAC-MAN around the board are not caused by the player, but rather are a function of the access time of the machine.

It is critical when executing Chart 1 that the player *not* hold the joystick in the direction in which PAC-MAN is moving. The player should merely tap the joystick each time he changes direction and release the joystick as PAC-MAN proceeds in the indicated direction. If the player holds the joystick in the turning position, the pattern will break down. (The movement of the monsters in portable PAC-MAN is affected by whether the joystick is held in the turning position.) It's all right to hold the joystick in the turning position during the moves shown in Chart 2 and beyond.

If the player hesitates at Point A in Chart 3 for one "beat," he should be able to eat one more blue monster before completing the pattern. The player using this pattern should score between 930 and 1,130 points on the first board.

Skill Level 2

The player should follow the pattern in charts 1 and 2 of Figure 8 and then use charts 3a and 4a in Figure 9. Note that the only basic difference in the pattern is that in Chart 3a, the player moves across the top of the board (avoiding the "S" channels) and then eats the dots in the "S" channels. In Chart 4a, the player pro-

Figure 9

COLECO PORTABLE PAC-MAN™
—SKILL 2 PATTERN

CHART 3A
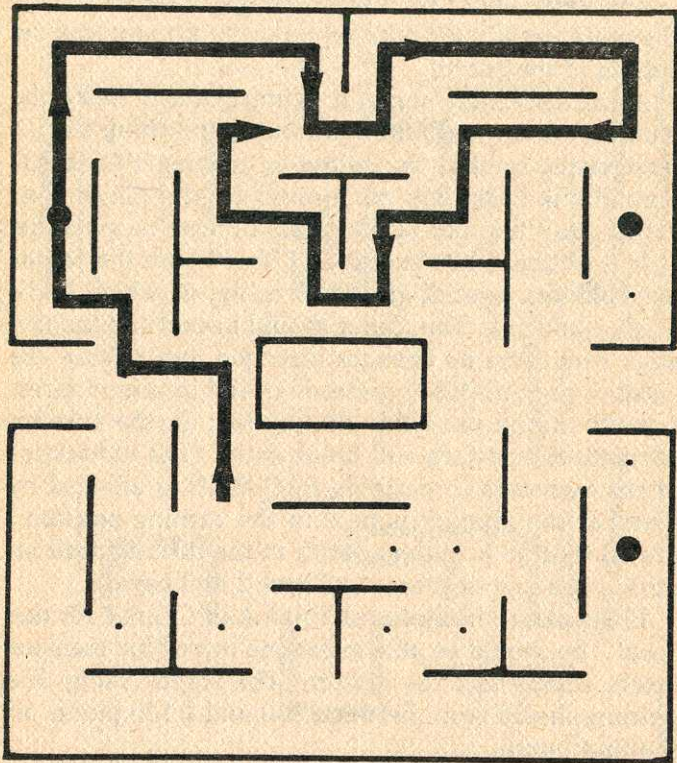
gresses east toward E2, eats E2, and completes the board, as in the Skill Level 1 pattern. Note that in Skill Level 2, too, if the player hesitates at Point A (Chart 4a), he should be able to eat one more blue monster, yielding a higher score.

Subsequent Boards

As in the arcade game, the velocity of the monsters and of PAC-MAN speeds up in subsequent boards. This, of course, affects the type of pattern that should be used. I have found, however, that the patterns shown in Figures 8 and 9 often work for advanced boards, but sometimes they do not, depending upon the timing of the player; as in the arcade game, delays which seem infinitesimal to the player are nevertheless picked up by the machine and can alter the movements of the monsters.

Portable PAC-MAN is simpler than the arcade game, primarily because of the fewer dots. Thus the player, after experimentation, should be able to develop his own patterns for the advanced boards. One tip is to start with the moves depicted in charts 1 and 2 and try alternative moves once the center channels are cleared. After an hour or two of experimentation, the player should be able to develop additional patterns to cope with the advanced boards. As in the arcade game, it is preferable to develop several patterns and alternate them when playing competitively, so one's opponent will have more difficulty learning the patterns and using them himself.

Head-to-Head™ PAC-MAN

Head-to-Head PAC-MAN is an exciting competitive game. Two players each control a PAC-MAN, each using one of the two joysticks on the console, and maneuver their respective men through the board's maze simultaneously. The goal is to eat as many dots, energizers, and blue monsters as possible in order to amass a greater score than one's opponent. The display

indicates which player is ahead by printing a red arrow on the side either of Player 1 or of Player 2. The amount by which the winning player is ahead is indicated at the top of the display. The two PAC-MEN can cross each other's paths and indeed there are times when the player may forget which PAC-MAN is his own.

Strategy

"Head-to-Head" lends itself to some interesting strategies to outfox one's opponent.

1. The key factor in this game is keeping PAC-MAN alive, that is, avoiding being eaten by the monsters. This is because, if one player is eaten, the other player can continue to play and to amass points as long as his PAC-MAN remains uneaten—and this can continue through successive boards. Thus the primary goal must be: do *not* get eaten by the monsters.

2. If either PAC-MAN hits an energizer, the monsters revert to their blue state and are subject to being eaten. Since the blue-monster points are high relative to the points awarded for eating dots, the player should be continually aware of when an energizer is hit by the opponent so he may move toward, and eat, blue monsters. The risk here is that if the player becomes overly preoccupied with the location of the opponent's PAC-MAN, he may find himself inadvertently eaten by a monster.

3. After an energizer is hit by either player, the player should rush to eat as many blue monsters as possible. As in the conventional game, however, if the player becomes too greedy, the monsters may revert to their aggressive status and eat PAC-MAN.

4. After an energizer is hit and the player observes that his opponent is about to eat a blue monster, he should consider delaying slightly before eating his own blue monster(s). In this way, his opponent will get 100 points for eating the first blue monster, and the player

will get 200 (or more) points for eating subsequent blue monsters.

Head-to-Head PAC-MAN is a fascinating game. The competitive factor of trying to outwit a human opponent, I believe, makes the game particularly interesting.

Eat & Run™ PAC-MAN

Eat & Run PAC-MAN is an intriguing variation in which the game begins with PAC-MAN in the center box. The "door" to the box is opened and the player leaves the box and moves about the board, eating energizers (there are no dots in this game), as the monsters chase PAC-MAN. The player must avoid the monsters and return safely to the center box, the door to which opens at random intervals. If the player eats no energizers, the door to the center box does not open. Initially the player is awarded 100 points for the first energizer eaten, 200 points for the second, 400 for the third, and 800 for the final energizer. If the player does not return safely to the center box, he gets no points, regardless of the number of energizers eaten.

Strategy

The value of eaten energizers increases as the player makes successful runs. As shown on the next page, the player receives 200, 400, 800, and 1,600 points respectively for the first through fourth energizers eaten, after he has made four successful runs. The points awarded increase further after eight successful runs, twelve runs, and finally sixteen runs.

Because of this scoring pattern, the player should try to make as many successful runs as possible so he will be able to progress to the higher point values. Thus, in the early stages of the game, it is to the player's

Figure 10

Eat & Run PAC-MAN™
Points Awarded After Energizers Are Eaten

	First	Second	Third	Fourth
During first 4 runs	100	200	400	800
After 4 successful runs	200	400	800	1,600
After 8 successful runs	300	600	1,000	2,400
After 12 successful runs	400	800	1,600	3,200
After 16 successful runs	500	1,000	2,000	4,000

benefit to eat just one energizer and return to the center box, completing a successful run, rather than risking the eating of additional energizers and being caught by the monsters.

