## Manuscript on Ms. Pac-Man by Bozeman Montana Think Tank: Tom Asaki, Don Williams, Spencer Ouren.

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## I. General Setup of Game

## I. A. Game Layout

| Maze | Blue Time seconds | Fruit | Ms. Speed |
| :---: | :---: | :---: | :---: |
| A | 6 | cherry | slow |
| A | 5 | strawberry | slow |
| ACT I: They Meet |  |  |  |
| B | 4 | peach | slow |
| B | 3 | pretzel | slow |
| B | 2 | apple | fast |
| ACT II: The Chase |  |  |  |
| C | 5 | pear | fast |
| C | 2 | banana | fast |
| C | 2 | random | fast |
| C | 1 | random | fast |
| ACT III: Junior |  |  |  |
| D | 4 | random | fast |
| D | 2 | random | fast |
| D | 1 | random | fast |
| D | 1 | random | fast |
| ACT III: Junior |  |  |  |
| C | 3 | random | fast |
| C | 1 | random | fast |
| C | 1 | random | fast |
| C | none | random | fast |
| ACT III: Junior |  |  |  |
| D | 1 | random | fast |
| D | none | random | fast |
| D | none | random | fast |
| D | none | random | slow |
| C | none | random | slow |
| C | none | random | slow |
| C | none | random | slow |
| C | none | random | slow |
| D | none | random | slow |

## I. B. Perfect Game (Scoring)

| Board | Dots | Fruit | Monsters | Total |
| :--- | ---: | ---: | ---: | ---: |
| Cherry | 2,400 | 200 | 12,000 | 14,600 |
| Strawberry | 2,400 | 400 | 12,000 | 29,400 |
| Peach | 2,600 | 1,000 | 12,000 | 45,000 |
| Pretzel | 2,600 | 1,400 | 12,000 | 61,000 |
| Apple | 2,600 | 2,000 | 12,000 | 77,600 |
| Pear | 2,580 | 4,000 | 12,000 | 96,180 |
| Banana | 2,580 | 10,000 | 12,000 | 120,760 |
| 8 | 2,580 | $2,700 *$ | 12,000 | 138,040 |
| 9 | 2,580 | 2,700 | 12,000 | 155,320 |
| 10 | 2,540 | 2,700 | 12,000 | 172,560 |
| 11 | 2,540 | 2,700 | 12,000 | 189,800 |
| 12 | 2,540 | 2,700 | 12,000 | 207,040 |
| 13 | 2,540 | 2,700 | 12,000 | 224,280 |
| 14 | 2,580 | 2,700 | 12,000 | 241,560 |
| 15 | 2,580 | 2,700 | 12,000 | 258,840 |


| 16 | 2,580 | 2,700 | 12,000 | 276,120 |
| :---: | :---: | :---: | :---: | :---: |
| 17 | 2,580 | 2,700 | $\mathrm{n} / \mathrm{a}$ | 281,400 |
| 18 | 2,540 | 2,700 | 12,000 | 298,640 |
| 19 | 2,540 | 2,700 | $\mathrm{n} / \mathrm{a}$ | 303,880 |
| 20 | 2,540 | 2,700 | $\mathrm{n} / \mathrm{a}$ | 309,120 |
| 21 | 2,540 | 2,700 | $\mathrm{n} / \mathrm{a}$ | 314,360 |
|  | maze 1 |  |  |  |
| 136 | 2,540 | 2,700 | $\mathrm{n} / \mathrm{a}$ | 914,040 |

## I. C. The Fruit and the Pretzel

Unlike Pac-Man, Ms. Pac-Man has a selection of only seven fruit. Actually one is not fruit, but still provides those extra points. The value of the fruit increases rapidly, but after the seventh maze something interesting happens. Every maze, from the 8 th to the 136 th, produces random fruit. The random quality has of the fruit has been a long-burning question among players everywhere (anyone out there got a clue?). An entire book alone could be written listing various methods used to try to force bananas to appear. The programmer has done a fine job of randomizing the fruit.

|  | Fruit |
| :--- | :--- | Points

There are two fruits for each maze. The first fruit appears after 64 dots have been eaten. The second appears when there are 66 dots left on the board. There can be no more than two fruits. It is possible to have only one fruit appear for a given board.

The fruit will bounce around one of several paths. Become familiar with them for eating the fruit is an essential part of high scoring. The fruit will always enter and exit a tunnel on one of many predetermined paths. During the later stages of the game, the score from eating the fruit will make up one-half of the possible points.

