JLMahJongg Computer Player Win Statistics

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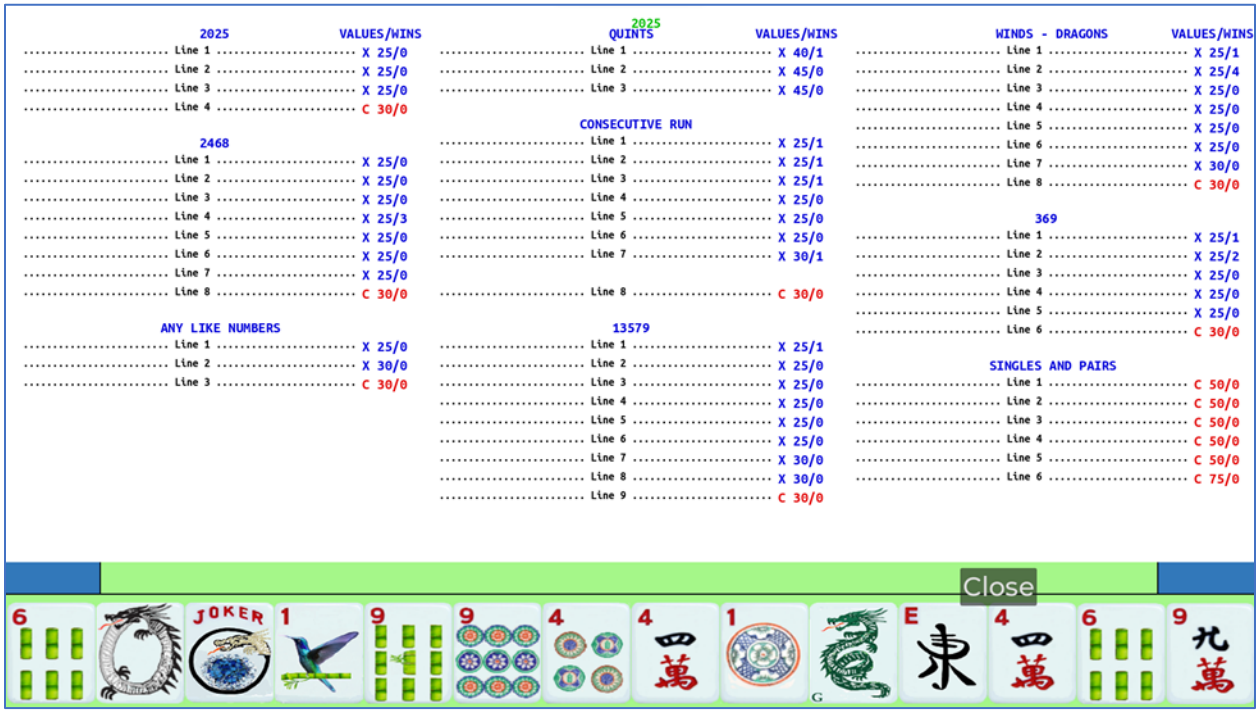
13 October 2025 (v1)

Hi Mah Jongg fans. I posted this JLMahJongg example NMJL 2025 card win completion display in two Mah Jongg Facebook groups:



The above result was for a limited number of games where I was playing against 3 computer players and following the AI-recommended hands. I had noticed the 2468, Line 4 gets recommended by the AI an annoying number of times. The above result is consistent with that, but is not enough random samples to give accurate results. Someone in another Facebook group made the same observation about 2468, line 4. I apologize to anyone who wants to call it a hand instead of a line. I distinguish a hand from a line. I call a hand a specific unique pattern of 14 tiles defined by one of the patterns on a line.

Several group members commented on the lack of enough data, but seemed interested in the results. I decided to use the demo feature of JLMahJongg to generate more meaningful statistics by playing games with 4 computer players (CPs or bots) playing against each other. I removed all delays so games are completed quickly.

I had the CPs play 5000 games and recorded all the results. This is called a Monte Carlo technique for generating statistics from a simulation. I also wrote a program to process the data and generate the statistics. The results are given in the following figures:

Category	Hand # (Line)	X/C	Value	Unique Hands	Wins (% of 4,504)
2025	1	X	25	6	1.7
	2	X	25	6	0.6
	3	X	30	6	0.6
	4	C	30	3	0.0
2468	1	X	25	9	1.6
	2	X	25	12	1.1
	3	X	25	3	0.0
	4	X	25	12	9.7
	5	X	25	3	0.3
	6	X	25	3	0.2
	7	X	25	12	1.6
	8	C	30	12	0.0
Any Like Numbers	1	X	25	27	2.0
	2	X	30	27	0.8
	3	C	30	27	0.6
Quints	1	X	40	42	2.8
	2	X	45	96	1.0
	3	X	45	27	0.2
Consecutive Run	1	X	25	6	0.9
	2	X	25	54	9.7
	3	X	25	63	4.3
	4	X	25	30	10.7
	5	X	25	21	3.5
	6	X	25	21	1.1
	7	X	30	75	4.8
	8	C	30	21	0.4
13579	1	X	25	9	0.9
	2	X	25	12	2.2
	3	X	25	6	1.4
	4	X	25	6	2.3
	5	X	25	9	4.9
	6	X	25	6	0.4
	7	X	30	12	1.0
	8	X	30	6	0.1
	9	C	30	12	0.2

