# WIN

The Cracker Barrel Peg Game

Keith Wannamaker

Introduction

Almost everyone who has visited Cracker Barrel has played the Cracker Barrel Peg Game, a tradition of the restaurant since its inception. Deceptively simple, winning the Cracker Barrel Peg Game can be quite a challenge. There are over 7.3 million possible variations with only about 400,000 winning "genius" endings.

The game is played with fourteen pegs on a triangle shaped board, beginning with one empty spot. Like checkers, pegs are removed when jumped by another peg. The object is to have one peg remaining; this is called a "genius" ending.

Starting Points

The initial blank spot can be any one of the fifteen holes. However, because the board can be rotated, there are really only five different ways to start the game. This solution manual gives the best and worst move list for all five starting points, as well as statistics on all moves from each starting point. The five starting points are shown here:
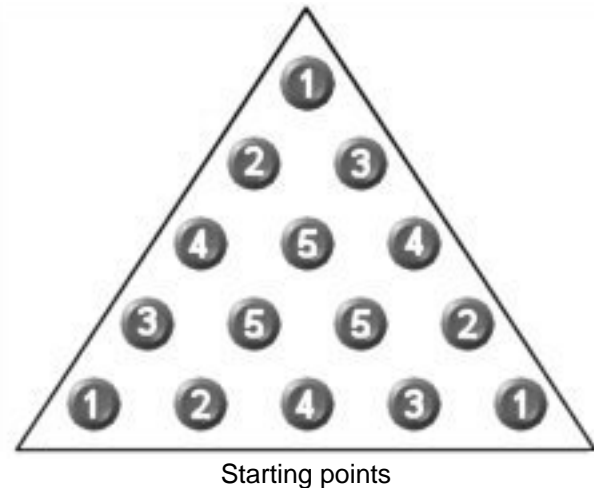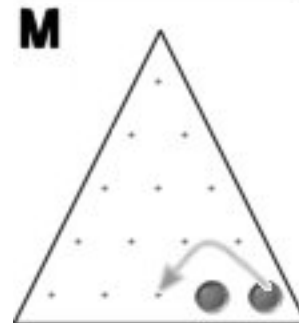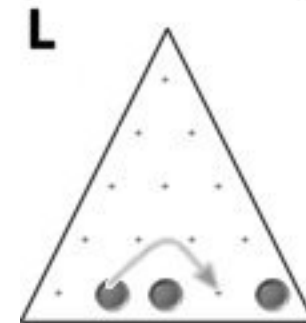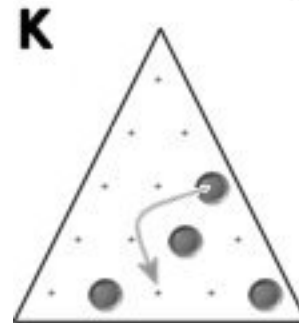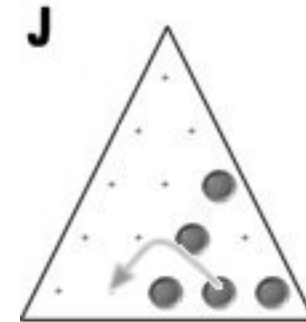

Starting points

Best Game for Starting Point #1

This solution is one of about 29,000 for any game in which the first empty space is in a corner.

A

B

C

D

E

F

G

H

I

J

K

L

M
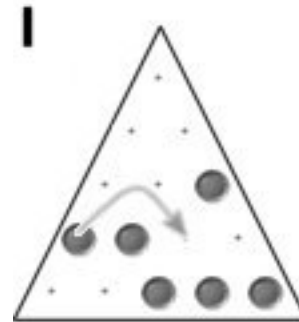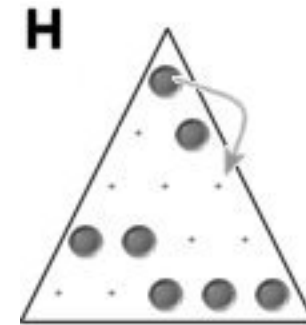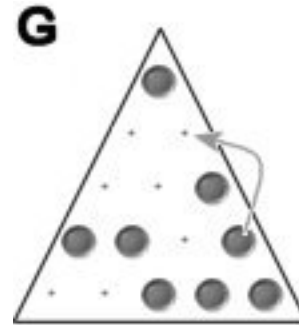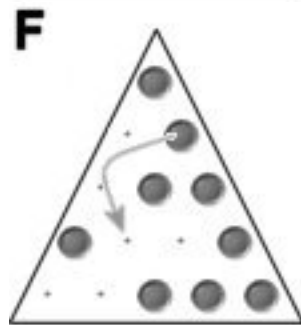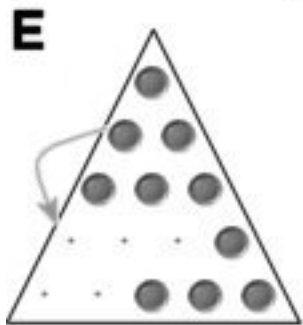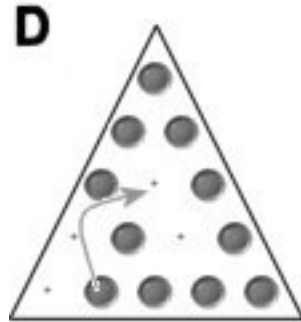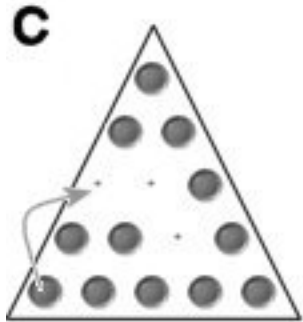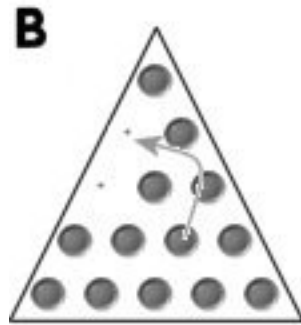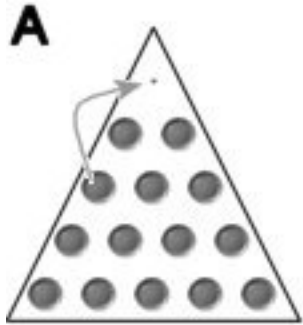
Finished!