## II. Monster Characters

 sequels, found in the arcades. They do not necessarily hold true for game machines, such as Super Nintendo\}

Understanding the habits of the monsters is an invaluable tool for mastery of the game. Spending time to learn the general rules and putting them into practice will be rewarding. Simple movements when executed with a steady hand and mind can amaze those who are watching. In a free-lance situation nothing can be more helpful than knowing having an idea of where the monsters are going to go.

The most important reason for knowing monster character is to develop routines, hiding places (holds), grouping techniques, and leading to energizers \{ for a 3,000 point addition $\}$ are all results of character study. The methods presented in this text are not the only possibilities. With help from this chapter you can develop your own methods more suitable to your needs.

Several ideas will be brought out here including: reversals; speed; direction; individuality; and the "Red fake".

## II. A. Reversals

Double-back, pattern switch, snap, and turn around are all common names for the same thing. I will call this event a reversal. A reversal is simply when all four monsters simultaneously reverse their direction without loss of speed. This can be dangerous movement especially if you happen to be behind a monster at the time.

A reversal will occur only for two distinct reasons: 1) natural occurrence; 2) upon eating an energizer.

Natural reversals occur during the play of each individual maze. Two of these are present very quickly. The first reversal is only five seconds into the play of the maze. The second reversal is twenty seconds later. The next reversal will: occur after approximately 20 minutes, and thereafter every 20 min . However, it is highly unusual for anyone to stay on one maze for more than 10 minutes. Thus, in practice, you will not witness the third reversal.

Upon the completion of a maze the natural reversal timer is reset. In other words, each maze will have its own set of identical reverses regardless of any previous action. The natural reversal timer resets after death.

Reversals are also created by eating en energizer. In most cases the monsters will turn blue and in some cases they will not; nevertheless, they will always perform a reversal. These (energizer reversals can only affect the natural reversal timer in one way: after that the second natural reversal is three seconds in the future at that time you eat an energizer turning the monsters blue for five seconds. Since blue monsters never naturally reverse the required reversal must be postponed! Indeed during the monsters' blue time the natural reversal timer is not running. The reversal thus occurs five seconds later.

## II. B. Speed

First let us consider how fast Ms. Pac-Man travels compared to the monsters. At the beginning of each board there is a de-finite relationship. It is important to note that all four monsters travel at exactly the same speed until a later stage of the maze.

Speed relationships beginning of the maze

| Mazes | Comments |
| :--- | :--- |
| $\quad 1$ | Ms. Pac-Man slightly faster |
| $2-4$ | Speeds nearly equal |
| $5-20$ | Monsters slightly faster |
| $21+$ | Monsters faster |

Ms. Pac-men is slowed when eating dots and can be caught much quicker. She can, however, corner much better than the monsters. In fact, she can corner so much better she can gain a lot of ground very quickly by turning several quick corners. This phenomenon is nor as pranced after the 20 th maze.

The most important element concerning monster speed is that of 'cruise elroy', the term ('cruise elroy' is not important. But I have yet to hear a more creative name). It will be necessary to define the 'Red point' thus: the Red point is that number of dots left on the maze at which Red(Blinky) begins a faster pace than the rest of the monsters.

Red point-- example of Red point--- (third maze) \{ I don't remember what this meant \}

| Maze | Red point dots left | o of normal speed* |  |  |
| :--- | :---: | :--- | :---: | :--- |
| 1 | nonexistent | 100 | 100 |  |
| $2-5$ | 7 | 70 | 100 |  |


| $6-8$ | 39 | 40 | 100 |
| :--- | :---: | :---: | :---: |
| $9-11$ | 49 | 39 | 105 |
| $12-14$ | 59 | 30 | 110 |
| $12-14$ | 69 | 20 | 115 |
| $15-17$ | 79 | 10 | 120 |
| 18 up | 89 | 5 | 125 |
| *estimates for comparisons | \{ not necessarily accurate to true game speeds, only |  |  |
| approximate\} |  |  |  |

Notice: By the chart, that. The first maze has no Red point. The strawberry board however has a Red point of 7. This means that if 8 dots remain on the strawberry board all four monsters will still travel exactly the same speed. If one dot is eaten the Red point has been reached and Red will speed up slightly. If more dots are eaten Red will move slightly faster yet.

When Red speeds up he is fondly nicknamed 'cruise elroy'.

## II. C. Decision Points

Remember that the monsters are not even a little intelligent they know very little about their surroundings. They do not know what the maze looks like. They only know when they have a choice of directions. When they turn, their eyes turn before they do. The decision point is where the monster makes her decision to turn.