With a few hours of experimentation, the player should be able to develop patterns of movements, as in the conventional PAC-MAN game, for each run. In the earlier runs, the player is able to eat E1, which is closest to the door of the center box, and return safely. In later runs, the safest energizer is not E1, even though a greater distance must be traveled.

14

IMPROVISING AT PAC-MAN™ AND GENERAL TIPS

The ability to improvise at PAC-MAN is essential, even to those with a knowledge of the patterns. This is because the player inevitably will make errors and will need to play without a pattern to complete boards.

Escaping the Monsters

An important skill in improvising is to be able to escape being eaten by the monsters. There are several evasive actions that will help avoid being eaten:

1. Turning Corners

On a straightaway, some of the monsters travel faster than PAC-MAN and thus will catch PAC-MAN. However, PAC-MAN goes faster than the monsters on turns. Thus if you are being pursued closely, make a number of quick turns and you will stay ahead of the pursuing monsters.

PAC-MAN also travels faster on a path without dots than on a path with dots—as if eating dots requires some of PAC-MAN's time. Thus when closely pursued, PAC-MAN stands a better chance of outrunning the monsters in paths without dots.

2. Using the Tunnels

You can also pick up speed on the monsters by going through the tunnels. This is particularly true if you make one or more reverse flicks as you enter the tunnel. These flicks (a sort of fake aggression as you "pretend" to go toward the monsters and then suddenly turn back) will often either (1) make the monsters slow down, or, particularly in the case of the light-blue and pink monsters, (2) make the monsters back off and not enter the tunnel in pursuit of you.

The orange monster often will back off and retreat when located near the exit side of the tunnel. Thus if you are being pursued through the tunnel and see the orange monster near the exit, do not back into the tunnel again—and thus probably into the pursuing monster(s)—until you are sure that the orange monster will not back off.

When being pursued by the red monster and considering entering a tunnel, make sure the light-blue and pink monsters are not near the exit side of the tunnel. These two monsters have a proclivity for entering the tunnel on their own, thus sandwiching the player between them and the pursuing red monster.

3. Fakes

When being pursued, you can sometimes make a quick turn *toward* the pursuing monster and cause it to veer away—if there is a convenient intersection between you and the monster. This is particularly true of the light-blue monster, who is aptly named "Bashful" because of his tendency to back off when threatened by PAC-MAN.

4. Dangerous and Safer Paths

The player is quite susceptible to being eaten in the southernmost long horizontal channel and in the corners. This is because monsters can enter these areas

from more than one direction and surround PAC-MAN. Try to avoid these areas when "on the run."

The player is generally safest in the center channels and in the two "S" channels above the center channel. Note that the monsters will *never* enter the "S" channels at Point A in Figure 11 (unless they are blue and therefore harmless). Thus a PAC-MAN "hiding" in the "S" channels may never be attacked from the south—only from the north. This is why the "S" channels are excellent places to take a breather when in a tight jam.

The good improviser can lead the monsters around the center channels and the "S" channels for minutes

Figure 11
PAC-MAN® Layout—Improvising Points
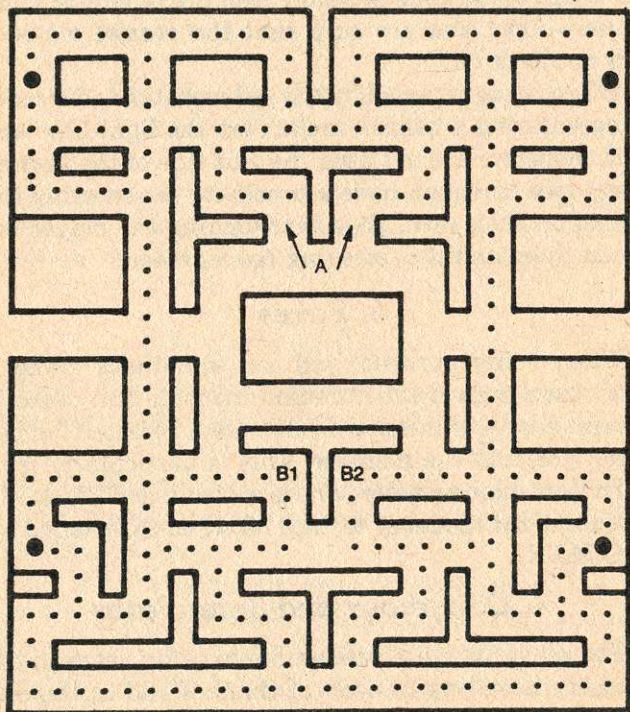
without being eaten—with an occasional escape into the tunnels.

Other good resting places are at B1 and B2 in Figure 11. The monsters *never* enter these channels from the south. Thus if you are being closely pursued below Point B1 or B2, move northward into the channel and you will find temporary safety.

Hustling PAC-MAN

The betting PAC-MAN player who is being observed by a potential "mark" (though I am not encouraging betting) would do well not to expose his knowledge of patterns, and should play a "fairly good" improvisational game. The best times to improvise are during the boards with long blue times (such as during the early boards and the 1st pineapple of the Fast Game). This is because, if the player gets in a jam, he can seek out an energizer and will have a longer time to recover.

During a game in which bets are involved, the player is advised to attempt to vary his pattern. This may keep the other player from observing board after board of your basic pattern and memorizing it for use against you. The player might consider alternating between the PK and P4 patterns during the middle boards.

Some time ago, the owner of a Las Vegas Strip casino wouldn't let me play blackjack in his place as I usually do. He did, however, bet me dinner for two in a contest at a PAC-MAN machine there. Even though I beat him by only a few thousand points, I couldn't get him to play me for higher stakes after the first game. I must have played too confidently.

Can PAC-MAN Be Beaten?

People watching me play often ask, "Are you beating the machine?" The answer to this is "No" since, like

death and taxes, the end of the game must inevitably come. The exception to this rule might occur when, like my San Francisco friend Raymond, you amass such a huge score that you walk away from the machine in midgame out of sheer boredom or fatigue. That might be considered a victory over PAC-MAN—that is, you have played all you wanted for your quarter and choose to do something else.

GENERAL TIPS

It's only an arcade game. Yet PAC-MAN seems to require physical and psychological preparations—just as the top chess masters often exercise before important matches. Here are some tips that will help the player perform better at PAC-MAN.

Concentration is highly important. When playing, think only of your PAC-MAN game. Be aware in advance what moves the pattern will require. Do not be distracted. Do not talk to others or check out the player next to you. Many, many PAC-MAN players have told me that they have been approached by someone with a question, or just a greeting, only to be eaten almost immediately thereafter. This has also happened to me on many occasions.

I cannot play PAC-MAN well when tired, hung over, or just not up for it.

The quality of the machine is important. All too many machines have loose joysticks. Some have the annoying habit of reversing directions without being instructed to do so. Newer machines with clean screens provide the best games.

When I play an important game, I bend both my knees when playing. This seems to force me into greater attention—it stops me from getting too relaxed.

It's really hard to play well when drinking. PAC-

MAN would make an excellent coordination test for alleged drunk drivers. Some of my dreadful games have occurred after I had downed four or five martinis.

