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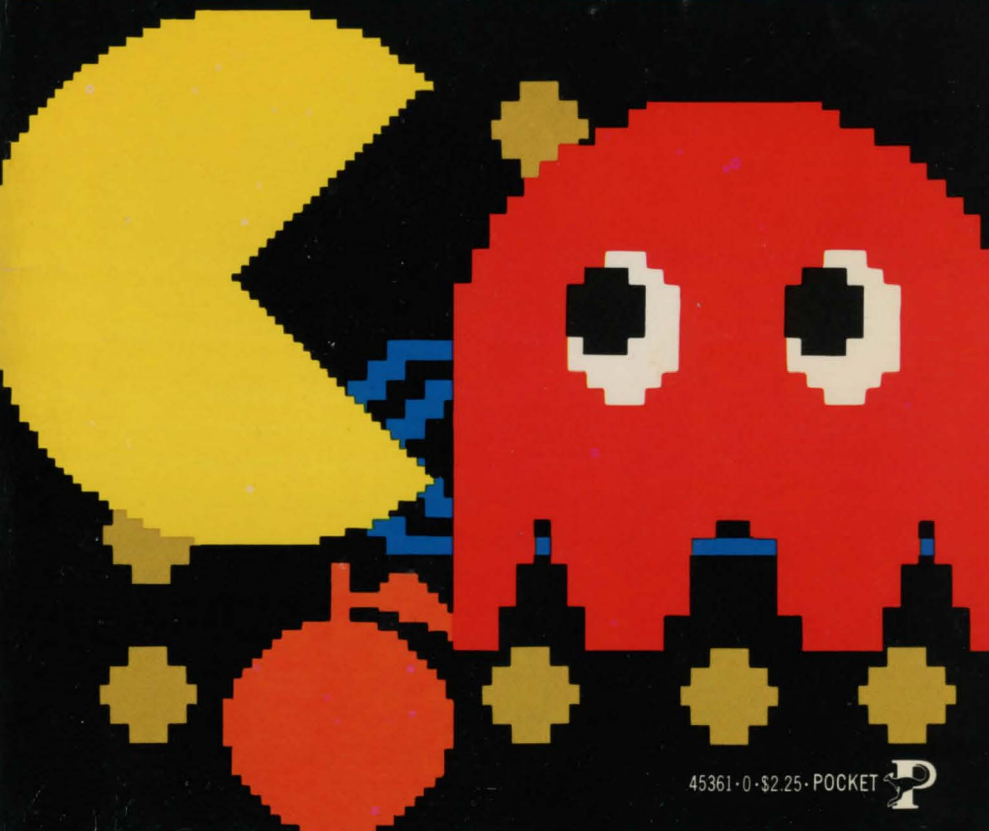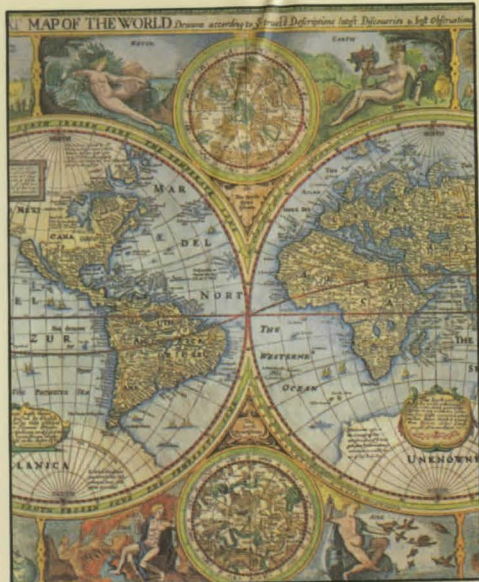
HOW TO WIN AT
PAC-MAN

The Only Book that Gives You All You Need to Challenge the World's Most Popular Computer Game!

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BY THE EDITORS OF CONSUMER GUIDE®

HOW TO WIN AT PAC-MAN ™

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HOW TO WIN AT PAC-MAN will teach you everything you need to know about the magnificent video game called Pac-Man. Our experts have been pumping numerous quarters into numerous Pac-Man machines throughout the country, testing all kinds of methods to help you build your Pac-Man score. Our research has led us to one overwhelming conclusion: Pac-Man is, without a doubt, one of the most ingenious, thoroughly enjoyable games ever introduced to any public anywhere. If you play the game regularly, you already know that. If you're just starting to hone your Pac-Man skills, start reading, and get yourself involved in a national addiction.

Pac-Man is to video games what the Duesenberg SJ is to automobiles or the Queen Anne chair to furniture: an undeniable classic. We use the word "classic" carefully, but it's the only word applicable to Pac-Man's ingenious design. A classic book can be read over and over again—each time with new understanding and increased enjoyment. The same is true with Pac-Man. It is impossible to exhaust its infinite delights and possibilities.

Introduction

HOW TO WIN AT PAC-MAN is more than an introduction to the game. It is a book that explains and helps you to understand the intimate nature of Pac-Man. We'll tell you how to use your own individual talents, how to design your personal Pac-Man strategy for maximum point potential. After reading this book and putting its tips and advice to work at the arcades, you will become, without a doubt, your own Pac-Man hero—a consistently high scorer.

Since its development in 1980, 250,000 Pac-Man machines have appeared all over the world. That's a quarter of a million machines! And 95,000 of those are in the United States. In fact, two or three of those machines are probably sitting within walking distance of your home, right now. After reading this book, you should get out of your chair and pump a shiny new quarter into the closest machine. Then put our advice to work.

The basics of Pac-Man are simple. You control one joystick that moves the Pac-Man through a maze—left or right, up or down. The trick is learning standard patterns to guide this Pac-Man through that maze. We offer you three authoritative, meticulously researched and tested patterns that can be

learned and put to work in a matter of days. These patterns will undoubtedly give you high scores. But you may eventually discover variations in the patterns that work better for you. And that's what Pac-Man's all about! Learn to personalize your pattern, give it your mark.

The object of the game is, simply, to score as many points as you can. Eating the small dots in the maze gives you the minimum number of points: 10 points per dot. Big points come when you eat the energizers—the big flashing dots near each corner of the maze—and then kill the fleeing blue monsters. Each energizer is worth 50 points. The points for the monsters double as you eat them during a single blue phase. The first monster is worth 200 points, the second 400, the third 800, and the fourth 1600. During the first three or four screens of play, it's fairly easy to kill all four monsters with each energizer—for a total of 3000 points. If you kill four monsters at each corner and eat up all the small dots (240 of them), you gather 14,600 points for each screen. If you gobble up a few fruits on each screen, you add their values to the total. The first fruits—cherries—give small bonus points (100 each). Each screen you play gives you different fruits with increasing point values (strawberry, 300, and peaches, 500, for example). You eventually get to high screens where there's no fruit at all, but bonus thunderbirds, bells, and keys (worth 2000, 3000, and 5000 points, respectively).

It's a good thing the bonus fruits and prizes are worth more during the later screens, because it becomes harder and harder to eat all four monsters with each energizer. Eventually, you must be satisfied with eating only one—or maybe two—monsters per energizer. That's because the monsters stay blue for such a short period of time as the game progresses. Once they return to their original colors, they'll kill you.

Every bona fide Pac-Man hero develops a love-hate relationship with the monsters. You've got to kill them for points—and they can kill you—so you hate them. But the monsters are so darn lovable—each with its own personality—that you can't help but feel some affection for them.