The above paragraph is very important. It will: be used to explain and describe other things later in this chapter. Make sure you completely understand each idea.'

## II. D. Beginning a Maze

There seems to be total chaos for the first 5 seconds of any maze. This is not altogether true. Each monster follows a predetermined plan:

Red and Pink : follow a random path regardless of any action taken by the player.
Green and Sue: follow predetermined paths that never vary (just as in Pac-Man). On the first two mazes. However, most of this five seconds is spent in the box.

## II. E. The Ghosts

## II. E. 1. Blinky - the Red Monster

Red, known sometimes as Blinky, is seen by many as the most aggressive and most dangerous. His nickname, 'shadow', amplifies this. His billing is too harsh, however. His movements are simple to describe and he can be easy to dodge.

The first rule to remember is this: Red always tries to shorten the horizontal or vertical distance between him-self, and Ms. Pac-Man. Whichever is distance is greater. This rule applies regardless of the maze configuration.

In the example, (See plate A \{ diagram - Boards 3,4,5 \}) Red is looking for Ms. Pac-Man. She is coming up to point, which is a decision point. At point B \{ just left of top right energizer $\}$ Red looks at point a to make her decisions. She notices that 5 dots separate her from Ms. Pac-Man \{ picture Ms Pac-Man 5 dots down the very top tunnel \} horizontally likewise three dots separate point a from Ms. Pac-Man vertically therefore by the first rule, stated above. Red will take the horizontal path towards point $F$ \{ traveling under

Ms Pac-Man and beyond the energizer \} . Notice that this is not advantageous to Red in the least \{ Ms Pac-Man is in a complete different path, one level up \}. It does; nevertheless follow the rule. Be careful in understanding this! The horizontal distance is greater so Red chooses the horizontal path.

This is the general. Idea governing all: of Red's movements the question then arises: what if both the horizontal and vertical distances are equal this apparent dilemma is solved by Red's priority order. Which is simply this: if Red is faced with more than one possibility he chooses the direction with the highest priority (from highest to lowest: up, left, down, right). So in our previous example if the distances had been equal then Red would have turned up for up is of higher priority than to continue right $\{$ on the mazes given as example Ms Pac-Man would have been forced through the tunnel, to the other side of the board with Red in pursuit \}

In example A. Plate B. Red is at a decision point. He notices that both horizontal and vertical distances from point $B$ to Ms. Pac-Man are the same. They are both 3 dots long. The rules say he must take the longer. But neither is longer! He then turns to his priority order . His options are to either go down or go to the right. He chooses to go down.

In example B. Plate $C$, the same situation arises. Except now Red's choices are left or down. Since left is of higher priority she continues to the left. When she reaches intersection d she waste no time in capturing Ms. Pac-Man.

In example C, plate D, Red has the interesting option to go up or down at D. Following the priority order we find that up is of a higher priority Red turns up.

An important fact to bear in mind is that Red performs his actions without regard to any other monsters. As you will see the Green one is not this way.

## II. E. 2. Pinky - The Pink Monster

Pink has been erroneously nicknamed speedy. At no time is she ever any faster than the other ghosts. She is however very crafty and very harmless. Her movements are not as simple to predict. An interesting observation about Pink is that she can make quick decisions. This means that her decision point seems to be closer to the intersection than Red. The truth of the preceding statement is a matter of much debate and we will leave it up to the reader. Another point of debate concerning Pink is the existence of her memory in some instances it appears that Pink is guided only by a past knowledge of the movements of Ms. Pac-Man. In other words Pink will do two different things in the same situation depending on how that situation was reached. All questions aside let us lay down some ground rules to describe the behavior of Pink. The first section will deal with Pink while Ms. Pac-Man is stationary. The second section will deal with moving characteristics.

Pink is rarely a danger, but is better described as a bother. When Ms. Pac-Man is stationary she is accurately described as stupid.

The first rule to remember is this: when Pink is very distant from Ms. Pac-Man she becomes like Red. Very distant means a good two-thirds the distance across the bottom of the board. This means that Pink follows all of the rules governing the actions of Red. If Pink is closer her movements can be altered by the player. Furthermore, if Pink is in the near vicinity of Ms. Pac-Man, she is very controllable.

When Ms. Pac-Man is stationary Pink will try her best to move in front of her. Note that in each example here Pink moves to the front of Ms. Pac-Man. Notice that at each intersection Pink makes the choice to get in front Ms. Pac-Man (see plates e1-e4). However Pink has no choice but follow to the corner. The end of an arrow along with the beginning of the next represents a decision.