Statistics for Starting Point #1

There are many ways to win from this particular starting point. Here is the exact breakdown of how many games end with a particular number of pegs remaining:

| Pegs Remaining	Number of Games	Percent of Total
1	29,760	5.2 %
2	139,614	24.6 %
3	259,578	45.6 %
4	123,664	21.7 %
5	14,844	2.6 %
6	844	0.1 %
7	324	0.1 %
8	2	0.0 %
any	**568,630**	100.0 %

The numbers reveal that more games end with one peg remaining than with five or more pegs remaining. In theory, it is easier to do very well than very poorly. However, most (92%) of the possible games finish with two, three, or four pegs remaining.
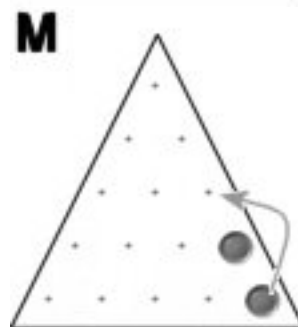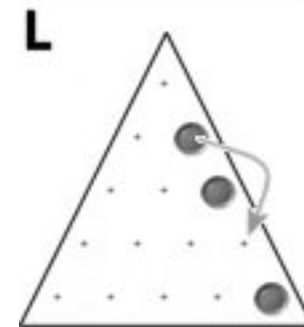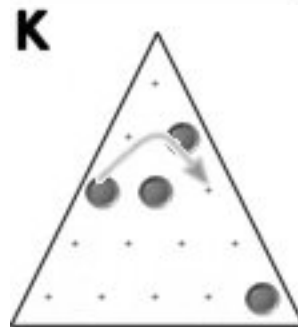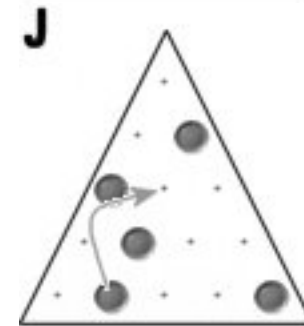
Worst Game for Starting Point #1

You may notice that only two of the half million possible games end with eight pegs remaining. This means it is a very difficult thing to do, and may require more "intelligence" than ending with just one peg! Here is the move list to end with eight pegs remaining:

A

B

C

D

E

F
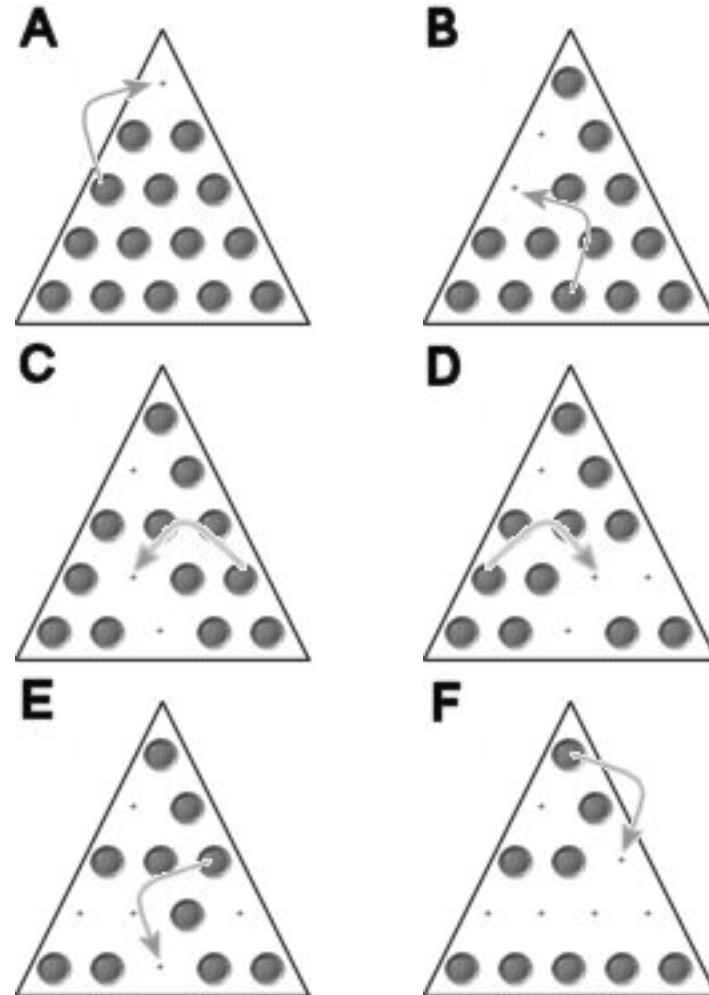
No moves left, with eight pegs remaining!

Best Game for Starting Point #2

This solution is one of about 14,000 for any game in which the first empty space is counter-clockwise one spot from a corner.

A

B

C

D

E

F

G

H

I

J

K

L

M
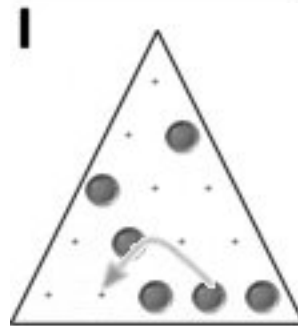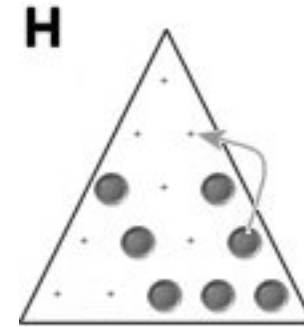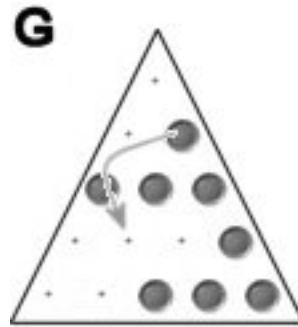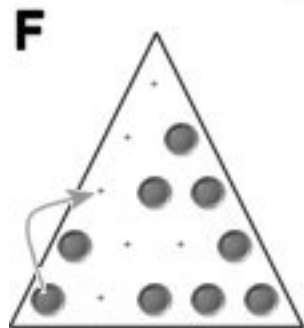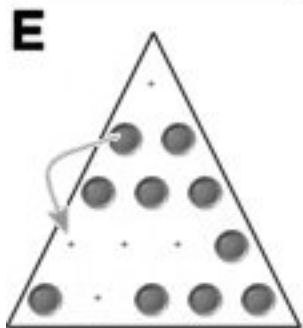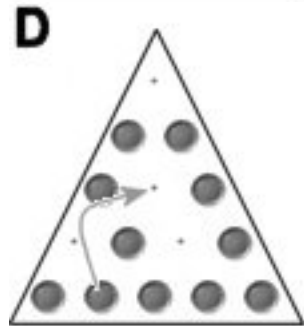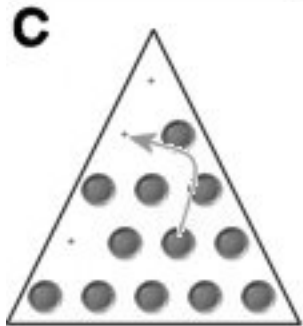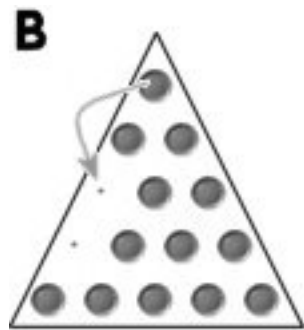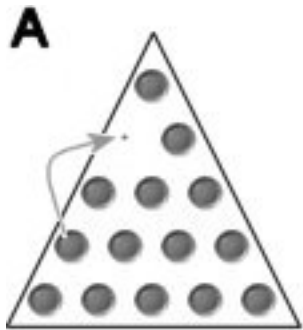
Finished!