A formal introduction is in order. Meet the red monster Shadow, nicknamed "Blinky." He's the slyest of the monsters. He always seems to be on your trail (like a shadow). His buddy, the pink monster Speedy (nickname: "Pinky"), is the fastest of the four monsters. Though not as sly as Shadow, he can actually outrun you, unlike the other monsters. The light blue monster is Bashful, and is nicknamed "Inky." Bashful is the darling of the monsters. He is so shy that he will actually run away from you if confronted. Some of us have at times actually run through Bashful without injury. We're not quite sure why. The orange monster is Pokey, nicknamed "Clyde." He's an ambitious little monster—always willing to attack you—but he's quite slow. You can usually outrun him.

Getting to know the monsters, their personalities and reactions, is one of the most important aspects of good Pac-Man strategy. It is most important that you get a good feel for strategy before the high scores start coming—consistently. But we don't think most potential Pac-Man stars are content with a mere rundown of strategy and technique. So we gave our computer experts a big (and as far as they were concerned, their best-ever) assignment: solving the mysteries of the Pac-Man machine. You won't be able to build a Pac-Man mechanism with our data, but you'll learn to appreciate all the work that goes into this top-notch video game.

We've also been pumping numerous quarters into every new video game we could find. The results of that hard work (don't you pity us!) is a short synopsis of four video games that we feel most meet rugged Pac-Man standards. If your favorite Pac-Man machine is booked up, check out one of the four games we list at the end of this book.

The final page of HOW TO WIN AT PAC-MAN is packed with some of the best Pac-Man tips you'll find anywhere. With tape recorder in hand, we interviewed every Pac-Man hero we could locate. The best of the bunch have been quoted in the back for your instruction and enjoyment.

Start reading the following pages and begin a new chapter in your Pac-Man development. Maybe take a few days with this book by yourself and improve your game. Then challenge your friends—or your enemies—to a game. You'll amaze them with your daring and skill. Happy Pac-ing!

Pac-Man is a game with five basic parts. Get to know these parts before attempting high strategy. Once you master the mechanics of the game, the real fun—and the high scores—will begin.

A. Pac-Man (alias The Pac, Jaws, Yellow Man, and Critter). Never hesitate moving the Pac-Man. Hesitation can be a more formidable enemy than the monsters. Courage is one of four ways to stop hesitation. The other three are practice, practice, and practice. You'll probably experience those painful Pac-Man ailments: Pac-Man elbow and Pac-Man blisters. They're but the price you pay for victory.

Tip One: Elements of the Game

B. Monsters (alias Ghosts, Zombies, and Screw-Eyes). Learn the personality of each monster. Speedy, nicknamed "Pinky," is pink, and he's fast. The red Shadow, nicknamed "Blinky," is always behind you; it's hard to shake him. The light blue Bashful, nicknamed "Inky," is terribly shy and will actually run away from you. The orange Pokey, nicknamed "Clyde," will try his best to get you, but he's slow.

C. Energizers (alias Power Points, Killer Pills, Fuel Tanks, and Vitamins). Make sure at least three monsters are following you before eating an energizer. You only have four energizers per screen—use them sparingly for maximum point potential. The energizers are to Pac-Man what spinach is to Popeye. They make the Pac-Man powerful enough to kill monsters.

D. The Tunnel (alias The Tube, The Time Warp, and The Scoot). The monsters always go slower through the tunnel than the Pac-Man. Use this to your advantage: lure the monsters behind you through the tunnel. This is the best way to get the monsters off your tail. It buys you time.

E. Fruits (alias Big Points, Point Pickers, and Weiners). Fruit makes for big bonus points. Try your best to get the fruit, but remember: the monsters know you want that fruit. Lure the monsters away. The speed of the game varies with the fruit showing. The progression from slowest to fastest is: cherries, strawberry, peaches, apples, grapes, thunderbirds, bells, and keys.

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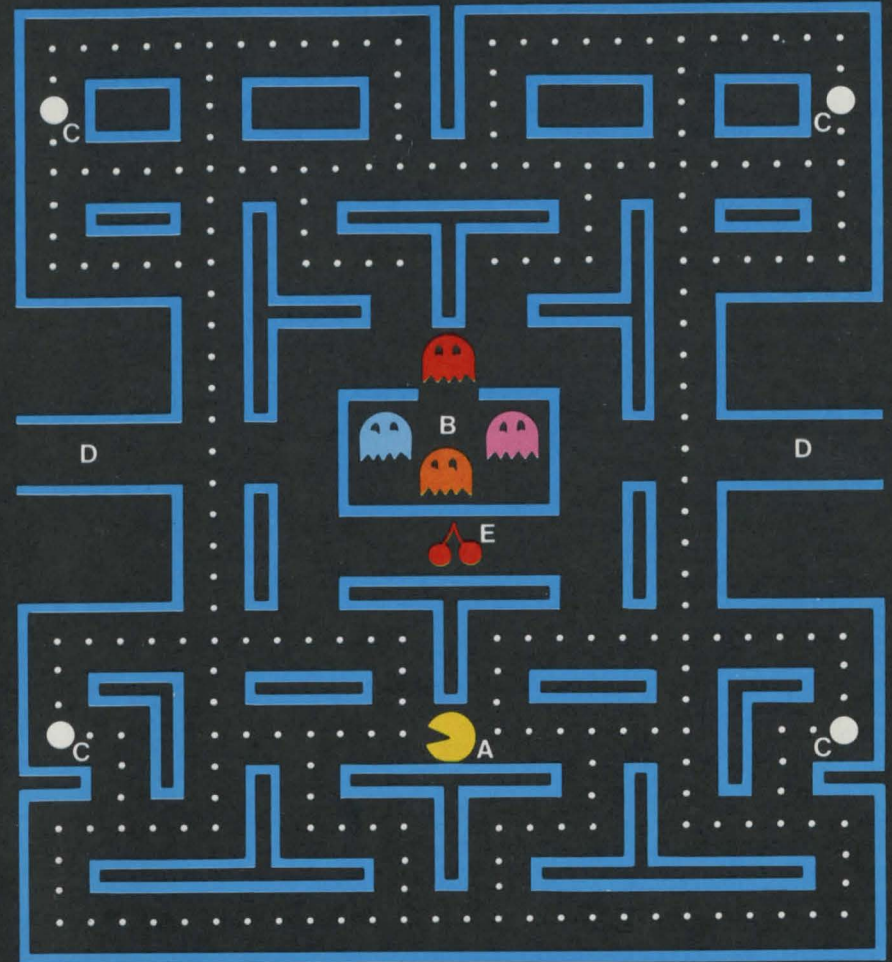
It is best to move the Pac-Man by logical and repeatable patterns in order to achieve the highest scores. The Cherry Pattern is the first of three patterns. If these patterns are followed closely, the Pac-Man will safely outwit the monsters.

All the other patterns build on the basic Cherry Pattern just like most poker games build on five-card draw. Everything moves slowly in this pattern; monsters stay blue longer after the Pac-Man has eaten an energizer than they will in subsequent patterns.

Tip Two: The Cherry Pattern

Once you memorize the pattern, you'll be able to relax (many people are seen yawning during the first screen). The toughest part of learning to follow a pattern is moving the Pac-Man without hesitation. Certain situations may look like certain death. Be brave. If you run the Pac-Man full throttle around the corners, you'll outsmart the monsters.