Category	Hand # (Line)	X/C	Value	Unique Hands	Wins (% of 4,504)
Winds - Dragons	1	X	25	2	2.1
	2	X	25	126	4.4
	3	X	25	1	0.6
	4	X	25	3	5.4
	5	X	25	30	4.2
	6	X	25	24	2.6
	7	X	30	6	0.4
	8	C	30	3	0.1
369	1	X	25	12	1.4
	2	X	25	9	0.8
	3	X	25	9	1.4
	4	X	25	6	2.6
	5	X	25	9	0.0
	6	C	30	6	0.4
Singles and Pairs	1	C	50	9	0.0
	2	C	50	12	0.0
	3	C	50	6	0.0
	4	C	50	6	0.0
	5	C	50	9	0.0
	6	C	50	6	0.0

In the above charts, a higher win percentage means it was easier for the computer players to win with that Line. Note that these results depend on how the AI logic tells the computer players to play. In JLMahJongg, the logic calculates the approximate winning probability (odds) for each hand. These odds are not exact, but are good enough to make the pro-level computer players difficult to beat. However, not all available information to a player is considered in calculating the odds. For example, you know any specific tiles you see during the Charleston are no longer in the wall. The ideal best-hand odds depend on this. JLMahJongg does not include Charleston observations in its odds calculations, but could and may in the future.

The total number of wins is not 5000 because the other 496 are wall games.

The results show 2468, line 4 and Consecutive run, lines 2 and 4 are all significantly easier (for the computer players), with about 10% of the wins each. Your results may vary. Another note: the AI currently chooses hands based on maximizing the odds of winning. This is not the same as maximizing your total average score. To maximize total average score, the hand selection

criteria need to consider harder hands can result in higher scores. Pro players consider this and play harder, higher-scoring hands if their specific tiles make the odds of winning high enough. I plan to add this as a characteristic of the "Pro" computer players in the future. Maximizing win probability instead of score is part of why the "Singles and Pairs" and some of the other harder hands are rarely chosen in this analysis. A win percentage of 0.0 means the percentage is < 0.1.

Below is a video showing how the JLMahJongg Demo/Tutorial/Testing mode generates data for statistics. The game goes to the highest speed at the end when I mute the voices (Press the V key). Due to file upload size limits on the server, I could only show a very short clip.

Reasons Some Lines are Easier:

1. Use of Flowers. There are 8 flowers and only 4 of other tiles, except jokers. A set with 3 or more flowers is easier to make because it can use 8 flowers and 8 jokers. However, flowers are the most-used tile in hands overall, so their odds of being discarded by players is lower.
2. Sets of 3 tend to be easier to make. Singles and pairs are harder because you can't call, except for Mah Jongg and can't use jokers. Sets of 4 (Kongs) are harder because it is harder to get all 4 of 4 tiles. Quints are even harder because you need at least 1 joker too.
3. Some lines define more unique hands than others (see above charts). The more hands that are represented, the easier it tends to be to make a hand from that line. That is why the consecutive run hands tend to be easier; they represent many different specific hands.
4. Concealed (Closed) hands will be harder because you can't call, except for Mah Jongg. Note that all Singles and Pairs hands are concealed because you can't call for a single or pair except for Mah Jongg. The NMJL singles and pairs hand values are not doubled for jokerless – they are "pre-doubled" because they all must be jokerless.

Below are the same charts sorted by win %, by request.

Category	Hand # (Line)	X/C	Value	Unique Hands	Wins (% of 4,504)
Consecutive Run	4	X	25	30	10.7
Consecutive Run	2	X	25	54	9.7
2468	4	X	25	12	9.7
Winds-Dragons	4	X	25	3	5.4
13579	5	X	25	9	4.9
Consecutive Run	7	X	30	75	4.8
Winds-Dragons	2	X	25	126	4.4
Consecutive Run	3	X	25	63	4.3
Winds-Dragons	5	X	25	30	4.2
Consecutive Run	5	X	25	21	3.5
Quints	1	X	40	42	2.8
Winds-Dragons	6	X	25	24	2.6
369	4	X	25	6	2.6
13579	4	X	25	6	2.3
13579	2	X	25	12	2.2

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Winds-Dragons	1	X	25	2	2.1
Any Like Numbers	1	X	25	27	2.0
2025	1	X	25	6	1.7
2468	1	X	25	9	1.6
2468	7	X	25	12	1.6
369	1	X	25	12	1.4
369	3	X	25	9	1.4
2468	2	X	25	12	1.1
Consecutive Run	6	X	25	21	1.1
Quints	2	X	45	96	1.0
13579	7	X	30	12	1.0
Consecutive Run	1	X	25	6	0.9
13579	1	X	25	9	0.9
Any Like Numbers	2	X	30	27	0.8
369	2	X	25	9	0.8

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Category	Hand # (Line)	X/C	Value	Unique Hands	Wins (% of 4,504)
2025	2	X	25	6	0.6
2025	3	X	30	27	0.6
Any Like Numbers	3	C	30	27	0.6
Winds-Dragons	3	X	25	1	0.6
Consecutive Run	8	C	30	21	0.4
13579	6	X	25	6	0.4
Winds-Dragons	7	X	30	6	0.4
369	6	C	30	6	0.4
2468	5	X	25	3	0.3
2468	6	X	25	3	0.2
Quints	3	X	45	27	0.2
13579	9	C	30	12	0.2
13579	8	X	30	6	0.1
Winds-Dragons	8	C	30	3	0.1

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