What does Pink do if she is already in front of Ms. Pac-Man? Example D shows that Pink is quite bashful. This example has many exceptions and is generally not of much use. This behavior is more typical of the next section.

While Ms. Pac-Man is in motion Pink still retains her desire to get in front of her. Pink is also noted for her parallel running as is illustrated in example E. If Pink is trailing Ms. Pac-Man very closely she will not lose the trail.

Example E shows Pink's desire to heed off Ms. Pac-Man had Pink been much closer to the intersection marked I she would have turned into it. Thus, being in front of Ms. Pac-Man had Pink been much farther behind she would follow the indicated path.

As mentioned, Pink will not lose the trail of Ms. Pac-man if she is very close. Notice however, that in Example $F$ Pink is easily tricked. In this case Pink is not very close to Ms. Pac-Man. When Ms. Pac-Man turns to the right, Pink in an effort to get in front also turns right.

## II. E. 3. Inky - The Green Monster

Inky, or Green, is by far the most complicated monster. Her behavior is so complex that at best a brief description will be given.

The character of Green is dependent on her position relative to Red. When Green is very close to Red, Green takes on a character nearly identical to Red. As Green moves away from Red, her own personal characteristics become visible. When Green is distant from Red she becomes unique in her actions. It is this character that $I$ will describe here.

Just as Red has a priority order so has Green. Hers, how-ever; is quite different. The direction most preferred by Green is right followed by left. Down, and up. Green follows all of the rules set down in the section on Red's priority order. Green uses her own priority order provided that Red is distant.

Just as Pink tries to stay in front of Ms. Pac-Man, Green tries to stay on the flank. She is a very good parallel runner. If Green has the option to turn wide or to cut in she will turn wide. This is illustrated on plate $f$.

Green also has the distinction of being very bashful. The best examples are plate 61.62. It must be remembered that Red cannot be too close to the action. The direction of Ms. Pac-men must also be unwavering. She cannot deviate from a straight and steady course. A common cause of death in a situation like this is panic. Moving the joystick wildly does not confuse the monsters! It simply leaves to chance what you could have had complete control over.

Plate $H$ shows Greens true cowardice this is not indicative of all similar situations, but is useful as a last resort escape. You will also find that plate D, in the Pink section, is a useful tool with Green. This situation also has exceptions end should not be trusted without testing.

## II. E. 4. Sue - The Brown Monster

Sue is the easiest monster to describe. She is infallibly predictable. Her movements are not random. The following sentence describes Sue's character in its entirety:

She follows a particular predetermined course dependent only upon the position of Ms. Pac-Man the examples are many. It should be sufficient to let the reader explore for himself. In this way you will become more familiar with her 'habits'.

## III. Boards

## III. A. The Junior Boards

\{These are the first set of boards that occur after the Jr. cartoon. This refers to both the dark blue and brown boards, with the exits to the side of the ghost start box. \}

## III. A. 1. Energizers and Holds

Then energizers and where located on board: 1 is below point 45 (refer to plate 4); 2 is below point 46; 3 is above point 5 (also known as Sues corner); 4 (is above point 11 . We suggest that you leave energizer 1 till last, eating the other three in any order. To prevent cruise Elroy you should leave many dots. On the first two boards, you can eat all of the bottom dots, as long as you leave the top dots (except for the necessary dots). On the third and fourth Junior boards you need to leave about 12 to 20 dots on the bottom, following the same top rule. The next time the junior boards come around you need to leave 30-40 dots on the bottom.

There is one hold on this board with two variations. The first variation places you in position 9 facing down. Only three monsters will be together in this hold: Red, Green, and Pinky. The group's pattern will be 1, 2, 4, 6, 7. Sue's pattern will be 4, 27, 22, $21,15,14,8,6$. The second variation is identical except that Sue is with the group... To change from one variation to another it is very simple. To go from variation one to variation two, wait until Sue and the group cross at 4, wait for group to get to 7 . Move directly to 8. Wait for Sue to decide from 22 to 27, move back to 9. From variation 2 to variation 1, wait at 1 till they group. Move to 8. When group nears 2, move toward 6 (Sue should travel up). Return to 9. Sue will now travel 2, 3, 28, 26, 27, 4. When Sue is at 27, move to 8. When Sue is at 2 , move to 9.