The Last Resort

If you find that you are playing under less than ideal conditions and are losing to players you feel you should beat, there are a lot of really good excuses you can use. I've heard many of these over and over again. Here are a few to start with:

"The glare on this machine's impossible! You can't even see the board!"

"This knob's too loose. There's no way to control the game."

"I pushed the knob up and the damn PAC-MAN went down. There must be a loose connection here."

"Please don't talk to me when I'm playing. See what you made me do?"

"My shirt's too tight. The blood can't get to my brain!"

"I was just experimenting—not playing for score. Got an idea about a new pattern."

"Whatta hangover. Wish I had some oxygen."

"Did you see that lady who just walked in? Wow!"

"Who stepped on my foot?"

"My hand's sweaty. Lost the knob."

With the knowledge of the patterns in this book, plus use of the improvisational tips, the reader should be able to join the ranks of the PAC-Masters—the very best PAC-MAN players in the nation. Of course, as more and more players become proficient, competition will get tougher—but it's still early and there's plenty of time to excel at the game.

Good luck to you!!!

15

DEVELOPING PATTERNS FOR CHANGING CHIPS

Already the manufacturer is starting to take counter-measures as players are becoming more and more adroit at PAC-MAN. As I've mentioned, there are games where the player is given only two men to play with (San Francisco) or the player is awarded an extra man after 15,000 rather than 10,000 points (several arcades on the East Coast). There is also increasing use of the Fast Game (nearly everywhere in California and Oregon).

Worse yet for the players, the manufacturer has come up with more serious countermeasures. The programming of the machine has been changed to foil the use of some of the existing patterns.

The PAC-MAN program is contained in a little microelectronic device called a "chip." The chip is tiny, smaller than your fingertip, but the thousands of computer instructions necessary to create a PAC-MAN game are miniaturized in this simple chip. The manufacturer has now come up with new chips in which the patterns previously presented do not work. Most readers will not be affected, however, since the vast majority of PAC-MAN machines in this country utilize the original chip.

In any case, for every countermeasure there's a counter-countermeasure. Experimenting with one of the new chips (I'll call it the Atlantic City Chip), I've found that Pattern P2 works well for the first board. The second board can be handled with a variation of P4 (in Chart 1, before eating the fruit, eat the dots in

the "S" channels from right to left rather than left to right).

For subsequent boards, there's a pattern (developed by Bob Squillace of *Playboy*) which is called the "Two-Dot Pattern" because it leaves pairs of dots in various parts of the board. For interested Atlantic City players, this pattern is shown in Figure 12. The pattern works for the same boards as does PK on the original chip— that is, for the third through the eleventh boards.

Notes on the Two-Dot Pattern

Point A in Chart 3. Hesitate slightly to make sure that the red monster follows you into the right "S" channel.

Point B in Chart 3. Sometimes the player will not be able to go east to E2. When blocked, eat E1 and then progress to E2 and continue as indicated on Chart 4.

Orange Boards. Be conservative in eating blue monsters. The blue time is noticeably shorter with the new chip.

The Manhattan Chip

I've spotted the use of another chip in numerous locations. I'll call it the "Manhattan Chip" because it's in several New York City arcades.

It can be identified, as is the case for all chips, by watching the test pattern. PAC-MAN eats the energizer in E4, eats E1, and is finally eaten by the blue monster just above the center box. Here's how to beat this chip:

Board 1. Start with pattern P1, but be prepared to vary. You should have no trouble getting through this board because the monsters move so slowly.

Board 2. A P2 start works. After you hit E4, you'll eat two or three monsters. Then go to the northern part

of the board and improvise your way through this relatively simple board.

Boards 3 and 4. As in the Atlantic City pattern, use a variation of P4. When you get to the "S" channels from the south, go up the *right* one first, and return south to the center through the left "S" channel (see P4, Chart 1). Then go down the right side of the center and move westward to the lower left-hand corner of the board. At that point, merely follow P4, which will take you through these two boards without problem.

Board 5 (the first apple) through the third key. Use P4 — it works just as well as in the conventional games.

If you encounter a chip with which you're unfamiliar, improvise through the first two to four boards. Then experiment with patterns you know.

P4 is more versatile than PK, that is, it can be used for a variety of chips. How will you know when this P4 variation is required? You can tell almost automatically. If PAC-MAN looks like he's going to be eaten in the left "S" channel, or just after he emerges from the left "S" channel (he's usually threatened by the red monster coming across the top from right to left), go up the right "S" channel — you have plenty of time to make that decision.

A final note in pattern development: Note that there are common sequences in the patterns in this book. These sequences can often be inserted into new patterns.

Some of the most commonly used sequences:

1. Go down to the lower left corner as all four monsters follow. Then go north just to the right of center (this is done in PK and P4).

2. Make a counterclockwise square around the board (this is done in P4). It's an efficient and frequently applicable approach to eating many dots in a short period of time.

3. Eat the dots just below the center channel as in

the sequence of pattern P4. This is often usable in early boards of new chips.

The only machines I've seen that can't be beaten by a pattern are the ones where the monsters move randomly. For some reason, these chips are rarely encountered except in MS. PAC-MAN. I wonder if this is an electronic hint that eventually women will rule the world.

How to Develop Patterns for New Chips

In the event that the manufacturer prepares additional chips in the future, the player can utilize countermeasures of his own by learning how to develop patterns. This section is devoted to the development of that skill.

In the battle of players versus computers (or really versus the programmers who tell the computers what to do), we players have the edge. This is because the computers must do what they are told to do. Even though it may sometimes appear otherwise, computers do not think for themselves. We players, on the other hand, can experiment and vary our play as we see fit.

After studying the new PAC-MAN chip, it seems safe to say that the basic characteristics of the game will remain the same in any future chips that may be developed. If this is true, we players will be able to develop patterns for any chip we encounter. Let's examine some of the basic characteristics of the game.

1. The Monsters Have Personalities

Each of the four monsters behaves in a different, and often predictable, way.

"Shadow," the red monster, is so named because he

generally follows PAC-MAN. While this is annoying, the player can use this knowledge to advantage by predicting where Shadow will move. Further, PAC-MAN can outrun Shadow every time, as long as he turns enough corners. The faster monsters can beat PAC-MAN on the straightaways, but PAC-MAN will stay ahead of all four monsters if he turns often enough.

"Pokey," the orange monster, is a delight. Not only is he slow, but he invariably seems to do the wrong thing. When PAC-MAN heads for E3 from the south, for example, Pokey, when following, will invariably go right by, as if he just isn't capable of following well.

"Bashful," the light-blue monster, is also aptly named. If PAC-MAN turns to make a threatening move toward Bashful, Bashful will often run away, turning into an intersection if one is available.

Bashful has one annoying habit. He tends to enter the tunnel all by himself. When he does this, and you have already entered the tunnel from the other end, Bashful may get you there. The player must make sure that Bashful is not entering the opposite end of the tunnel (or is anywhere near the tunnel's entrance) before committing PAC-MAN to the tunnel.

"Speedy," the pink monster, is fast and can outrun PAC-MAN (unless enough corners are turned). Speedy likes to go through the left tunnel, a proclivity which we can use to our advantage (as we do at Point B in Chart 4 of Pattern P4).

