## Tips For Winning:

Game theory tells us that every situation has a specific way to be played, and that straying from this strategy at all will decrease your chances of winning or lower the amount you can win. The following chart, known as a game matrix, maps out the possible decisions each player can make, and the payoffs that result from each situation.

|  | Spade | Heart | Club | Diamond |
| :--- | :--- | :--- | :--- | :--- |
| Spade | 0 | +1 | +2 | -3 |
| Heart | -1 | 0 | +1 | +2 |
| Club | -2 | -1 | 0 | +1 |
| Diamond | +3 | -2 | -1 | 0 |

This matrix, as is convention, assumes that your options are listed in the first box of each row. A payoff denoted with a "+" implies a gain for you, whereas a "-" implies a gain for the other person. A " 0 " simply means that neither receives a payoff. You may be wondering, how does this game matrix help us win this game if all it does is map out the possible outcomes? Well I assure you, this matrix is just the beginning. The math behind this is pretty complex, so I'll just lay out for you a chart, which I derived as a result of 11 different matrices and more than 50 different calculations.

| Have | Play Spades | Play Hearts | Play Clubs | Play Diamonds |  |
| :--- | ---: | ---: | :--- | :--- | :--- |
| S,H,C,D | $2 / 6$ | $3 / 6$ |  | $1 / 6$ |  |
| S,H,C | $1 / 2$ | $1 / 2$ |  |  |  |
| S,H,D | $2 / 6$ | $3 / 6$ |  | $1 / 6$ |  |
| H,C,D |  | $1 / 2$ |  | $1 / 2$ |  |
| S,C,D | $1 / 2$ |  |  | $1 / 2$ |  |
| S,C | $1 / 1$ |  |  |  |  |
| S,D | $3 / 4$ |  |  | $1 / 4$ |  |
| S,H | $1 / 2$ | $1 / 2$ |  |  |  |
| C,D |  |  |  | $3 / 4$ | $1 / 4$ |
| C,H |  | $1 / 1$ |  |  |  |
| D,H |  | $1 / 2$ |  | $1 / 2$ |  |

Game theory also tells us that, when no one strategy can guarantee a gain for you, it is best to switch up your decisions at random to keep your opponent guessing. The leftmost column lists all possible combinations of suits that you could have at once. The remaining four columns give you the odds that you should use when you inputting each option into a random decision maker. The blocks left blank mean that the card is either not in your hand, or should not be played at all given your hand.

I suggest using https://www.randomdecisionmaker.com/ to randomly make the decision for you. Simply input the name of each suit the same number of times as denoted in the numerator of the corresponding block and hit the "Choose for me!" button. Whatever suit it chooses should be the card you play. While it may sometimes give you decisions you don't agree with, I strongly urge you to follow it. Not only were these decisions derived from the specific situations the game generates, it has shown itself to be incredibly useful in my experience using it. When using this chart, I have won 7 games to only 1 loss. When not using it, I have won 3 games but lost 2.

After playing the card that the random decision maker tells you to make, you should reexamine your hand. Repeat the process listed above for your new hand, except this time, rather than playing the card, keep it for next round and discard the remaining two. Doing these steps will maximize your chances of winning. In fact, while this game is almost perfectly fair, if you follow these strategies, even if your opponent makes all the right decisions, you still give yourself a $0.003 \%$ advantage over your opponent. I know it's not much, but assuming your opponent didn't create a game matrix and calculate the perfect way to play, your advantage is much larger, nearly 25\%!

Now remember, if you are playing this game with a friend or a loved one, it may be best to throw them a bone every now and again and let them win.

This will ensure that they keep playing this game with you and that you can continue to beat them for years to come.