**A.** Make absolutely sure to clear the entire bottom row of dots. There's no danger if you do this quickly at the start. If you miss one dot and have to return, you'll mess up the pattern. The Pac-Man is more vulnerable on the bottom row than any other area on the board. The monsters could conceivably block the four entrances and attack. It's a dangerous place. Beware!

B. Three monsters are going to be coming at you here. Don't hesitate. Be courageous. Make this corner as quickly as possible. If you hesitate, prepare to meet your fate.

C. Eat this energizer. Then kill the three monsters running from you. The fourth monster, worth 1600 points, will be heading toward the bottom of the screen. Chase him and kill him while he's still blue.

D. This is the least predictable part of the pattern. At this point, you're on your own—with a few tips to go by. Two or three monsters will be following you. If they continue to follow you, eat the top right energizer and kill the monsters. If the monsters stop following you and retreat, clear as many dots on the top of the screen as possible and head for the energizer on the top left. The monsters will eventually catch up to you there. Eat the energizer and kill the monsters.
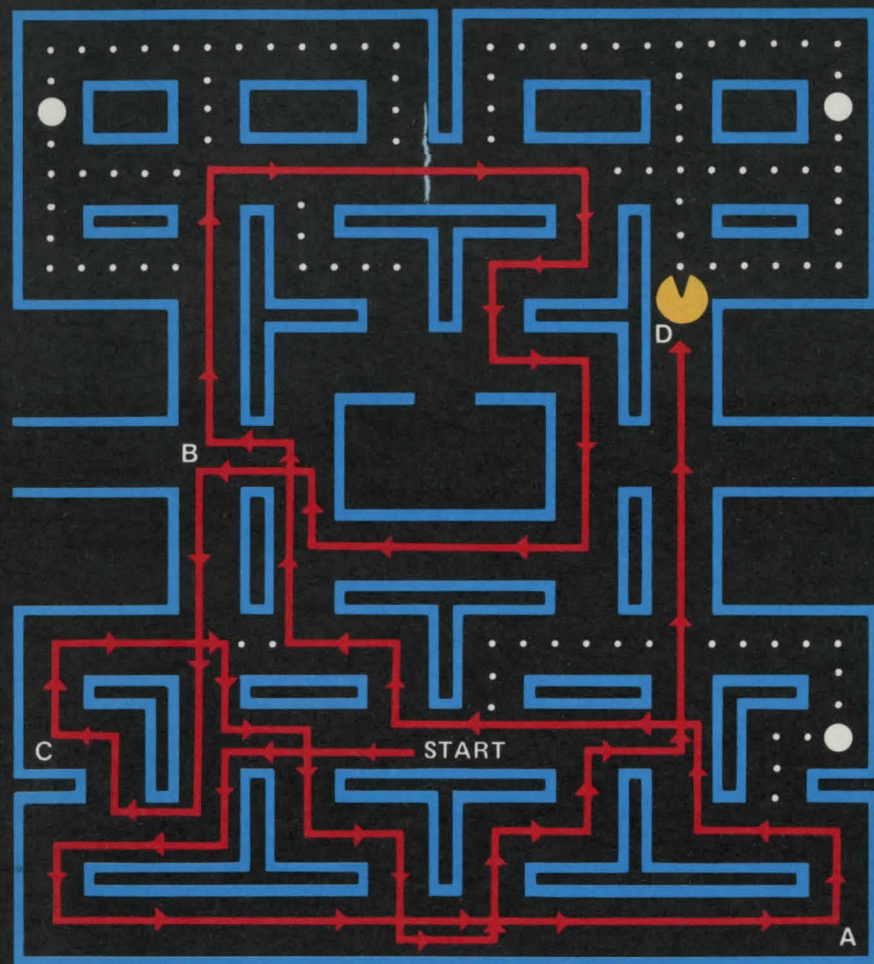
The pace speeds up with the second "Mid-Fruit" Pattern. This pattern works for the next three screens. The first will have a strawberry; the second and third will have peaches. The monsters don't stay blue as long as they did in the first pattern. Point values for the fruits are up. The tunnel becomes more effective in this fast-paced game because it slows these monsters down.

A. Clear the bottom row of all dots as in the first pattern, but retrace your steps quickly before the blue monster attacks.

Follow the pattern indication at the bottom right.

B. Again, turning this corner is critical. Do not hesitate. The monsters are charging faster than in Pattern One. If you slip, you're dead. If you're quick, you'll give them the slip.

C. Eat this energizer and kill the three monsters. One of them will try to escape through the tunnel. Don't let him. Grab him before the tunnel and then go to the bottom and grab the fourth—1600-point—monster while he's blue.

D. You're on your own again. The play will be the same here as in Pattern One. If the monsters keep after you, eat the top right energizer and kill them. If the monsters retreat, eat the dots on the top of the screen and make your way toward the top left energizer. You can meet the monsters there.

Tip Three: The Mid-Fruit Pattern

Pokey "We were all speeding up in the pattern trying to scare the Pac-Man. I could tell his blood pressure was rising when he ate the first energizer and we all turned blue. I made a quick run for the tunnel and he came after me, but I got away. His whole pattern was messed up and he got confused and made mistakes. And they call me Pokey!"

START

Tip Four: The Apple Pattern
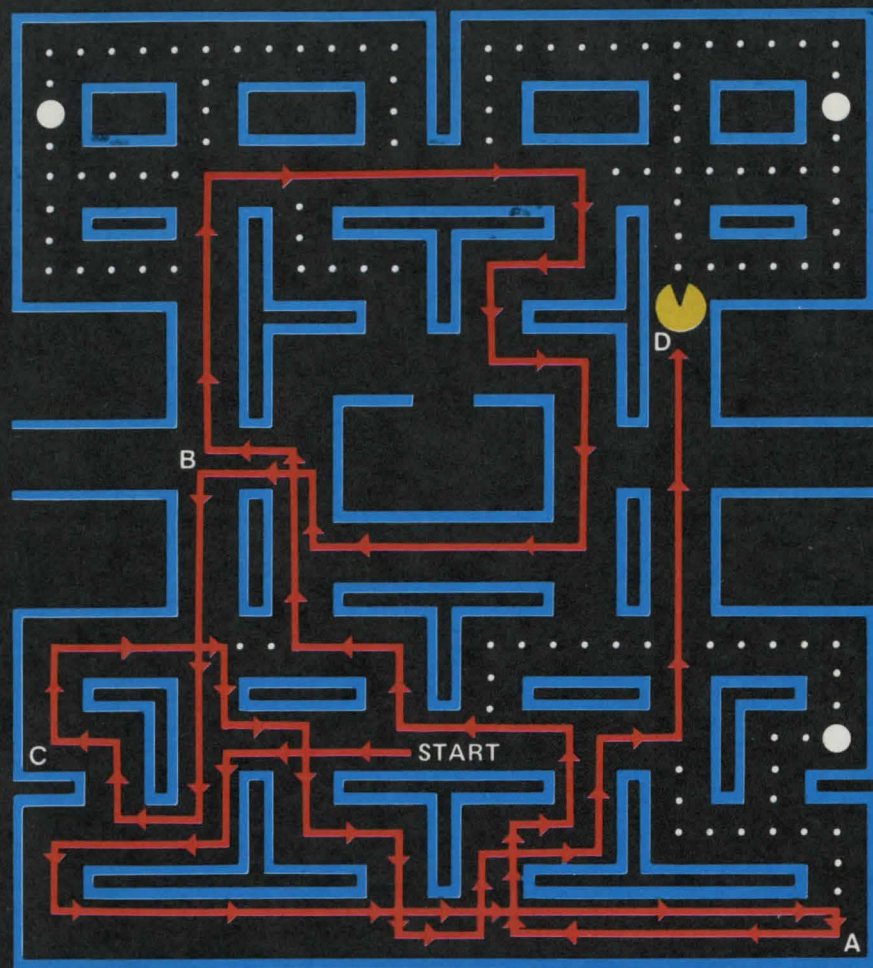
The Apple Pattern is the third and final Pac-Man pattern. If followed faithfully—and without hesitation—you'll successfully gobble up most of the dots before any monsters are eaten. What remains after the pattern is completed are the four energized corners. Play these corners individually for maximum point potential and downright fun. Remember: The post-apple screens are fast-paced and the monsters don't stay blue for very long. You may be able to eat only one—or perhaps two—monsters after they've turned blue. Don't get too greedy. Fruits play a big role in these final screens. Our Apple Pattern enables you to easily swallow two big-point fruits per screen.