## III. A. 2. How to eat the energizers

Energizer 1 (see above): You want hold variation 2. The best situation would put Sue and Red one body length behind the other two ghosts. When ghost get to 7 take the following path to the energizer: 9, 8, 14, 15, 16, 18, 29, 30, 31, 34, 33, 40, 41, 45 (non-stop). The ghost will follow on path: 7, 1, 2, 4. 27, 22, 23. 20, 19, 36, 35** 47, 37, 39, 40, 41, 47 (** Sue will deviate here to a $35,34,33,40,41,45$ path). You will arrive first at the energizer. When the group is nearly onto you eat the energizer then the ghosts.

Energizer 2: You also want hold variation 2 here. The best group puts only Sue one body length behind. When the ghosts are at 7 start a 9, 8, 14, 15, 16, 18, 29, 30, 33 \{I think this is an error in the original manuscript, should be 30, 31, 34, 33-don\} (wait for Pink to go up at 35. But watch Sue she will turn if you do not leave soon enough). 32 , 46 . The ghost will travel along a 7, 6, 4, 27, 22, 20, 19, 36, 35, 47, 37, 38, 36, 19, 18, 29, $30 * * *, 46$ (*** Sue deviates to go to 31). Eat energizer as soon as ghost almost on top of dot. On boards 12, 13, and 18 you are cautioned against chasing Sue if she travels down at 30 .

Energizer 3: For this energizer you want all the ghosts traveling in hold variation 2 with the group close to one ghost. When ghosts between 7 and 1 move to 7 . Wait till ghost come down at 4. Then move to 5. Let ghosts get close and turn to eat them.

Energizer 4: For this energizer you want the ghosts in hold variation 1 . When Sue and group cross near 8 and 6, move to 10. Fake up, and stall here. This will let Pink and Green to come down the channel at 10-13. When they do this move to 11 (watch Sue). Wait for ghost to get near then eat energizer end turn to eat the ghosts. Path of group: 7, 1,

** If you get a cruise elroy before eating all four energizers try to eat less dots. It is very important to eat the ghost. Try to eat energizer 1 last. Especially on the 18th board

## III. A. 3. Clearing Technique for 21st and all similar boards

Get the ghosts grouped. Remember you will travel faster if you can eat some dots in paths you will be using (i.e. the path around the tunnel). For this technique to work it will be necessary to eat some dots before putting the group in the hold to start a pattern. These paths are:

- $44,43,42,39,37,47,35,34,31,30,29$
- 28, 25, 26, 44
- 29, 18, 16, 17
- 26, 27, 4, 6, 8, 9
- 16, 15, 14, 8, 9
- 17, 13, 14

The tunnel will be useful to get rid of some of these dots. For more on how to get rid of these see further hints. (Put the group in hold variation 1, then follow given path. Be prepared to freelance if necessary. Path:
$9(1), 8,6,7,1,2,4,6,8,9(2), 10,13,10,11(3), 12,17,16,18,29,30,31,32$, $33,40,33,34,33,32,46(4), 30,29(5), 44,45,41,40,41,42,43,42,39,40(6), 33$, 34, 31, 30, 29, 18, 16, 1 7, 28, 3, 2, 3, 5, 1
(1) wait until ghost pass to follow.
(2) return here immediately wait for ghost to 7
(3) wait till Red *almost* turns right at 14
(4) wait till group in 40.33 path
(5) leave from right side to left side of tunnel when Red is at 18 or just before
(6) most dangerous task left (clear bottom) ** you may need to wing it from here.

## III. A. 4. Jr. Hints

## III. A. 4. a. From The Hold

Problem: want to move Pink up four body lengths or she breaks off in faking Sue.
Solution: flip right then left at 9 and Pink will pass over head. Works anytime Pink comes down 14-18 path.

From variation 2 to move Sue and/or Pink up four just follow the ghost around path 6, 7, $1,2,4,6,8,9$

To move Sue back four body lengths wait at 7 till group at 4. Move back to hold (7, 1, 2, 4, 6, 8, 9).

Green must be within one body length of Red for the holds to work.

## III. A. 4. b. Grouping

On the junior boards, you group the ghosts(Pink, Red, and Green) before going to the hold. You can group Sue once at the hold.

Start the boards by heeding to the bottom right tunnel cross through to 28. Wait for the first double back. Then get Pink, Red, and Green to left half of board. Go to 17 and start going 17, 16, 18, 29, 44, 25, 26, 28, 17, etc. Stall at 28-17 and 29-44 to get as many ghosts as possible to follow you. After the second double beck, reverse the path in the tunnels. Get as many ghost to follow you as possible. Once you get Red . Green. And Pink to follow you in and out of every tunnel you can start to refine the group. You can be in either 17-17 pattern above. Although the second is better.