2. The Monsters Have Corners

Each of the monsters has a "home" corner. Shadow hangs out in Quadrant 2—and he's always the first one out of the center box at the beginning of each board. Pokey runs toward Quadrant 3. Bashful, the second monster out of the center box, goes to Quadrant 1, and Speedy goes to Quadrant 4.

During each board, there are times when the mon-

sters are instructed to go to their corners. They stop following PAC-MAN, appear to break up with a sudden movement, and head to their respective corners. This is a great opportunity to use a pattern where PAC-MAN eats stray dots isolated from the protection of the energizers—a time to do "clean-up work."

3. The Monsters Respond to Energizer Hits

Notice that when PAC-MAN hits an energizer, the movement of the monsters changes. Sometimes PAC-MAN can hover around an energizer waiting for approaching monsters, hit the energizer, and know exactly what direction to go in order to eat the monster.

If the monsters are going through the tunnel, they will reverse directions when an energizer is hit. One good strategy to use when three monsters have just entered, say, the left tunnel is to eat E3, move north to the tunnel, and eat the three defenseless blue monsters who are now returning, left to right, through the tunnel.

4. Other Tips

When developing a pattern, remember that PAC-MAN is most vulnerable in the long southernmost path on the board and in the four corners (since he may be attacked from different directions). These areas should be avoided unless all monsters are a safe distance away from PAC-MAN. Patterns should eat up the southernmost path as soon as possible during each board, preferably at the very beginning (as in P2 and the Two-Dot Pattern). This is often possible because at the start of each board the monsters come out of the center box one by one, and PAC-MAN starts in the lower quadrants of the board. Note that each monster usually goes to his corner when leaving the center box, before engaging in pursuit of PAC-MAN.

Try to get as many "long runs" in each pattern as is possible. Notice, in the Two-Dot Pattern, how we first make a long run across the southernmost path and then a long run up the left side of the board. Later, we make another long run up the right side of the board. All this eats lots of dots, and the more dots that are eaten early in the board, the safer PAC-MAN will be later in the board.

Try to save the energizers for last—they're our safety valves. Note how Pattern PK eats all the dots except those immediately surrounding the four energizers. This is why PK is one of the safest patterns to execute—it saves the "best for last."

Above all, when developing patterns, don't get intimidated. Remember that no matter what chip is used, those monsters will always move the same way in a given board, as long as your timing is consistent. Note that once you develop a pattern for the third board of the Fast Game, this pattern should be usable for about ten more boards. Thus against any chip, once that basic pattern is designed, the player should be able to score around 80,000 to 100,000.

Prediction

Someday, someone might be motivated to write a computer program to construct patterns against any chip that is used. Then the manufacturer might be inspired to design a chip that will alter monster behavior once trends in the player's patterns are picked up. Then the player-programmer could input this information in turn and come up with continually changing patterns.

Although I must admit that all this is unlikely, there's really no knowing where this battle between the big companies and the players may lead. Sort of reminds me of the blackjack battle.

Welcome to the electronic age!

Figure 12

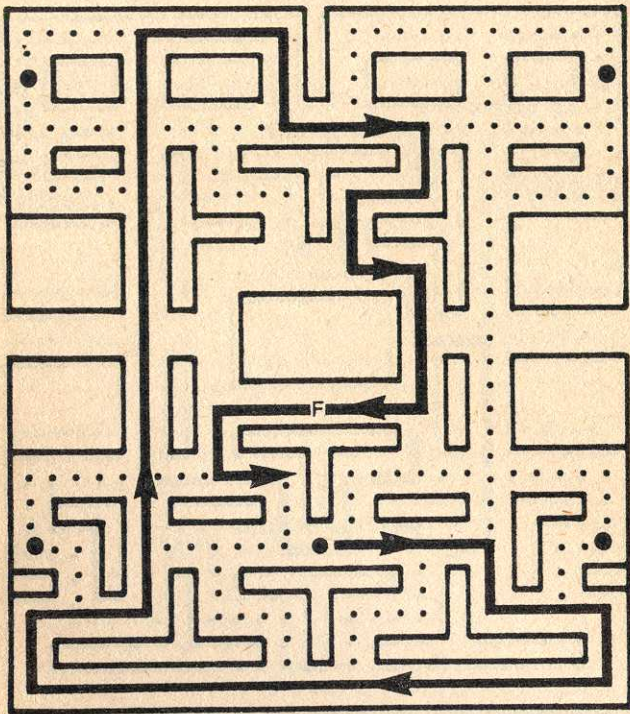# THE TWO-DOT PATTERN
for the Atlantic City Chip
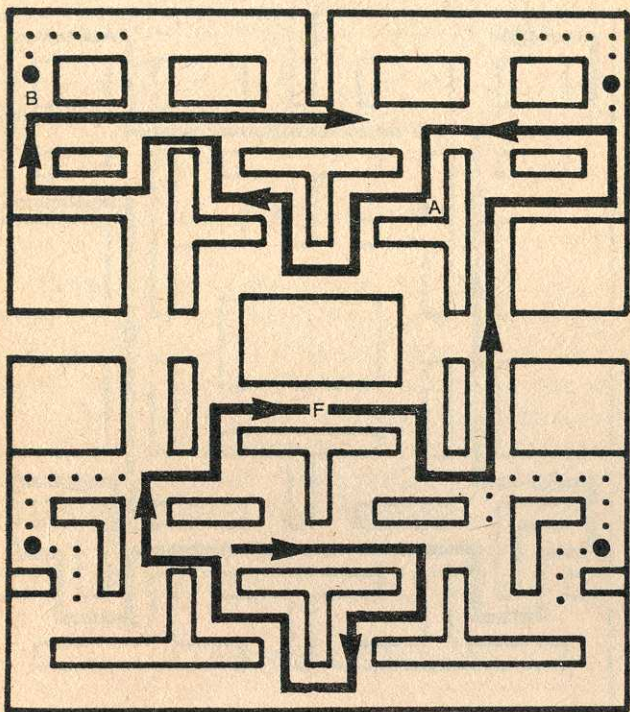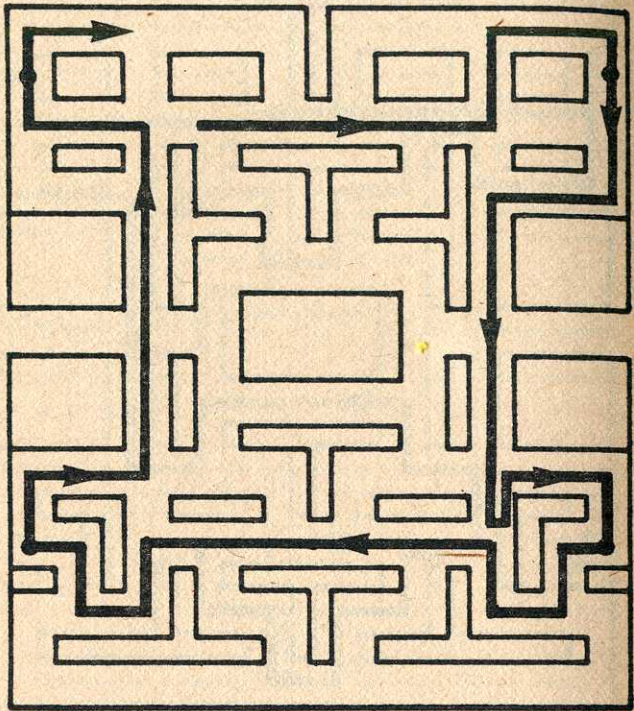
CHART 1

CHART 2

CHART 3

CHART 4

Evaluation

Players used to the arcade PAC-MAN game, who expect the same level of graphics and other features, will be disappointed with the home game. However, taken on its own merits, this cartridge is fun to play and, within the confines of limited computer memory, the game designers have done a good job of making the country's most popular video game available to millions of homes in America (and elsewhere).