A. Unlike the previous two patterns, you clear only half the bottom row of dots, and then move up as diagramed.

B. Although you have already eaten the dots in this area, make sure to guide your Pac-Man all the way down to the joint of this block. Then double back. This decoy will make the monsters slip right past you. When the coast is clear, you can resume the pattern.

C. Two stray dots will remain at this spot. Quickly—and we mean quickly—snap up these dots, reverse, and continue up. If you've lagged previously in the pattern, you may not be able to snatch the dots. If you can do it, do it. It will leave a super-clean board.

D. If a monster is charging from your right at this point, hesitate, and let the monster scoot under you. That monster will then devise his own path toward and through the tunnel. Follow him, but not too closely. If you overtake him, you're dead. If no monster is approaching, simply continue the pattern as shown.

E. Go through the tunnel. At this point, 80 percent of the screen will be cleared of dots. The only remaining dots are conveniently positioned around the energizers in the corners. Play each corner individually. Eat the dots around the energizer, shake the joystick to lure monsters toward your trap, eat the energizer, and kill at least one blue monster. Don't get too greedy. Some screens may let the monsters stay blue longer than others. Feel this out and plan your offense accordingly.
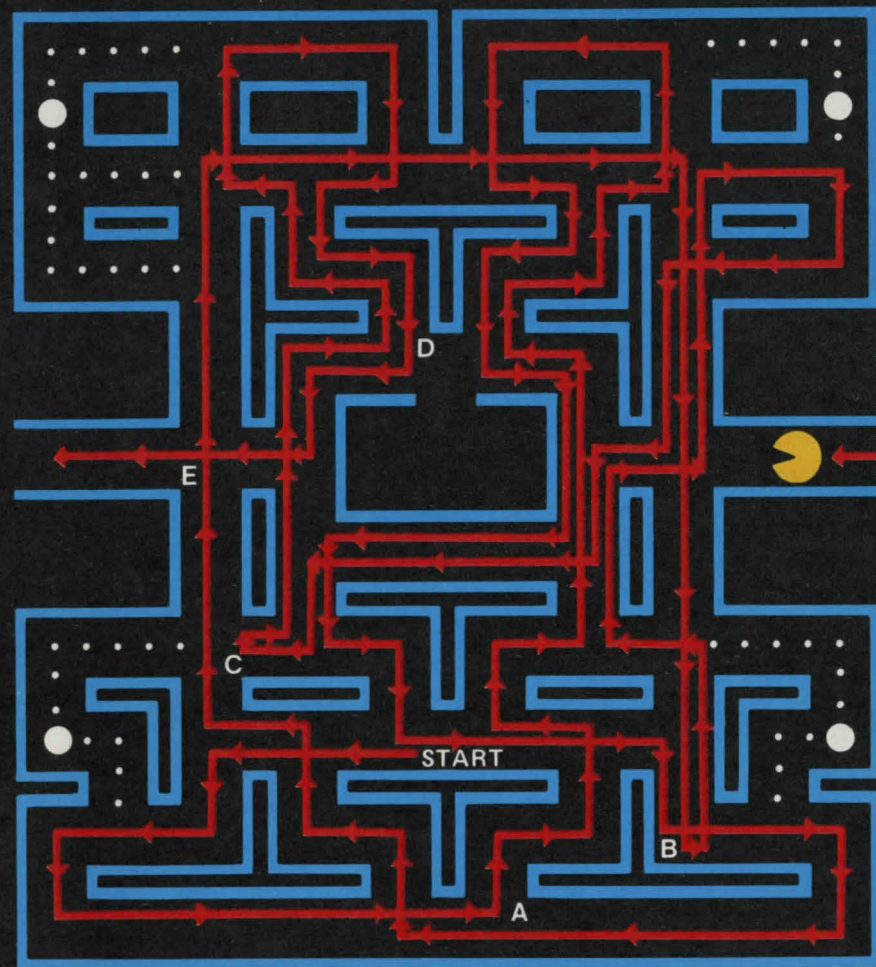
After Pac-Man developed a dedicated audience in the arcades—and people started scoring lots of points—Midway Manufacturing Company introduced a new Pac-Man machine. This new machine looks the same from the outside, but holds devious little tricks on the inside. The original patterns don't work. After the initial shock, it became evident that Midway had simply switched the order of the patterns. Because both versions of the game are available, it's imperative to know which machine you're playing when you start. By following the diagrams to the right, you should be able to determine which type of machine you're playing in a matter of seconds.

## Tip Five: Pattern Variations

A. If the light blue monster (Bashful) remains in the monster pen as shown in diagram A, you're on a 1-2-5 machine. This means the Cherry Pattern is used during the first screen; the Mid-Fruit Pattern on screens 2, 3, and 4; and the Apple Pattern from screen 5 until your arm falls off.

B. If Bashful leaves the monster pen, and goes stair-step fashion down to the bottom right-hand corner, as shown in diagram B, forget the Cherry Pattern and start the game with the Mid-Fruit Pattern. The entire machine will follow a 1-3 design, where the Mid-Fruit Pattern is used on screens 1 and 2, and the Apple Pattern is used from screen 3 until they pull the plug on you.