Statistics for Starting Point #2

Again, there are thousands of ways to win from this starting point. Here is the exact breakdown of how many games end with a particular number of pegs remaining:

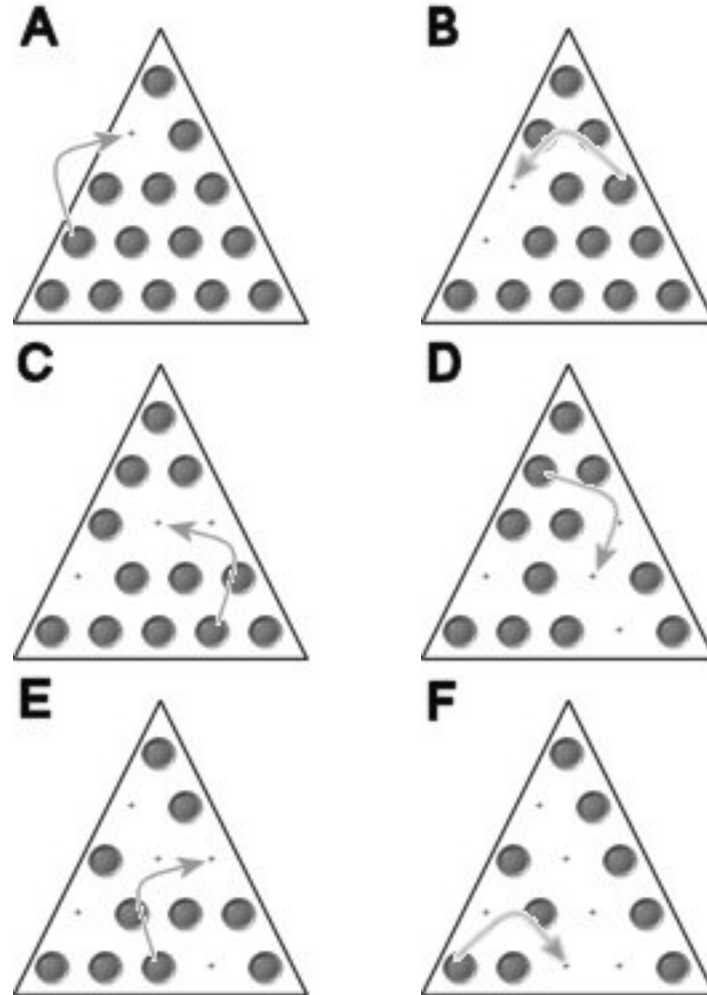| Pegs Remaining	Number of Games	Percent of Total
1	14,880	5.1 %
2	70,481	23.9 %
3	133,919	45.5 %
4	65,832	22.4 %
5	8,740	3.0 %
6	522	0.2 %
7	168	0.1 %
8	1	0.0 %
any	**294,543**	100.0 %