Number of Players   1 or 2

General Objective

1. To eat dashes (not dots) in a maze, avoiding pursuing ghosts (not monsters).
2. Also, to eat the ghosts when they're vulnerable and, if convenient, to eat a high-valued symbol that periodically appears on the board.

Scenario

You are PAC-MAN, a little yellow quasi-circle traveling through a maze eating dashes in your path, pur-

sued by four ghosts. If any of the ghosts even touches you, it's all over.

As in the arcade game, there are four energizers (called power pills, although I'll stick to the term "energizers") in each corner of the board. If PAC-MAN hits an energizer, the ghosts are rendered helpless and PAC-MAN can "eat" them in turn, amassing points for the player and making the ghosts disappear for a while.

If the player eats all the dashes on the board, he's rewarded with another board, more difficult to complete.

The Board

The board consists of 43 barriers that form mazelike paths, in which are located 126 dashes. In the center of the board is a box, out of which emerge the four ghosts. The four energizers are located in each of the corners, and there are two exits to a tunnel, one on the bottom of the board and one on the top, through which either PAC-MAN or the ghosts may go.

Board Differences from the Arcade Game

1. The board layout is less varied. All the dividers are either L-shaped (right-side up, upside-down, or sideways) or bars. As a result, the board resembles a series of rectangles with a bar in the middle.

2. The board is not as complicated. It has 126 dashes, while the arcade version has almost twice as many (240) dots.

3. In the arcade game, the tunnel entrances are at the right and left side of the board, rather than at the top or bottom, an insignificant difference.

Figure 13
PAC-MAN™ (Atari®) Board

TUNNEL

TUNNEL

ENERGIZER (POWER PILL)

VITAMIN

STARTING POINT

139
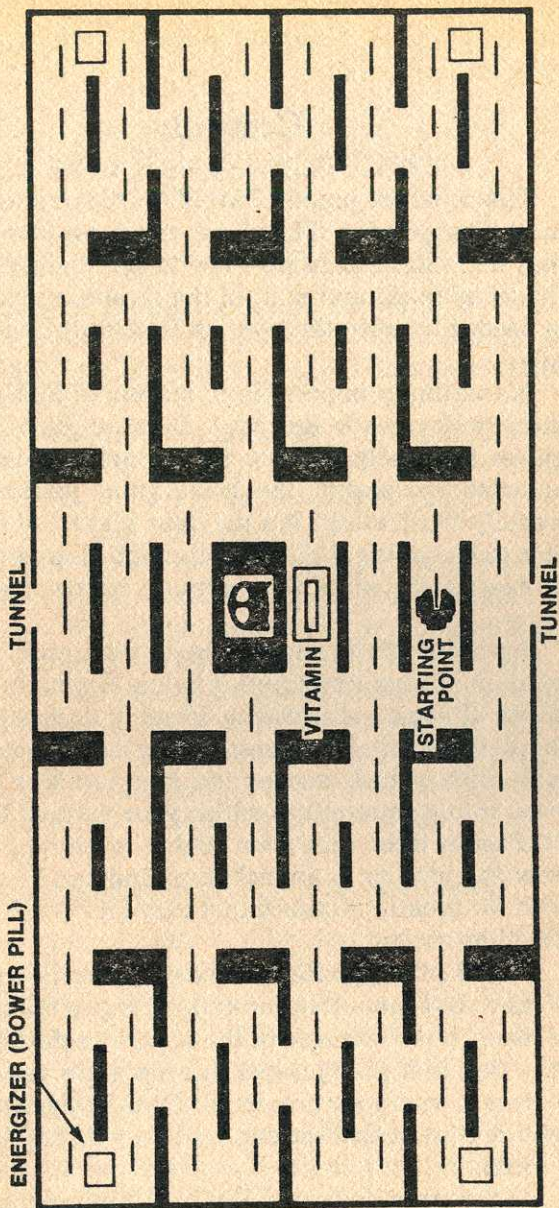
Controls

This is where arcade PAC-MAN players will be the most disappointed. The player must use two hands to play PAC-MAN at home—one to hold the joystick and the other to maneuver it (in the arcade, only one hand is needed because the joystick is mounted on the console).

It's virtually impossible to maneuver PAC-MAN at home with arcade accuracy. Because PAC-MAN requires extremely delicate timing and consistent and accurate movement, the home game joystick is extremely frustrating. It's the rare player who will be able to maneuver PAC-MAN through a series of boards in exactly the same way, without losing time on the turns.

For those of you who are *really* dedicated, there's a solution. Construct a joystick holder (I wouldn't be surprised if some enterprising inventor comes out with this before long). I'd suggest buying a cheap, old, *sturdy* table with a thick wooden top. Hammer four pieces of wood into a square into which your joystick base will fit. Pack it tight with foam rubber (even rags will do). Now the joystick is immobilized and can be operated with far greater accuracy (not only for PAC-MAN, but for other games).

To make the joystick really tight, pour in some epoxy around the edges of the joystick, filling in the tiny gaps between it and the side of the square in the table. The only risk is if your joystick breaks; it's a real pain to remove it from your homemade PAC-MAN console and replace it with another one (and they *do* break once in a while).

To the truly dedicated PAC-MAN player, however,

this is a small price to pay to avoid inaccurately executed patterns and "blown" boards.

Facts You Should Know

Patterns

The fact of greatest interest to many of you is whether patterns which consistently clear boards can be developed for home PAC-MAN. There's good news and bad news:

1. The good news—definitely so. In fact, I've included a pattern in the next section as well as a "board starter" to get you going on developing your own patterns for the home variations.

2. The bad news—to work the patterns consistently, it's necessary to devote considerable time to stabilizing the joystick. You might consider going through the carpentry number I described earlier. I've tried lots of things, such as placing the joystick between my legs for support, stabilizing it under both my feet, and even, would you believe, cradling it between my toes. If you come up with an alternative that works for you, let me know (Box 8080, Walnut Creek, CA 94596).

Differences from the Arcade Game

There are a number of differences. Some are trivial and others have a significant effect on strategy.

1. PAC-MAN looks less healthy and less friendly. He's a pale yellow fellow. His mouth, instead of being a smiling wedge, more closely resembles an intimidating rectangular gap.

2. PAC-MAN only looks where he's going when he's moving to the left or right. When moving vertically, he travels sideways.

3. When PAC-MAN gobbles dots, a sound resembling the low note on an electronic piano is played. When PAC-MAN eats a ghost, a popping sound, not unlike the old pong-game noise, is generated.

4. The ghosts are all the same whitish color. Because ghosts flash sequentially, it looks like they're jumping back and forth from one location to another on the board, which is quite confusing.