C. If Bashful doesn't behave as shown in either A or B above, you're on a variant machine. A serviceman may have put in a few new monster computer chips to alter the patterns, or you may be playing on a "bootleg" Pac-Man machine—something not made by Midway. You can try to devise your own original patterns for these machines, but by the time they start working for you, the arcade may change the formula again. Our advice: Frequent a video arcade that doesn't change the Pac-Man programs from the true, classic patterns. We have tested our patterns on machines across the country, from New York to Chicago to San Francisco. We have come across only one machine that didn't respond properly to our patterns. We believe that only the classic Pac-Man machines will allow you to truly hone your Pac-Man skills.
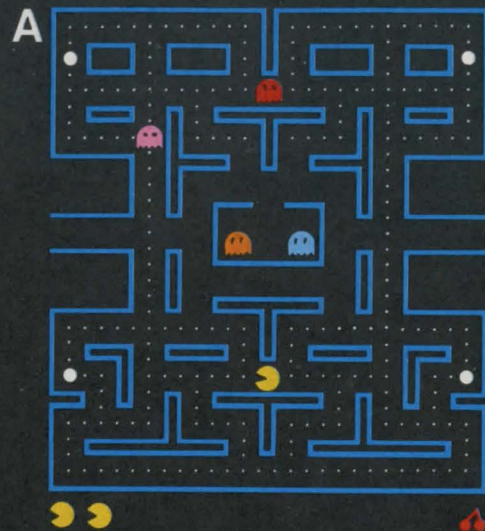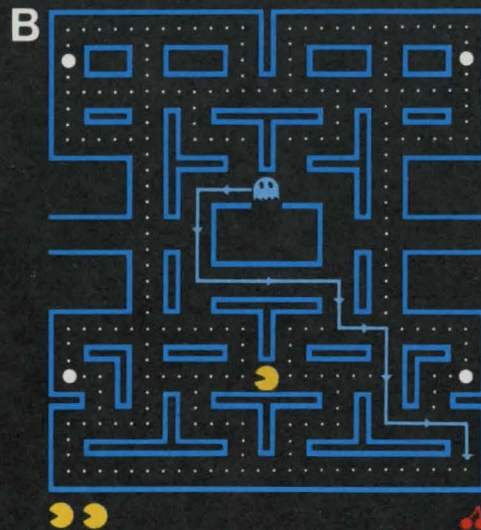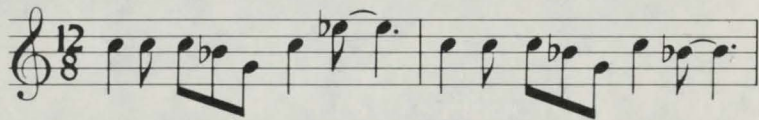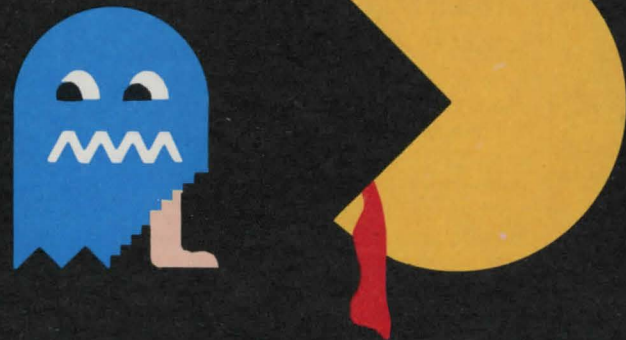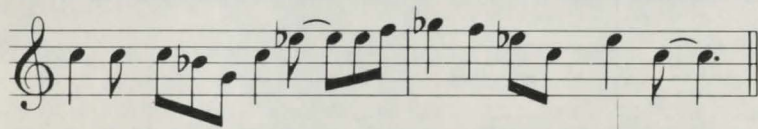
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Musical score courtesy of Doug Lofstrom

Whether or not Midway intended it, there's a secret hiding place in the Pac-Man maze. This magical spot will keep you safe from all monsters for as long as you want, but only during the Cherry and Mid-Fruit Patterns. It does not work during the Apple Pattern.

Tip Six: The Hiding Place

Suppose you get a phone call in the middle of a game. You don't have to waste coins destined for Pac-Man to call anyone back. You simply slip into the hiding place, answer your phone call, and then resume your game. It's also a good spot when you're tired or frantic: take some time to massage your arm, to go get a snack, or to simply heave a heavy sigh of relief.

A. Enter the hiding place only when the monsters are looking in other directions. Be as cautious as Clark Kent entering the phone booth. Like most hiding places, if you're seen entering, you'll surely be found.

B. Once you're in the hiding place, the monsters will begin darting frantically around the maze trying to find you. Confusion will force them into repetitive patterns—like hamsters on a wheel. We stayed in the hiding place for ten minutes; it would probably keep you safe forever.

● ●

Shadow "I didn't know what to make of it, that little yellow guy seemed to have disappeared from the face of the screen. Then all of a sudden I sensed a movement—that critter shaking in his hidey-hole. It was none of my buddies so it had to be him. Yellow Man thought he was invisible so I just charged right at him. He had no time to bolt. He wasn't even moving when I nailed him. After the game, us monsters decided that the dumb player must've bumped the joystick while Pac-Man was hiding. Otherwise, we would never have known he was there."

18

1 UP   HIGH SCORE   2 UP
50010   115900   320

A

1 UP   HIGH SCORE   2 UP
50010   115900   320

B
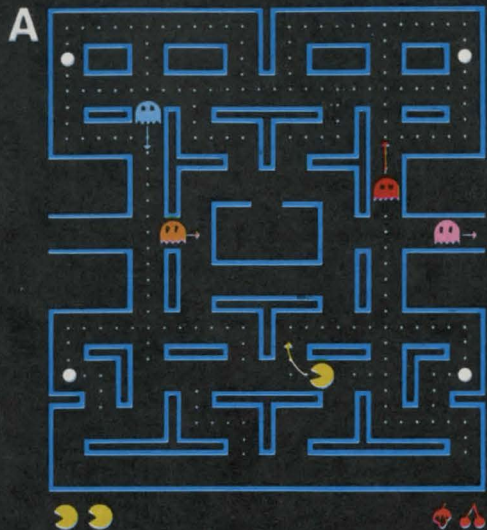
The tunnel becomes most effective after the Apple Pattern, when the pace of the game is fastest. It's useful in two important situations: when you want to escape the monsters, and when you want a short-cut to the opposite side of the board. The monsters always move slower through the tunnel than the Pac-Man does. Use this to your advantage. The best way to do this is to lure them into the tunnel, slow them down, and gobble up as many dots on your way out as you can while the monsters are still coming through the tunnel.

Tip Seven: The Tunnel

A. Lure the monsters behind you through the tunnel. This can be done by jiggling the joystick and waiting for them to follow. Or you may be in a situation where they're all upon you, closing in for the kill. Don't panic; just scoot through the tunnel.

B. The monsters move through the tunnel slower than the Pac-Man. You'll get a good jump on them. Wolf down some dots while they're caught in the time warp.