The numbers show that most games end with two, three, or four pegs.
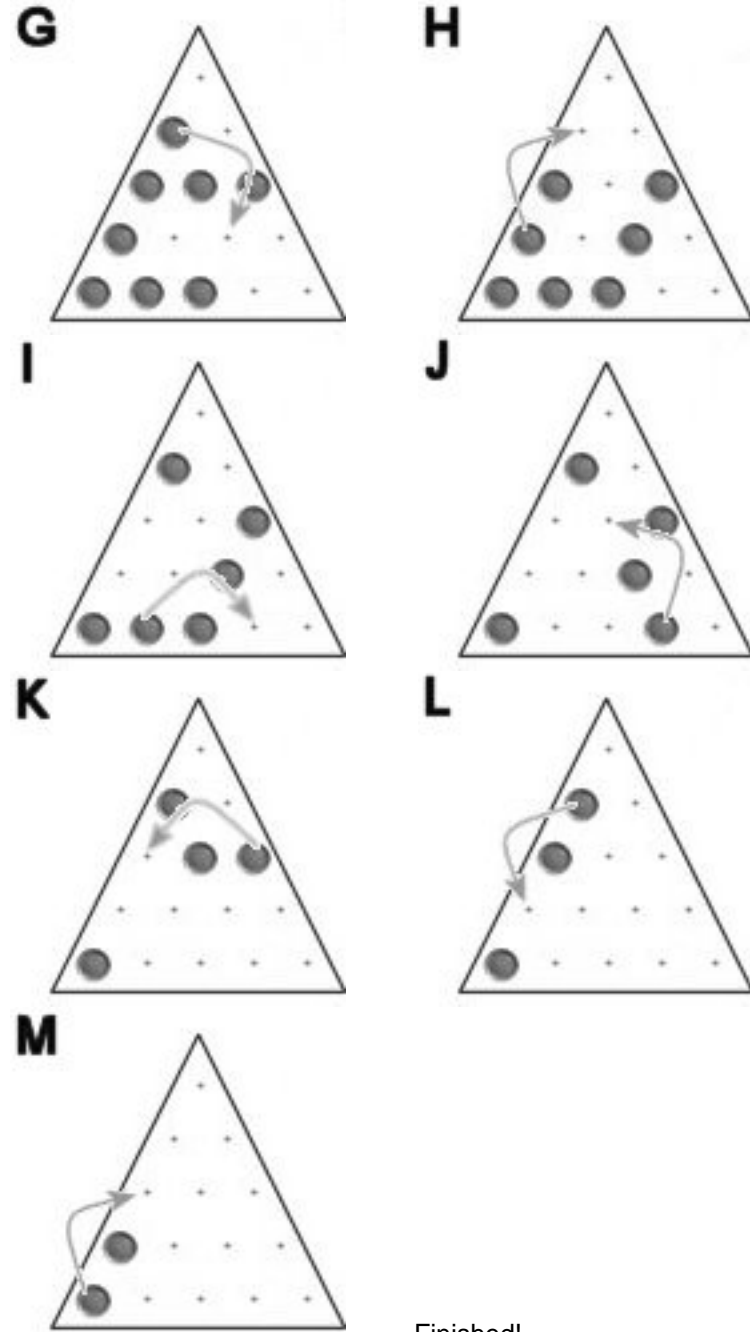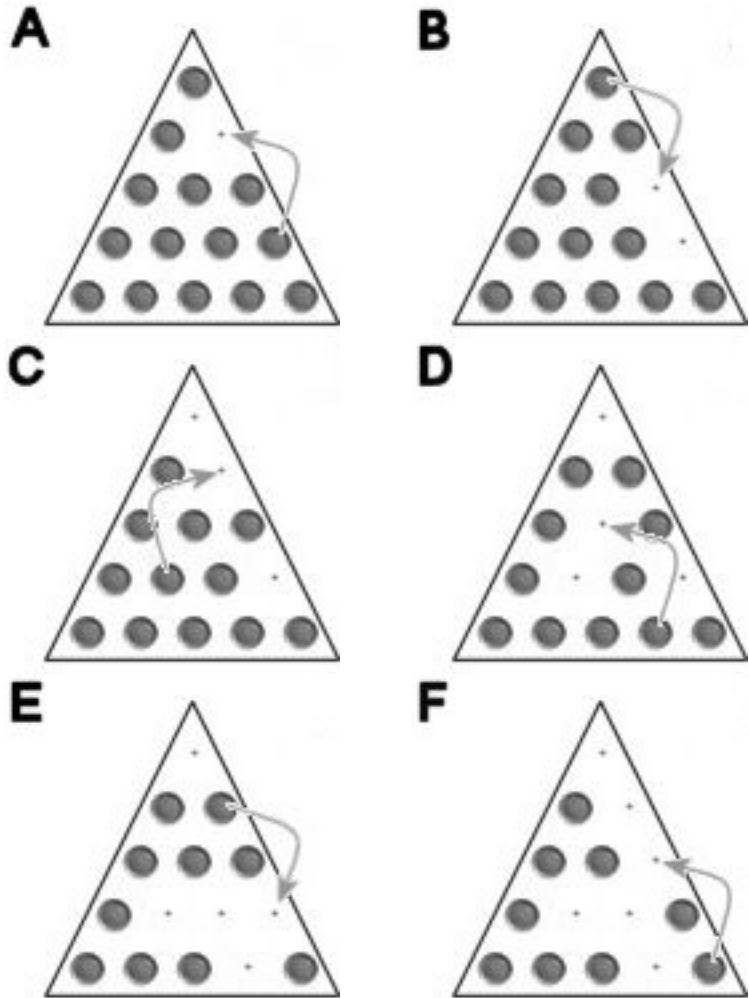
Worst Game for Starting Point #2

There is only one worst game possible for this starting point. Eight pegs are left with the following move sequence:

A

B

C

D

E

F

No moves left, with eight pegs remaining!

Best Game for Starting Point #3

This solution is for any game where the first empty space is clockwise one spot from a corner. Because this starting point is a mirror image of starting point #2, the statistics are the same and the solution is a mirror image. The worst game is not reprinted, but it is a mirror image of the worst game for starting point #2.

A

B

C

D

E

F

G

H

I

J

K

L

M

Finished!

Best Game for Starting Point #4

This is one of 85,000 possible solutions for any game in which the first empty space is in the middle of an edge.