5. When PAC-MAN eats an energizer, the ghosts turn a pale blue, as do the uneaten energizers, and are difficult to distinguish because the background of the board is also blue. When the ghosts are vulnerable, a high-pitched harplike sound is generated (it reminds me of the sound effects in the heaven scenes in old movies). When the ghosts are eaten, their eyes return to the center box for reincarnation, but there's no indication on the board of points awarded, as in the arcade game.

6. The game has a health orientation. The energizers are called "power pills" and the symbol in the center of the board (called a "fruit" by most arcadians) is referred to as a "vitamin."

The vitamin is always the same shape, a pink rectangle with a smaller white rectangle inside it. It's always worth the same bonus, 100 points; fruits in the arcade game award bonuses varying from 100 to 5,000 points.

7. The game has more difficult features, both defensively and offensively: PAC-MAN meets his demise if merely brushed by a ghost; in the arcade game, close calls are tolerated. PAC-MAN must totally engulf a dash to ensure that it's eaten. Notice how PAC-MAN's mouth is the same shape as a dash. There are times when the player will think he's eaten a dash, particularly when reversing directions, only to find that PAC-MAN's mouth was open when the dash was encountered, and the dash was not actually touched and remained on the board.

8. The player is given more men. Each player starts with four men (versus three in most arcade games) and is awarded an extra man with each board completed (versus only one extra man, usually at 10,000 points in the arcades).

Game Variations

The cartridge basically contains one PAC-MAN game—the board always has the same configuration and the overall rules do not vary. However, PAC-MAN may be set to move either at a slow or fast speed, and the ghosts may move in one of four speeds. This, in combination, gives the player eight game settings, as follows:

Game #	Speed of PAC-MAN	Speed of Ghosts
1	Slow	Jogging
2	Slow	Running
3	Fast	Crawling
4	Fast	Walking
5	Fast	Jogging
6	Fast	Running
7	Slow	Crawling
8	Slow	Walking

The ghosts move very slowly and are easily avoided in games #3 and #7, which are recommended for children and novices. Each of these games may be played with either one player or two players.

The skill level for each of the eight games may be set at easy (switch "a") or difficult (switch "b"). In the more difficult "a" games, the ghosts remain in their blue state for shorter periods, and the vitamins don't remain on the board as long.

Scoring

The minimum number of points per board is 146 points, 126 points for eating the dashes and 20 points for the four energizers.

The maximum per board is 1,546 points, a goal rarely achieved because it requires eating all four ghosts four times, after each energizer is hit, and eating the vitamin twice (sometimes the vitamin appears twice per board; sometimes once). As in the arcade game, the bonus for eating the third and fourth ghost after an energizer is hit is quite high, relative to the overall scoring of the game.

Point values in about all cases are equal to one tenth of those in arcade games, as follows:

	Points Awarded	
	Home Game	Arcade Game
Eating a dash (dot)	1	10
Eating an energizer	5	50
Eating the 1st ghost (monster) after an energizer is hit	20	200
Eating the 2nd ghost	40	400
Eating the 3rd ghost	80	800
Eating the 4th ghost	160	1,600
Eating the vitamin (symbol)	100	100 to 5,000

To give you an idea of how well you're doing, use the following guide:

	Home Game	Arcade Game
Novice	100 to 300	1,000 to 3,000
Average	700 to 1,200	7,000 to 12,000
Good	3,000 to 7,000	30,000 to 70,000
Expert	10,000 to 70,000	100,000 to 700,000

There is great variation in the difficulty of the home game, depending upon the game selected and the difficulty level setting. The above home game scores are applicable for game #1, which seems to be more comparable to the average arcade game (arcade game speed settings also vary).

Strategies

Beginning Strategy

The Grip Assuming you don't build the PAC-table I referred to earlier, here are some tips on how to hold the joystick.

If you're right-handed, you'll probably find it easiest to hold the joystick firmly with your left hand wrapped firmly around the base of the joystick. There are two alternative ways to grasp the stick itself with the right hand that seem to work best:

1. Hold the stick at its base with the thumb, index, and middle fingers.

2. Hold the stick *lightly* at the very top, with the tips of the thumb, index finger, and middle finger. I find this grip gives the best control, especially while negotiating a series of turns in rapid succession.

Familiarization with the Game

If you're a novice, start with game #3. Initially, you should become familiar with:

1. The joystick, so that you can move it instinctively in each of the four directions.

2. The board. After a dozen games or so, you will become quite familiar with the layout of the board. You will know almost subconsciously the locations of the tunnel entrances, the energizers, and the entrance and exit paths to the various rectangles.

Playing the Game

The arcade strategy of starting at the bottom of the board doesn't work here. This is because in the arcade game, several monsters head north at the start of every board, regardless of the movement of PAC-MAN. In the home game, the ghosts vary their paths far more noticeably, depending upon the movement of PAC-MAN.

The energizers are safety valves, for use when PAC-MAN is jeopardized by closely pursuing ghosts. Try to clear as many dashes as possible before hitting energizers. But don't risk getting eaten to do this. If you're in a tight jam, head for an energizer and eat a ghost or two.

As soon as the harplike sound stops, forget about chasing ghosts. They've become aggressors once again.

Use the tunnels to evade closely pursuing ghosts. On many occasions, you will find the ghosts do NOT follow you through the tunnel, giving you plenty of breathing time to eat more dashes. Obviously, check out the other side of the tunnel before entering it to make sure you won't be trapped when emerging on the other side.

Your ultimate goal (although you won't achieve it with regularity unless you're very proficient) is to get to the point where all that's left on the board are energizers and surrounding dashes. Then all you must do is head for each energizer in turn and eat it, the nearby dashes, and a ghost or two, as they turn helplessly blue. Try for the vitamin—100 points is an important bonus—but don't jeopardize PAC-MAN to do so.

If you're able to clear the first board, you will get a score of at least 146 points, and more likely you'll rack up 300 to 400 points, depending on how many ghosts you gobbled up.

Advanced Strategy

Home Game Pattern for Game #1 As I mentioned before, patterns can be developed for home PAC-MAN. To give you an idea of how the home patterns work, Exhibit 1 contains the pattern for getting through the first board of game #1.