When going from the bottom right to the bottom left tunnel, take in the ghosts closest to you. But don't allow the beck ghost to follow ( this is done by being on the right side of the tunnel for the first ghost and the left side for the back ghosts)

The front ghosts will go 16, 17, 28, 25, 44, right behind you and the back ghosts will go 16, 15, 21, 20, 23, 24, 25, 44 and start following you again.

The back ghosts will pick up one body length on the front ghosts. This can be repeated until the desired group is obtained. (i.e. Pink. Red and blue are all together).

Watch Sue very carefully in grouping this way. She may follow you into a tunnel or she may harass you when you are following a 17.28.26...29.18.16.17 path watch when you are 28 and 26 for sue at 23-24, for at this point she will come over to position 25 . Which is in your path.

If you have ghosts Pink, Green, and Red 4 body lengths ahead you can group without using a 17-17 cycle. This is done by being in the lower tunnel 17-28. The ghost will travel near the box when grouped. If you are on the 17 side when they reach 19 they will go to 18, instead of if you when they pass 20 they will go $20,19,36,38,24$. At this point they will turn to 25 if you are on the 28 side, else they will cycle the box. Experiment with this for a while and it will become clear.

To move to the hold from 28 you have several choices:
Group at 23. Move 17, 16, 15, 14 (or 17, 12, 13, 14), 8, 9. Let ghost follow you through the tunnel at 17. Move $17,28,26,27,4,6,8$. You may have to hesitate between 4 and 6 to keep Pink from traveling 27, 22.

## III. A. 4. c. Misc.

To clear $44,43,42,39,37$ get the monsters to follow you through the tunnel at 28, 25, 44 and lead them around. The same is true of the right side symmetric to this path.
Mirror the path.
If you get to 47 before the ghost get to 39 coming from 29 .
$44,43,42,39,37,47$, the ghosts will go to $40,33,34$. This gives you time to get the dots above the box.

If in need, don't forget the hold at 9.
If being pursued across the top and some ghosts are (below you go all the way over to the edge of the screen or use $40.33,34$ (33.40.39) if safe.. Watch Sue here. She will come up 43-45 end use 18-29-31.

Follow ghosts after second double back, if desperate for a move.
If ghosts above 2 crosses adjacent to the box going out to the edge of the screen. Travel below the tunnel to fake them into the top tunnel.

If some ghosts are far enough behind you where you have a choice to take them in or not, (use this rule: if danger on the other side don't take them in otherwise do.

## III. B. The Chase boards

\{ These are sometimes also referred to as the banana boards. They are the third and fifth set of boards, and beyond. Their colors are Red and Pink. \}

## III. B. 1. Holds and Grouping

Hold 1 : to get the ghosts into hold 1, make sure that Red, Green, and Pink ghosts are above the $41,39,38,37,36,35,40,34$ line. Then. Just sit at 41 facing up. The above three ghosts should go around a 42, 57, 58, 53, 52, 42 loop, Sue will usually go around a 28, 37, 38, 31, 9, 28 loop.

To group the ghosts, you first them into hold l (TYPO). Then, gradually move them closer together using a short move. If the three are more than 5 body lengths apart, go through the tunnel to 34 and wait for a ghost to pass 46 . Once he passes 46 (and before he reaches 48) go back to the hold position. Repeat until the three ghosts are within 5 body lengths. Now there are two basic grouping moves.

1 move: move ghosts two body lengths closer together:
When front ghost or ghosts just about reach 53, move through tunnel to 34 wait for the three ghosts to be between 46 . And 48 and then return to the hold.

In this move the front group should go 53, 52, 43, 44, 45, 46, and back to the hold. The back group should go 53, $50,44,45,46$, and back to the hold position.

2 move: move ghosts one body length closer together:
When front group reaches 53: Go down and back up quickly. The front group should go 53, $52,43,37,38,39,42,52,53,50$, and back to hold. When the front group gets between 37 and 38 go through the tunnel and wait until the new group reaches 50 , then go back to the hold position. The back group should go 53, 52, 42, 57, 58, 53, 50 and back to the hold.

The previous moves are the major moves used. But there are many others. Don't be afraid to use your own moves. The first thing to perfect is getting the ghosts above the 39, 38, 37, 36, 35, 40 line. The second is to get Pink, Red, and Green on top of each other.