A

B

C

D

E

F

G

H

I

J

K

L

M
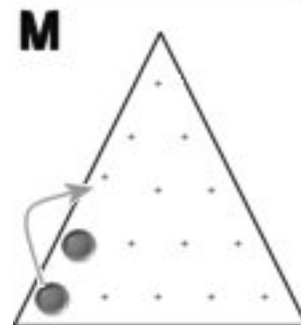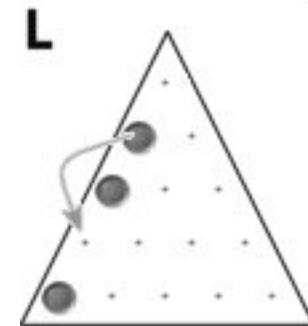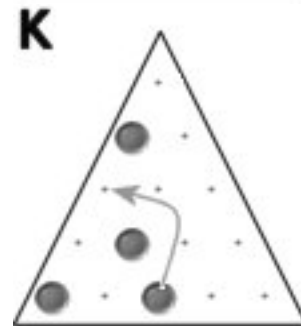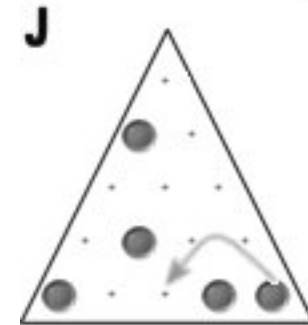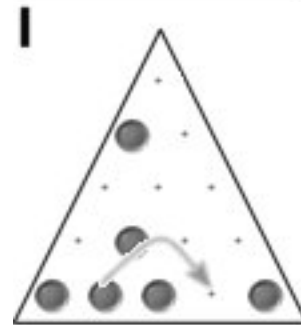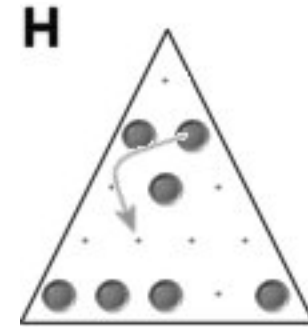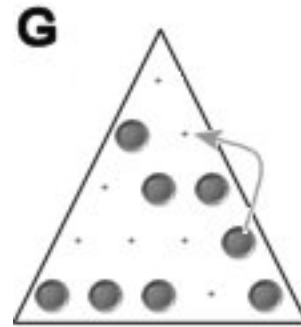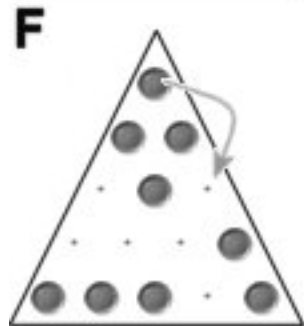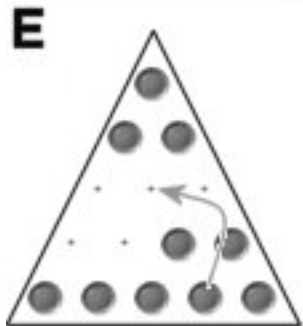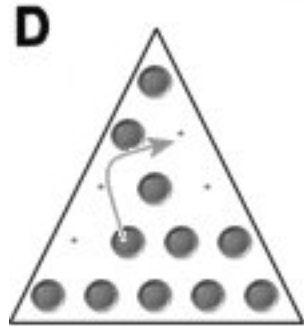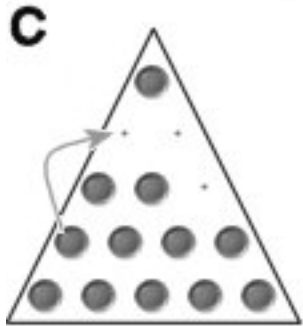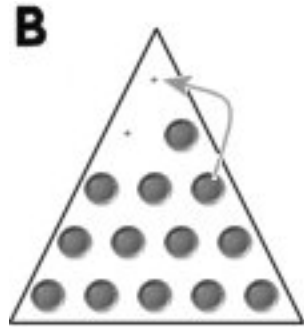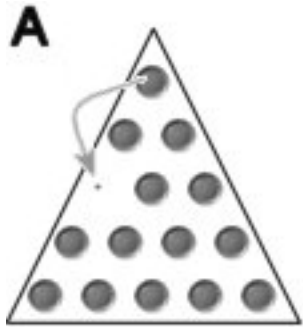
Finished!

Statistics for Starting Point #4

There are over one million possible games when starting from this point (the blank spot in the middle of one of the three edges). Because there are over 85,000 genius endings, a player is more likely to win the game starting from this point than from any other point. Here are the overall numbers for all endings:

| Pegs Remaining	Number of Games	Percent of Total
1	85,258	7.4 %
2	290,954	25.3 %
3	510,556	44.4 %
4	233,060	20.3 %
5	27,878	2.4 %
6	1,458	0.1 %
7	404	0.0 %
any	**1,149,568**	100.0 %

Worst Game for Starting Point #4

This is somewhat better than the other worst games. It is not possible to leave more than seven pegs when starting from this position. This is one of about 400 ways to leave seven pegs from this starting point:

A

B

C

D

E

F

G
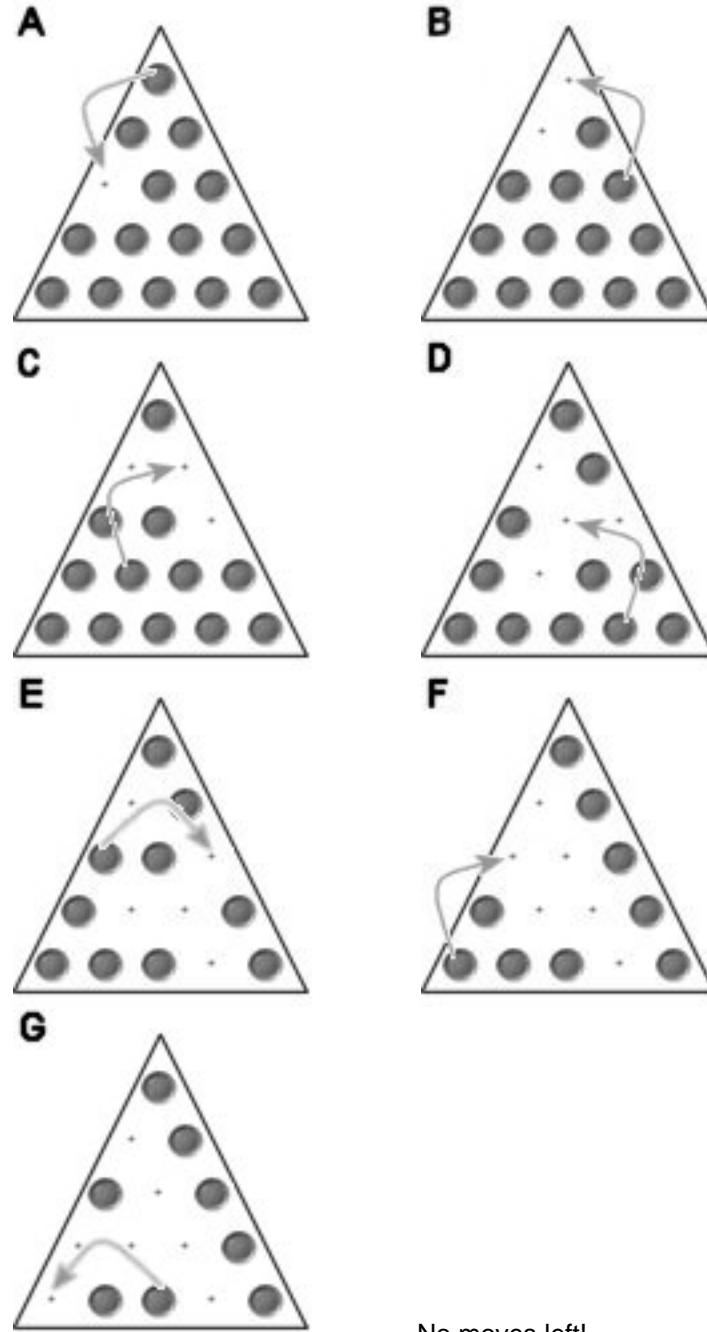
No moves left!

Best Game for Starting Point #5

This solution is one of only 1,500 for any game in which the first empty space is one of the three middle spots.