Exhibit 1 GAME 1
CHART 1
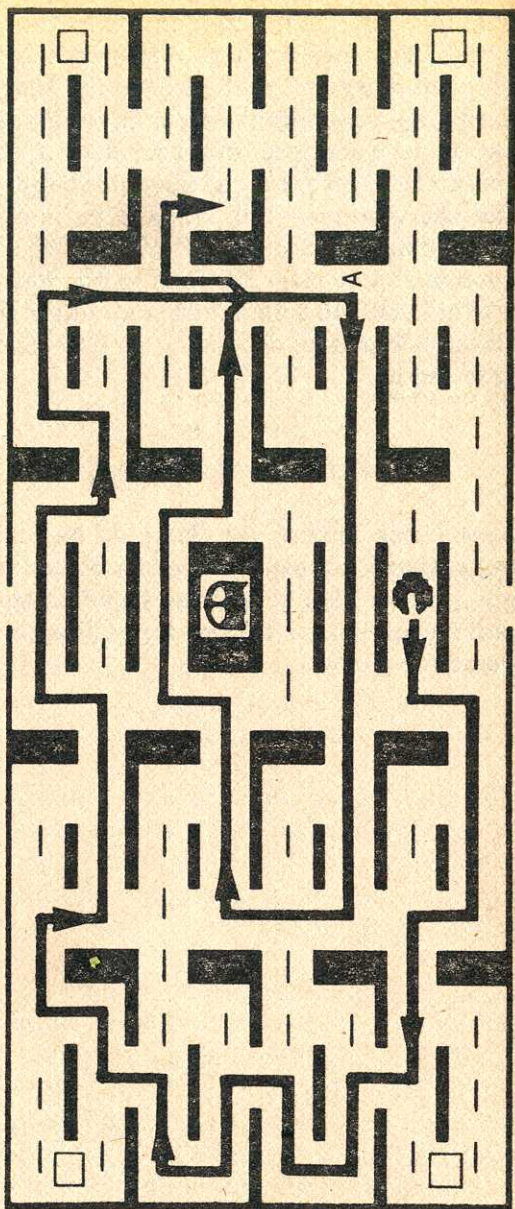
Exhibit 1
CHART 2
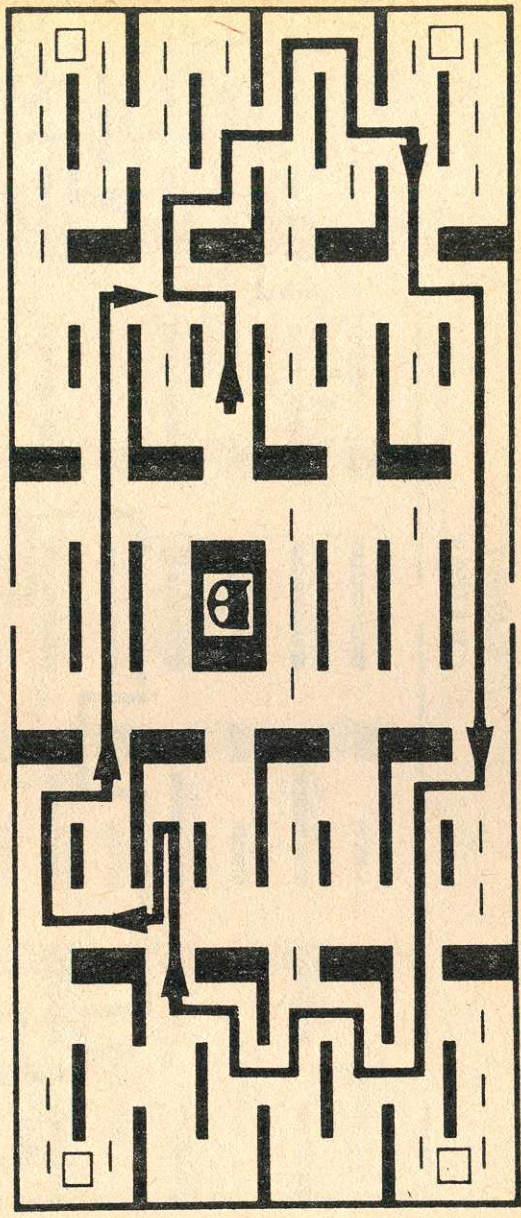
Exhibit 1
CHART 3
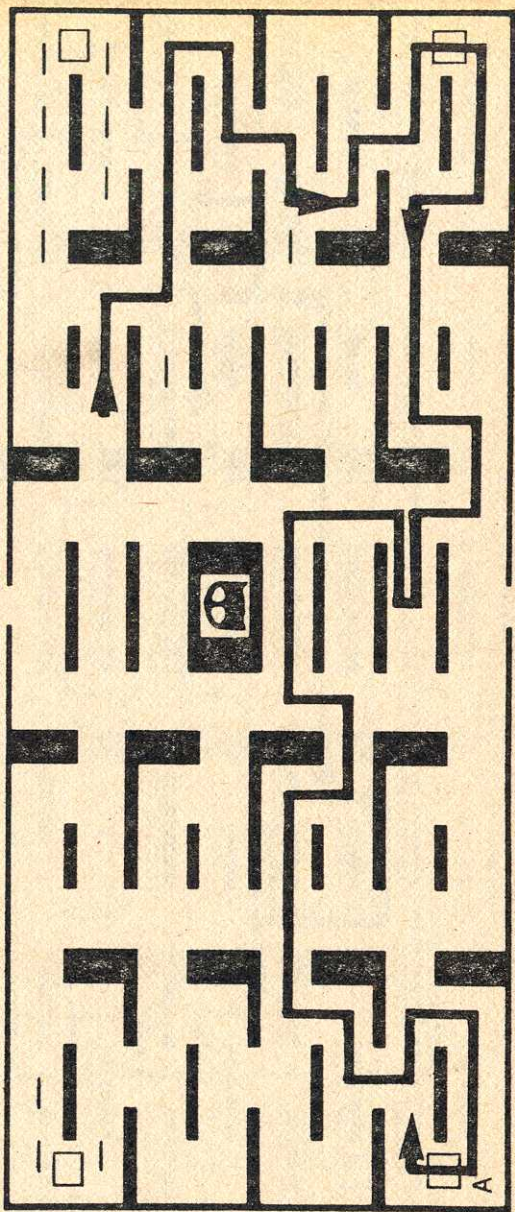
OPTIONAL: Hesitate at point A until pursuing ghosts get closer. Then you may eat several of them, for more points.

150

Exhibit 1
CHART 4

OPTIONAL: As in the previous chart, you may hesitate at point B until pursuing ghosts get closer. Then you may eat several of them for more points.

151

Even with knowledge of this pattern, you will not find it easy getting through the board because of the controls, which do not permit tight, accurate turning. Wrong turns, delays, and other errors will inevitably creep into your play. For this reason, it's essential for the home game PAC-MAN player to stabilize the joystick.

Begin moving PAC-MAN *immediately* at the start of the game. Don't lose even a fraction of a second, which is challenging in and of itself, since to start the game you must take one of your hands off the joystick to press the reset button on the console.

When PAC-MAN starts moving, anticipate each turn in the pattern. Since the computer works in hundredths of a second (or less), and we work in tenths of a second (or more), delays which we won't perceive will alter the movement of the ghosts. You must anticipate each turn and move the joystick in that direction *before* PAC-MAN reaches the intersection. This will ensure that PAC-MAN makes the turns instantaneously. Be careful though—if you anticipate prematurely, PAC-MAN may turn too early—blowing the pattern.

Developing Your Own Patterns

In experimenting with PAC-MAN patterns in the home game, you have two large advantages:

1. You're not putting quarters into the machine, so your experimentation isn't costing you anything.

2. After losing a man, you can reset the board back to the beginning. Just hit the reset button on the console. Forget about the other men until you've got the pattern down correctly.

It's not hard to develop your own patterns. As you experiment:

—try to use long runs, which clear many dashes quickly.

—try to leave the energizers alone as long as possible.

—to the extent possible, avoid a quick series of tight turns, because the controls make these maneuvers far more susceptible to operator error.

—use the tunnels frequently to get away from the ghosts and to get breathing time to eat more dashes.

To assist you in developing patterns, I've included the beginning of another pattern (Exhibit 2), which can be used to construct patterns for several of the home game variations. You'll find that between the patterns in Exhibit 1 and 2, you may begin clearing each of the eight boards, as outlined in Exhibit 3.

Now you've got a start. The rest is up to you!