C. If you have energizers left on the exit side of the tunnel, go for the nearest one, and then ambush the weary blue monsters as they exit the tunnel. The four of them may be like sitting ducks. The ambush only works when the monsters stay blue for a long period of time, however. Otherwise, they'll turn the tables on you and make your little trick fatal. If the monsters are turning back to their natural colors fast, be content with the extra time you get to eat up dots.
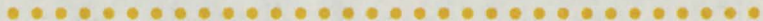
Bashful "Pac-Man was luring us all toward him, but I was kind of tired and stayed behind. All the others were so excited and making so much noise that I slipped into the tunnel for some peace and quiet. I didn't know that Pac-Man was luring them into the tunnel on the other side! I met him head-on and he died. It scared me, but not to death. Maybe next time I won't be so bashful."
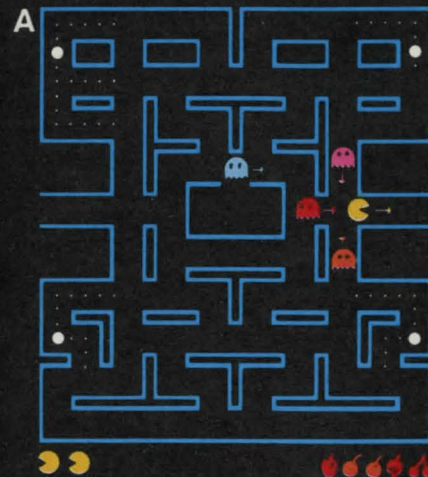
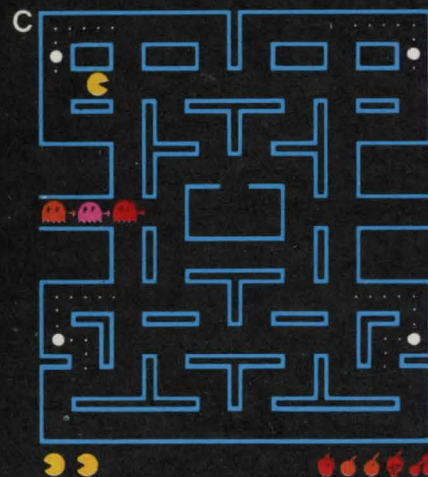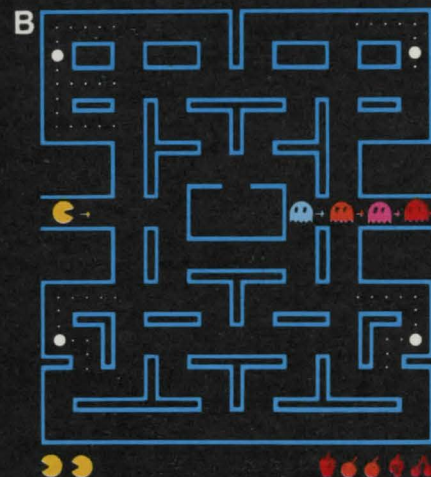Fake-outs are the hallmark of good Pac-Man strategy. Although there are ingenious individual techniques (see the Testimonials on p. 32), all fake-outs build on two basic concepts: Misdirection and The Lure. Once these concepts become second nature, you'll discover your own personal variations on the themes. And that's what Pac-Man's all about.

Tip Eight: Fake-Outs

A. Misdirection. Make the monsters think you're doing something you're not. In diagram A, the Pac-Man must escape the approaching monster in order to consume the top right energizer. By hooking around the block as shown, all the monsters believe the Pac-Man is going left, and they readjust their patterns to intercept him. But by hooking around the block, you indeed escape the confused monsters. Solid lines show where the monsters actually go. Dotted lines show where the monsters would have gone if you hadn't misdirected them.

B. The Lure. Get the monsters to come to you. This basic fake-out can be utilized in numerous situations at numerous points on the screen. The Pac-Man in diagram B is near an energizer, but wants some monsters nearby before he eats the energizer. If you shake the joystick back and forth or up and down, the monsters will locate and attack the Pac-Man. When they get just close enough to touch, you've got them trapped. Eat the energizer and kill as many monsters as possible.
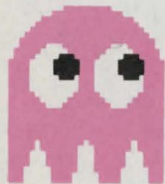
Speedy "I may not be that smart, but I'm faster than anybody. I use my speed to my advantage. Pac-Man hooked around a block to fake us guys out, but I guess he underestimated my speed. When he tried to cut in front of me, I slammed right into him. I'll take him any way I can get him."
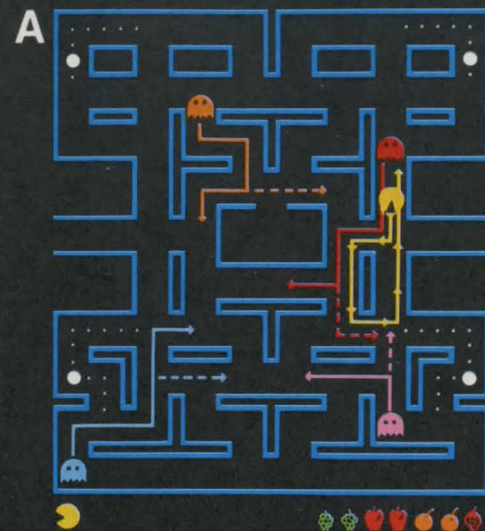
Listed below are the bonus fruits, their point values, and characteristics. We have indicated which patterns to play with the different fruits and different machines. For a review of the patterns, see pp. 8-13; for a review of variations in patterns, see pp. 14-15. Fruits serve as landmarks, orienting you to the speed of the screen you're playing. They will appear at the bottom of the screen throughout the game as a record of the number of screens you've cleared.

Tip Nine: Fruits

Fruits start with a cherry and end with a key (if you're lucky enough to get there). Only seven fruits fit along the bottom, so old fruit, like the cherries and strawberry, disappear to make room for the thunderbirds, bells, and keys as they come up. The mark of an expert Pac-Man operator is a long row of keys at the bottom of the screen.

Screen One: Cherries 100 points/slow-moving screen/ Cherry Pattern on 1-2-5 machines; Mid-Fruit Pattern on 1-3 machines

Screen Two: Strawberry 300 points/speed accelerates/ Mid-Fruit Pattern on all machines

Screen Three: Peach 500 points/same speed, as above/ Mid-Fruit Pattern on 1-2-5 machines/ Apple Pattern on 1-3 machines

Screen Four: Peach 500 points/speed the same/Mid-Fruit Pattern on 1-2-5 machines/ Apple Pattern on 1-3 machines

Screen Five: Apple 700 points/speed fast/monsters blue for only 2.5 seconds/Apple Pattern on all machines

Screen Six: Apple 700 points/pace may slow down somewhat from the first apple/monsters may stay blue longer/Apple Pattern on all machines

Screen Seven: Grapes 1000 points/fast speed/monsters blue for a short period of time/Apple Pattern on all machines

Screen Eight: Grapes 1000 points/may be slower speed than the first grape/monsters may stay blue longer/Apple Pattern on all machines

Screen Nine: Thunderbird 2000 points/speed fast/Apple Pattern on all machines

Screen Ten: Thunderbird 2000 points/speed may be slower than the first Thunderbird/monsters may stay blue longer/Apple Pattern on all machines

Screen Eleven: Bells 3000 points/speed fast/Apple Pattern on all machines

Screen Twelve: Bells Same as above

Screen Thirteen: Keys 5000 points/fastest speed/Apple Pattern on all machines

All future screens: will display 5000-point keys.

To be a total Pac-Man player is to utilize all 10 tips to your best advantage. That means following the patterns to the best of your ability, knowing which type of machine you're playing on, making full use of the hiding place and the tunnel, devising ingenious fake-outs, and getting the most out of the fruit. Our patterns are starting places: good ways to get the feel of the game. You may devise or stumble upon different patterns—patterns that work better for you. We won't take offense. In fact, devising a personal, workable pattern is one of the most satisfying Pac-Man achievements. We'll make but one demand upon you: Don't Eat the Last Dot.

Tip Ten: Don't Eat the Last Dot

A. Eating blue monsters is like eating your vegetables: they're good for you. And you should finish those vegetables before you start your dessert—that delicious last dot. If you've ended up with one energizer and one dot at the end of the screen, be careful! If you eat the energizer and unwittingly eat the last dot on your way toward the blue monsters, the game will stop, a new screen will appear, and you will have lost all those potential monster points. You should lure the monsters toward the corner, eat the energizer, and avoid the last dot while trying to eat as many blue monsters as you safely can. Then—and only then—eat the last dot and start a new screen.