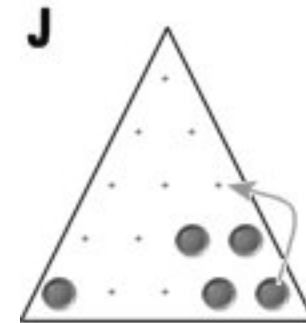**A**

B

C

D

E

F

G

H

I

J

K

L

M
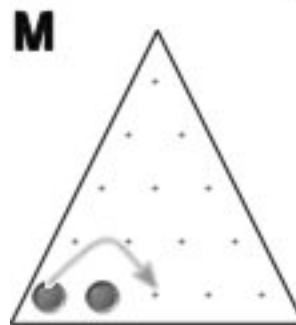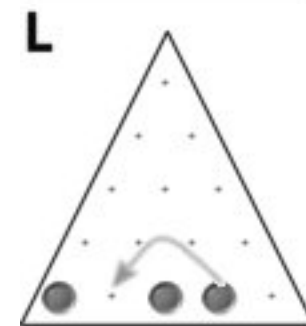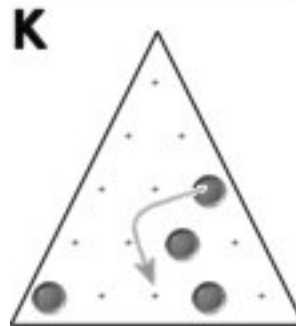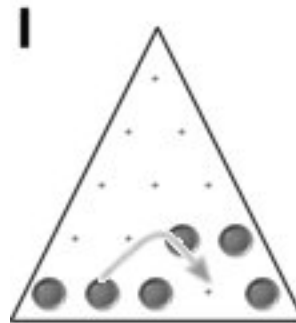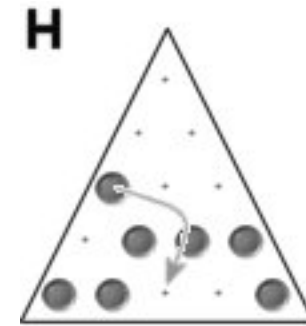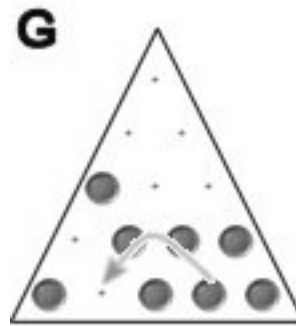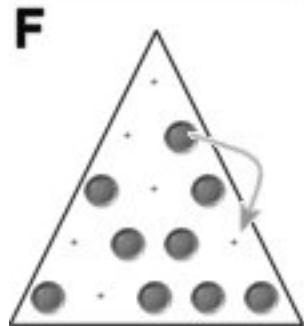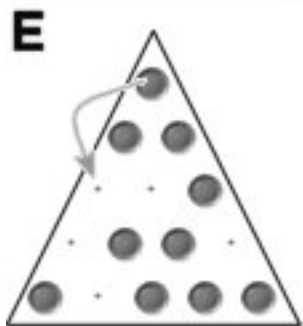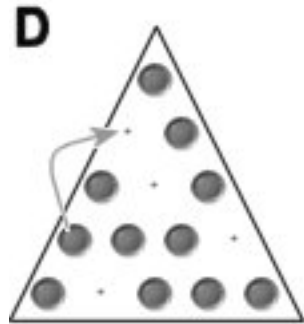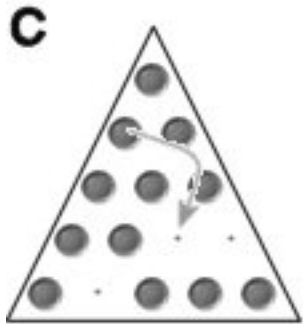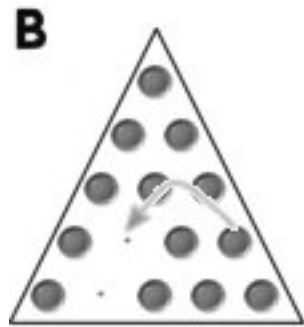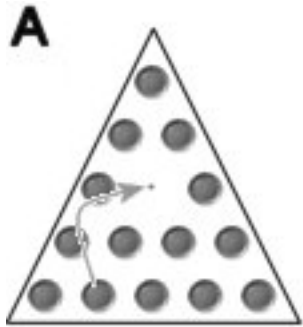
Finished!

Statistics for Starting Point #5

This is a very difficult starting point to win from. Only about 1% of the games are winning ones!

Pegs Remaining	Number of Games	Percent of Total
1	1,550	1.1 %
2	20,686	15.0 %
3	62,736	45.5 %
4	46,728	33.9 %
5	5,688	4.1 %
6	374	0.3 %
7	82	0.0 %
10	2	0.0 %
any	**137,846**	100.0 %

Worst Game for Starting Point #5

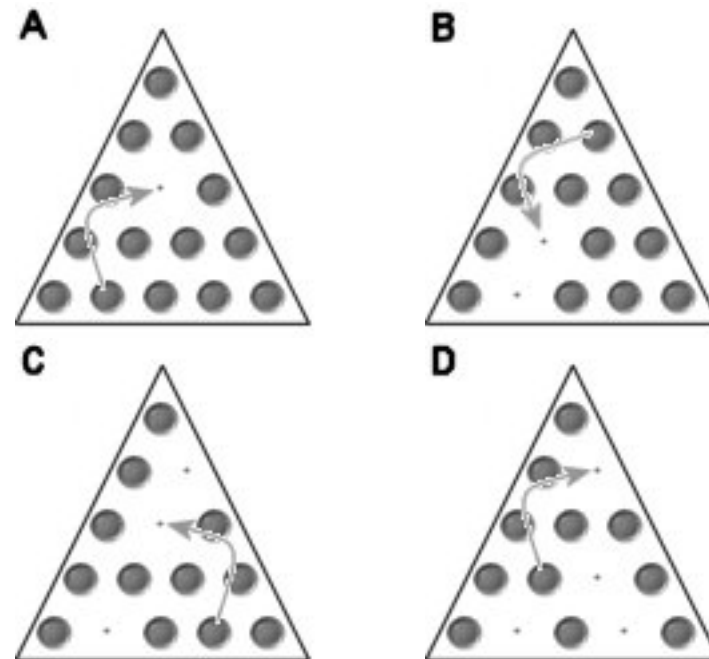It is possible to do poorly – very poorly – with this starting point. In fact, it is possible to leave more pegs when starting from this point than from any other. While it is not possible to leave just eight or nine pegs, it is possible to leave a whopping ten pegs on the board! This is how that feat is accomplished:

A

B

C

D

No further moves are possible!

Conclusion

While this game provides hours of daily entertainment (and perhaps frustration) to people nationwide, there is satisfaction in knowing both that it can be won and how to win it. A glimpse of the complex possibilities gives many a greater appreciation for the game's simplicity.

About the Author

Keith Wannamaker is a software engineer from Columbia, SC, who had free time on a recent vacation and was inspired by a delicious breakfast at the Cracker Barrel. He can be reached at the email address <Keith@Wannamaker.org>.