## III. B. 2. How to eat the energizers

One important move for three of the four energizers is getting Sue up with the group. To do this takes split second timing end a little practice. When the group is at 42 and Sue is just before 37 leave to 34 and wait for the group of four ghosts to form end come to 46. The path of the three ghosts should be $42,57,58,53,50,44,45,46$ and the path of Sue should be $37,38,39,42,52,53,50,44,45,46$ to be a successful catch.

The top left energizer 1600: catch Sue as mentioned before for a perfect group of three. When the group passes 46, leave back through the tunnel to 41, then to 39, 42, 60. Now, wait until ghosts about to eat you. Then go up to energizer and back to eat the ghost.

The bottom left energizer 1600: catch Sue. Wait for the group of four ghosts to pass 46. Go through tunnel and down to intersection 2 by passing the energizer. Go up to 3 and sit facing right. When the ghosts pass 8 , go sit at 4. Wait for ghosts, eat energizer, and back up to eat ghosts. The perfect group is all four ghosts on top of each other.

The bottom right energizer 1600: catch Sue. Wait for ghosts to pass 46. Go

34, 41, 30, 7, 8, 6, 10. Sit down at 10 until the group reaches 28. Move 10, 11, 14, 16, 17, 18, 21. Wait for the ghost, eat energizer, back up to eat ghost. The perfect group is all four ghosts as one.

The top right energizer 1600: wait for the group to be at 42 at the same time Sue is at 28. Move 41, 34,40 when Sue is at 28 . Stall about a half second(waiting for Sue to be a half body length from 36). Move 40, 47, 48, 54, 55, 56, wait for all four ghosts end eat them on energizer.

## III. B. 3. Clean up

To clean the top, wait for the group of three to reach 60. Move 41, 39, 42, 60, 57. Stalling here is important, but not to long, move 57, 58, 53 end to whatever top dots you went to get. Repeat until all top dots are gone.

To clean the bottom: the last dots to be eaten should be those in the bottom left corner. Wait for the group to reach 60. Move $41,30,7,8,6,10,11,15,12$. Wait for the group to reach 2. Move to 13. Wait till ghost are at 2 again. Move 14, 16, 17, 18, 19. Wait for Red to go from 14 toward 13. Move 20, 21, 22, 23, 33, 34, 41 and regroup. When all three reach 60 move $41,30,7,8,6,10,27,10$ (stall a second), 10, 11, 14, 16, 26, 24, 25, 32, 33, 34. Now get the bottom right hand corner.

## III. B. 4. Chase hints

## III. B. 4. a. General Chase hints

Start these boards by heeding directly to the top right tunnel. Do not go around the bottom loop! When cleaning up, don't bite off more than you can chew. (several passes are safer).

If the Red ghost has sped up start the moves with Pink and Green together end Red about 3 body lengths behind. If a ghost follows you through the tunnel, drop down instantly to lose him.

## III. B. 4. b. 22nd and similar boards

head to top right tunnel and group the ghosts. Wait for second double back. Clear bottom except bottom left corner first.

Try to eat the two dots between 6 and 8 while doing hint 3 eat top left energizer by going 41, 39, 42, 60 energizer end then back out the same way you entered.

Get a group and clear top as you did before. Eat top right energizer by going
$58,53,50,51,49,54,55,56,47,40,34,41$. Eat bottom left last by decoying the ghosts to the top right corner and use the tunnel to get down to the energizer a long time before them.

## III. C. Peach, Pretzel, Apple Boards

\{ Don't get discouraged if the Apple board gives you problems. It is my humble opinion that after the boards we call the ninth key boards this is the toughest board. \}

## III. C. 1. Opening

Opening of the board: Stay clear of the ghosts. Maybe go to the top right hand tunnel at position 1. If Red and Green are together this is a hold position. You can group from this position. We do not group this way though, but you can develop techniques like many other people. \{ in later years I used this hold to group for the upper right - don \}

## III. C. 2. Grouping

## III. C. 2. a. Bottom

Use the tunnel efficiently to get the Red, Green and Pink ghosts together. A helpful hint for grouping Green and Red is to sit at 2 or 3 until Greens eyes go up. Then go out the tunnel. If Sue follows you out left tunnel move up and she will continue straight then down. Perfect the trick for Green on the peach before attempting to do on apple. Use positions 2 and 3 to figure out other grouping moves (watch the ghost closely.) Pink is effected by the direction of Ms. Pac-man is facing on these boards.