Pac-Man "It worked for me every time. I'd leave an energizer and the dot right next to it for last. When the Zombies started to zero in on me I'd eat the energizer, then gobble them up—one-two-three-four—and then go back for that last dot to finish the screen 1660 points higher. One time I nailed the first two Zombies before they knew what hit them but the third one was beginning to flash when I caught up with him. I knew my score was close to 100,000 but I didn't have time to check. I got greedy and went for the 1600-point fourth monster. He turned back to pink the last instant before I pounced. I had plenty of time then to study my final score: 99,990. One dot short. Anybody got a quarter?"

1 UP   HIGH SCORE   2 UP
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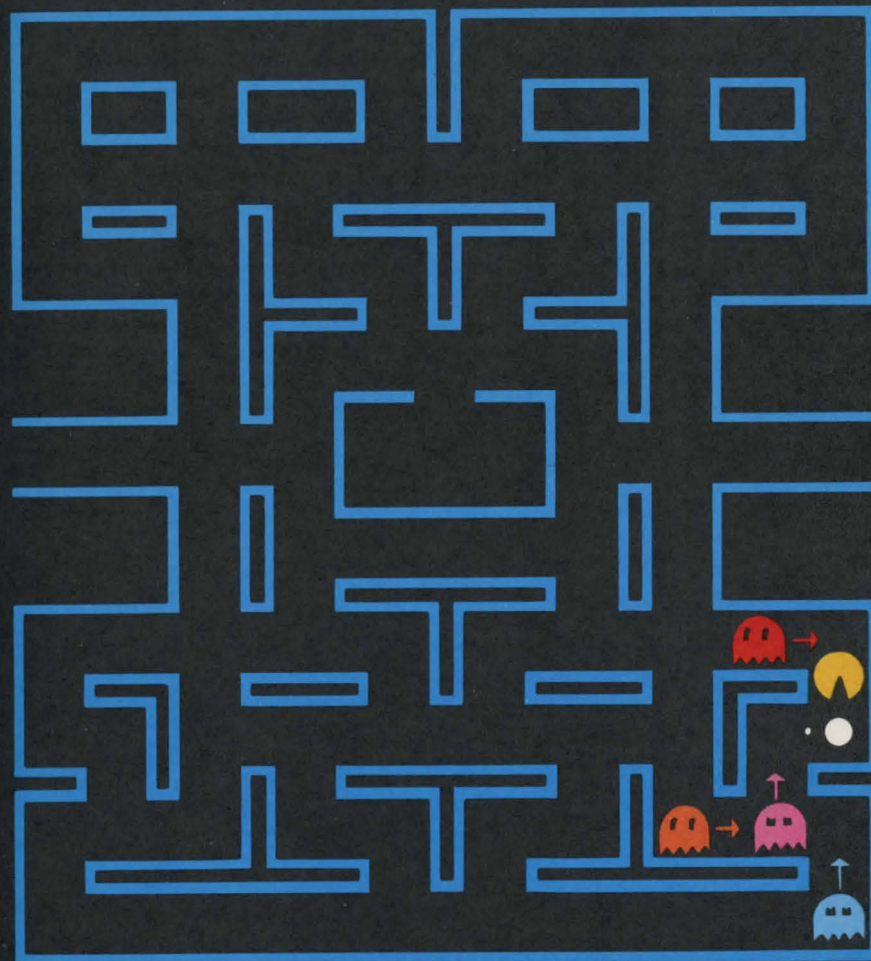
The Pac-Man program is top-secret information. And Pac-Man's manufacturer—Midway Manufacturing Company—guards that secret as if it were the cure for the common cold. Even Midway's competitors, who are all doing their best to get a cut of the big video-game money, can't seem to get it right. We've stumbled across a few bootleg machines that came close to the Pac-Man we know and love, but the action, colors, and general feel were just not up to snuff. In the end, only Midway knows the technical engineering of Pac-Man—and they're not talking.

Pac-Man Tech 101

When asked directly, they cordially offered some general video information that any bright grade school student could have offered. So we decided to put our experts to work—to try to get a reasonably accurate picture of what goes on inside Pac-Man.

The Pac-Man machine combines three basic components: a video screen, an easy-to-use control panel, and a sophisticated logic system. Various alterations have been made to the basic machine since its introduction to make the game more challenging (see pp. 14-15). But the general working concepts have remained the same.

The video screen is similar to a home TV. A special design enables the screen to stay bright and clear in a variety of situations—even in areas with bright lighting. The screen is also made specifically to accept the computer-generated video images that the Pac-Man's brain sends out.

Part of the magic of Pac-Man is in its simple control panel. You are required to move only one joystick (steering rod) to play the game. This joystick activates a series of switches that send signals to the computer and cause the Pac (yellow guy, etc. . . . you know these terms) to move in the direction you've moved the joystick. If you push the stick diagonally —instead of up, down, left, or right—the machine may become confused. This will cost you valuable time—make you hesitate—and could very easily lead to instant Pac-Man death.

The heart of the Pac-Man machine, the sophisticated logic system, is controlled by a series of specialized computer "chips." Each chip is individually designed to produce one of the many images—monsters, fruits, etc.—displayed on the video screen. A chip is a super-small circuit board made of silicon. It combines the individual transistors, resistors, diodes, and other necessary electronic components that make the circuit operate. These chips connect to a large printed circuit board that allows the different chips to "talk" with each other. There are chips that locate and draw Pac-Man, chips that draw the board and maze, chips that keep score and display fruits, chips to direct the monsters' movements, and chips that determine if a death has occurred.

The primary part of the circuit board is a master chip that oversees all the other components of the machine. This master chip is called a micro-processor. As the name implies, a microprocessor is a tiny computer that processes information by means of a specified program. The Pac-Man machine program is designed to make monsters chase Pac-Man, produce fruit to be eaten, and keep score during the game. But, with a different set of instructions, the same microprocessor could just as easily calculate your tax returns or chart your biorhythms. To show how far electronic technology has progressed, the microprocessor in the Pac-Man machine does more calculations in one second than early computers could do in several hours.

How do all of these elements work together? Very simply and very quickly. When you push the joystick forward, the switches signal the microprocessor to move the Pac-Man up the screen. Nothing moves, however, until the microprocessor relays your command to the Pac-Man chip. The Pac chip actually redraws the Pac at its present position in black (the background color of the maze), making the Pac-Man disappear briefly, sets the coordinates for the new position, and draws the Pac-Man there in yellow. In other words, when you move the Pac-Man, the Pac-Man chip is actually making him disappear and redrawing him completely—every 1/30 of a second!

The microprocessor is also programed to report the new position of the Pac-Man to the monster computer chip. This monster director then determines the speed and direction of the Pac-Man, and sends the monsters to intercept and kill the Pac-Man. The monster chip decides where to go based on several factors: what the Pac is doing, whether the fruit is up for grabs, what level of play you're currently at, and how many dots and energizers you have left on the screen. This all happens so fast that, to the player, those monsters appear to be moving constantly with a definite intent to kill!

The animated intermissions are also stored in chips that the microprocessor allows to function when the time is right.