Exhibit 2

COMMON START OF PATTERN FOR SEVERAL GAME VARIATIONS

CHART 1
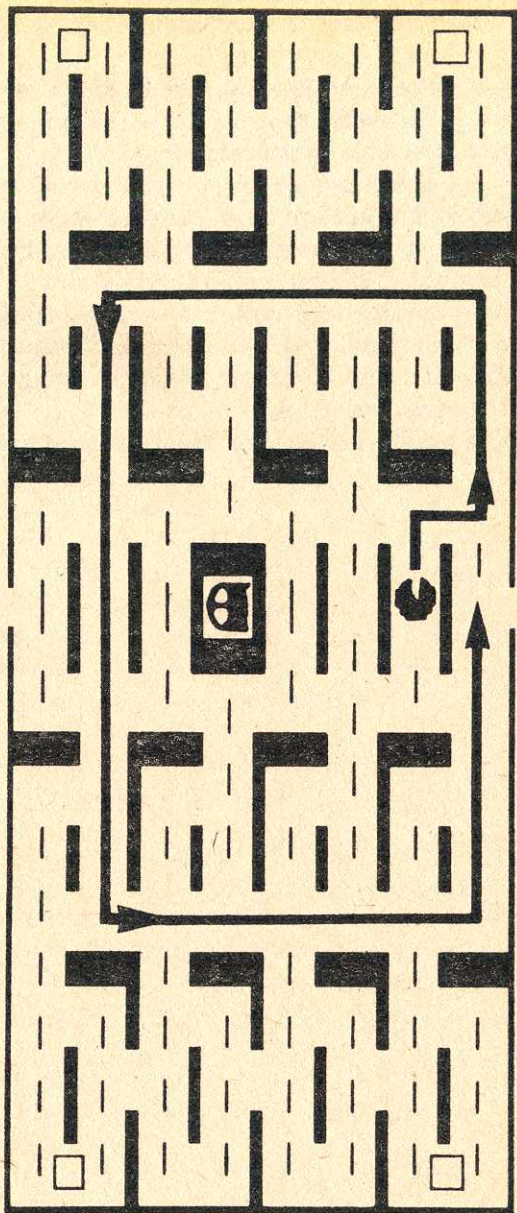
Exhibit 2
CHART 2
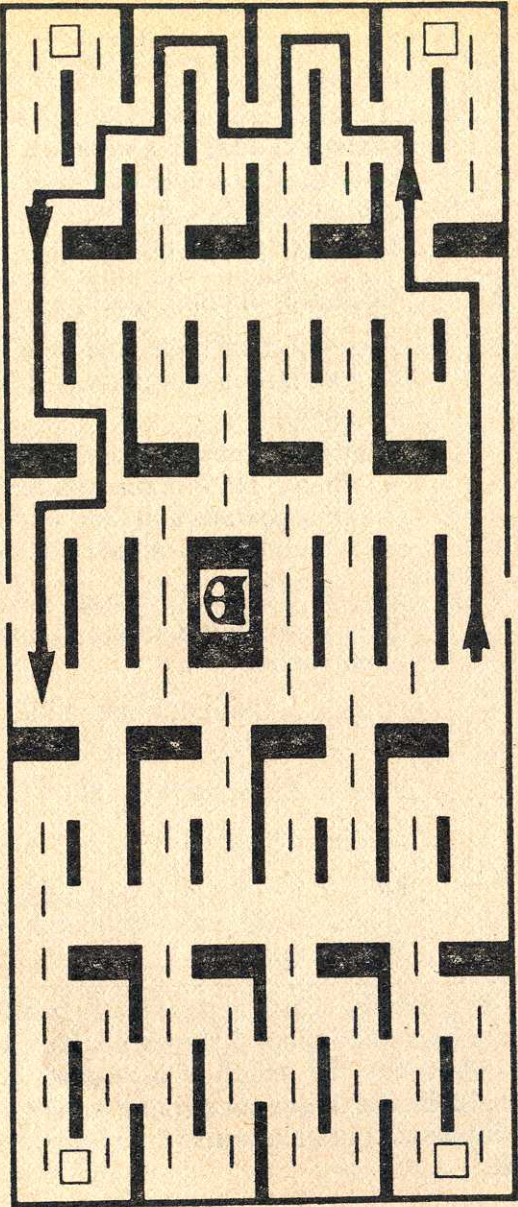
Exhibit 3

Game Variation	Start of Pattern
1	Pattern in Exhibit 1 works all the way through, if executed with no delays, for skill level "b."
	For level "a," Exhibit 1, Chart 1, works.
2	Exhibit 2, Charts 1 and 2.
3	The easiest variation and thus one where experimentation should begin for the novice.
	Exhibit 1, Chart 1, works through point A. When point A is reached, head south as far as possible and then west, going south through the bottom tunnel.
4	Exhibit 1, Chart 1, through point A. Then go south and west and through the lower tunnel.
5	Exhibit 1, Chart 1, works all the way through, with no timing delays.
6	Exhibit 2, Charts 1 and 2.
7	Exhibit 2, Chart 1.
8	Exhibit 1, Chart 1, through point A. Then go south and west and through the lower tunnel.

Note: The pattern charts apply equally to either skill level for game variations 2 through 8. Skill level settings affect only the length of blue ghost time. The pattern in Exhibit 1 does not work for game #1, in level "a," because the ghosts return to their aggressive states earlier.

ABOUT THE AUTHOR

Ken Uston is widely known as the foremost blackjack player in the world. He has been featured on *60 Minutes* (February and May 1981), the *Today* show, *Good Morning, America, The Tom Snyder Show, The Mike Douglas Show, That's My Line,* and *To Tell the Truth.* Feature articles about him have been included in *The New York Times Magazine* (cover story), *Time, Newsweek, Sports Illustrated, People, Money, US* and countless other periodicals.

Ken is no stranger to teaching methods. He has written five books, including the recently published *Score: Beating the Top 16 Video Games* (for arcade players) and is hard at work on a sixth called *How to Buy and Beat the Home Video Games* (for home video enthusiasts). *Mastering PAC-MAN,*℠ has been listed on *The New York Times* Best Seller list. His best-selling book on blackjack, *Million Dollar Blackjack*, has been acclaimed as "the most complete book ever written on the game of blackjack" (*Boardwalker* Magazine). His first book, an autobiography entitled *The Big Player*, is being made into a major motion picture.

Ken is a Phi Beta Kappa Bachelor of Arts in Economics from Yale University and an MBA From Harvard University, and has been teaching blackjack around the world for the past five years. He has been Senior Vice-President of the Pacific Stock Exchange, Director of Operations Research for the Southern New England Telephone Company, and a consultant for Cresap, McCormick and Paget, and has also taught several courses in Business Management at Quinnipiac College in Hamden, Connecticut.

As Ken puts it, "Mathematical and logic challenges of all kinds have always been of interest to me, whether it's computer programming, probability analyses, bridge, blackjack, PAC-MAN or the other video games."

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KEN USTON is recognized as the foremost blackjack player in the world. He has appeared numerous times on national television, has been written up in *The New York Times Magazine, Time, Newsweek, People,* and countless other periodicals, and the story of his life is currently being made into a major motion picture. Ken has a B.A. in Economics from Yale (Phi Beta Kappa), an M.B.A. from Harvard, and has taught blackjack around the world. And, as he himself puts it, "Mathematical and logic challenges of all kinds have always been of interest to me, whether it's computer programming, probability analyses, bridge, blackjack, or PAC-MAN."

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