## III. C. 2. b. Top

From the top hold it is actually fairly simple to group the ghosts. The closer Inky and Blinky are the better. To move a ghost up one position, wait for the other ghosts to commit to up around their cycle, move Ms Pac Man to the right only long enough to attract the trailing ghost right and commit to the right. When the ghost has committed fully to the right, return to the hold. Inky will mimic Pinky in this case, as long as you lead right, if Inky is not close enough to Red, you need to guide here right until she will line up with Red. If you do not guide here she will catch you.

## III. C. 3. Energizers

Top right: when you get a group, get it to go 4,5,3 when the group is at 3 you should go through the tunnel and take the shortest path to 8 e . Now do not be afraid of Sue. When the group is at 10 end Sue is at 7, then go eat the energizer and then the ghost.

Top left: energizer: mirror the top right energizer. Except you will have to hope you will get Sue because she is different on this side. Bottom energizers: these are basically simple once you have a group. We have confidence in you figuring out your own methods.

## III. C. 4. hints

All you have to do is learn how to group the ghost. As grouped ghost are easily led into patterns. After the second double back it is safe to follow the ghost.

If you leave all of the dote along the dashed path until the end you won't get a cruise Elroy until you eat one of them

A good pattern for clearing them is to get them into the hold for the top right energizer. When the group of 3 reaches 11, do exactly what the arrows show.

## III. D. The first two boards

We will leave this as an exercise to learn to group. This will benefit you, and show you how well you understand this paper. Hints to group: use the upper tunnels. Stay stationary against the walls here to watch ghost (do not fear Sue here). (most energizers
require that after you start all four ghost come together. For the bottom right energizer a slight hesitation at the bottom will help. There are two holds at the top of the board (sitting up against the left walls, this narrow it to three). Could make upper right energizer simple to get. Or allow you to buy a coke.

Ok, I take some of the exercise out of the first board: (originally in Message to Dennis Brown , this is added in after the fact, but the italics was a bit much so it is in normal print)

1) head to upper tunnel, you may eat some dots at bottom, but get to upper tunnel prior to the second reversal.
2) wait in upper tunnel area until second reversal.
3) Now just practice going from one "L" to another, don't let the ghost follow you into the tunnel.
4) Notice if the ghost are traveling above you they will drop on the other side of the "L" from you, this is a good time to travel to the other side. (got it?)
5) The hardest ghost to control here will be inky, try to stay on one side long enough for her to rise above you, hopefully within a half body length of Red.
6) The Pink ghost should fall in close to the others.
7) Sue for the most part will not travel into your area of the board, though sometimes it will look like it -don't panic. There is a couple of situations where she will usually from above.
8) Once you get the ghosts (other than Sue)"grouped", you will have to get Sue. When Sue is in the proper position (you'll see) and the ghost are going left to right, once they drop down on the "L" (force this by doing instruction 4), go through the tunnel and take the path most direct to sit above the upper left energizer (without eating it). Wait for the ghost to get real close, then eat the energizer, and ghosts. You should not have to chase anyone real far.
9) Regroup and go for the upper right. When the ghost are moving to the left, move to the upper right corner, but don't sit above the dot, come to rest just to the left. The three ghost should start cycling in the tunnel just to your left. If Sue is not moving around the "L" on the right, wait till the others are going left, move right and then back again, this should change Sue's cycle. Now when Sue is going down and the others up, eat the dot, they will come back at you for another easy 3,000.
10) regroup and now we will go after the dot in Sue's corner ( lower left ). You will again need to judge a good location for Sue to start your move there. When the ghost are traveling right, after they cross the middle of the board go straight down the left side. take the second path down. move to sit under the dot. Once again eat them when they are close. - If Sue is ahead of the others by a 2 or more body lengths, move to the right - she will go left - follow her, then eat the dot.
11) the lower right starts in the same fashion as the lower left, just travel to the left, when you reach the bottom and then move left and wait by the dot until they are close.

When you understand and master these techniques you should be able to score 29400 by the time you finish the strawberry.

## IV. General and most helpful hints

1. Learn the ghost's characters and learn to use them to your advantage.
2. Learn to group in your own ways. If you learn your own ways you know how to use them.
3. Develop methods that will aid you once you have a group.
4. Eat all four ghosts on every energizer. It is hard to clear very many mazes past 25.
5. Don't get a "Cruise Elroy" until you have eaten all of the energizers.
6. Be real patient. These techniques take a long time.
7. Points are hard to come by later in the game. Get all the points possible early in the game.
8. Remember when you make a bad move the situation will probably show up again.
9. Never take your hands off the joystick even in the worst situations. You may run through the ghost.
V. Diagrams




Comment by mattgreen:
I don't believe these diagrams are accurate to the originals, but hopefully they are to some use.