That's about all there is to the Pac-Man machine, except for the ever-hungry coin mechanism and some power supplies that convert normal house current to acceptable computer current. Admittedly, you won't be able to build a Pac-Man machine with this information. In order to do that, you'd have to decipher the actual programs. And that's the secret Midway Manufacturing Company refuses to divulge (would you?). But this rundown should shed some light on a subject that most of us don't take into consideration. And to think that you get all this fun technology for a quarter (and a quarter and a quarter).

Pac-Man Offshoots

It's hard to find a game with the same challenges and rewards that Pac-Man offers. Four games that should appeal to the Pac-Man fanatic are listed below. All four are similar to Pac-Man in that they're maze games, yet each offers a radically different variation on the maze. **Rally-X** is a fast-paced game that never reveals the entire maze at once. The maze is "truer" than Pac-Man's: there are decoys and dead-ends. **Frogger** puts you on a time limit to get through two mazes. It's a good game only if you like beating the clock. **Make Trax** employs the most complex maze, with several overpasses, underpasses, and tunnels. You paint your own maze, and this can get overly complicated. **Donkey Kong** has a simple maze that keeps changing as you move through it. The real charm of Donkey-Kong is the same as the Pac-Man intermissions: fun, animated entertainment.

Rally-X is a maze game, like Pac-Man, but you never get to see the entire maze at one time. The main screen allows you to work with about 1/9 of the total maze. The object of the game is to run your race car through the maze, capturing ten flags to clear the screen. Each flag is worth points. You operate the race car with a single joystick, like Pac-Man. The only other control you have is a smokescreen to escape

"killer" cars. These killer cars are similar to the monsters in Pac-Man. The better you get, the faster they get. You have a limited amount of fuel and a limited amount of smoke to use during each screen. The Rally-X maze is a truer maze than Pac-Man's in that it has decoy paths that terminate in dead-ends. It's easy to get trapped in these and waste time and fuel. You can monitor the entire maze on a small "radar" screen located below the main screen. The screen doesn't reveal the secrets of the maze, however, only the locations of the flags.

Frogger has a main screen broken into two maze-like sections. You control a frog that has to safely make its way through the two sections of the maze. You control the frog with a Pac-Man-like joystick. The bottom half of the screen—the first maze—is a six lane highway, bustling with cars, trucks, and Indy-type race cars. The frog must cross over the highway without getting run over. A stone wall separates the highway from the top

maze, which is a river with moving turtle packs, logs, and an occasional crocodile. You have to move the frog across the river without falling in or getting eaten by a crocodile. And beware of snakes on the wall; they're hungry! Eating waterbugs or flies, and escorting a lady frog to your pad, give you bonus points. You can safely hop on the turtle packs or logs, but the turtle packs will sink at random intervals, and the crocodiles are camouflaged like logs

(look for the eyes). If you can cross the river and safely hop on one of five green lilypads at the top of the screen, a new screen will begin. As you get better at the game—the more screens that are cleared—the traffic gets heavier and faster and the river gets more dangerous.

Make Trax is a relatively new video game that is quite similar to Pac-Man in design and concept. Instead of moving a player through a maze, however, you paint your own maze. Like Pac-Man, the game is controlled by a single joystick that moves the player's paintbrush.

As the maze is being painted, two devilish little goldfish form in the aquarium and take chase after the paintbrush. If they overtake the

brush, a new one will have to be used. Your only defense against these twitching-tailed little fish is to roll over them with the rollers provided. Each time you roll over a goldfish you collect bonus points, and temporarily put them out of commission (but like Pac-Man monsters, they go back to their aquarium, regroup, and come back to torment you further). If that isn't enough, you also have to contend with other little beings determined to make trax in your nice paint job: kittens, mice, and even a dirty bird that leaves droppings in your fresh paint. These creatures (including cars, cats, and an invisible, footprint-leaving man) can be caught—if you're quick enough—for 1000 points each. When you reach 10,000 points, you get another paintbrush.

Donkey Kong, recently introduced to the United States, is similar to Pac-Man in that it's a nonspace, easy to operate game.

Donkey Kong follows the familiar King Kong story. A large gorilla grabs a terrified young lady and carries her up to the top of a tall tower. Jumpman, the player's piece (and our hero) must run up the ramps to the top of the tower to rescue the lady, all the while dodging exploding barrels, attack vessels, and fireballs rolled down the ramp by Kong to stop him. Contacting any of these hazards will kill Jumpman, but at any
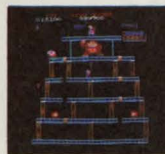
time Jumpman can jump in the air to avoid being harmed. If you reach the top of a 25-meter tower (the lowest one), Kong will grab the lady and drag her up another 25 meters, which, of course, you have to climb to rescue her. Kong seems to have an inexhaustible supply of balls, vessels, and barrels, so you can't just jump aside and wait for them to stop coming; you must get to the top of the tower in order to stop them while Kong climbs higher. This machine has some great graphics and the characters are very detailed and realistic. Kong even growls and laughs at your misfortune when he hits you with something. The music and sound effects are wonderful. One of the more challenging games out on the market these days, and one you could spend a bundle of time and money trying to master.

Testimonials

All people who dare to call themselves Pac-Man heroes use personal techniques to achieve high scores. Most people stumble across these techniques by accident, in the heat of the game. We've collected a few of the more instructional techniques for your benefit, and added a few statements on the pleasures of Pac-Man. You should soon be able to add to this list.

Mike, age 45, Chicago, Illinois (high score: 75,000)
"I try to keep an overall picture of the monsters' positions in mind at the same time as concentrating on the area immediately around the Pac-Man. This usually gives me a little advance warning about where the monsters are going. But not always! I could play this game all day if I didn't have to eat."

Jim, age 26, Nashville, Tennessee (high score: 115,400)
"I sometimes reverse direction just before I eat a killer pill and then turn back and get it. This is tricky because I usually have a bunch of monsters on my tail. But the rewards are worth it. When you do this, the monsters all reverse with you for a second, then come back toward you after you eat the pill. That way, you don't run after them, they all come to papa. Big bonus for small action—that's what life's all about, isn't it?"

Mike W., age 11½, Morton Grove, Illinois (high score: 106,240)
"I like it because you have to use your brain—you have to learn which way they're going (the monsters) by whichever way their eyes are pointed. My strategy is to use the tunnel a lot to get away if they're close behind me."

Tricia, age 30, Chicago, Illinois (high score: 97,000)
"I like Pac-Man because it's like a big game of Hide 'n Seek and because there's no killing, just eating. I can eat and eat and eat and never gain any weight! The best part of the game is that no one gets hurt."

Lin, age 26, Berkeley, California (high score: 106,110)
"As for tips, if you want to get extra points on the lower boards, just watch closely when the monsters go to all four corners and that's the time to go scarf up some fruit and leftover dots. Happy Pac-ing."

Bobby, age 13, Chicago, Illinois (high score: 65,870)
"The way this machine works is real cool. I'm a pro, you know. That's my high score there (65,870). My dad says I shouldn't play so much, but that's just because he doesn't play at all. If he did, he'd know. He'd probably play more than me because he's got more quarters. My special trick is to fly around the outside of the monster cage to confuse them, then I head for a power dot and chomp a few. Like I said, I'm a pro."

**THE COMPLETE GUIDE TO THE GREATEST THRILLS,
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