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# WINNING...At Poker?

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## Learning Objectives

- Work with a simple example of a **simulator**
- Apply the use of **arrays** to a useful situation
- Generate a **random number** in VBA
- Use **loops** to repeat sections of code to perform an operation multiple times

## Overview

In the game of poker, a player's hand consists of 5 cards drawn from a deck. The game has a variety of "hands" that a player tries to create to beat the other players. These are shown below, thanks to WikiHow:

- The highest-ranking hand is a **royal flush** (the royal straight flush). This hand includes a 10, Jack, Queen, King, and Ace of the same suit, one kind (all clubs, diamonds, hearts or spades). It can only be tied but not beaten by the royal flush of another suit.
- A **straight flush** is made up of 5 consecutive cards of the same suit.
- **4 of a kind** means you have 4 cards of the same rank (but different suits, of course) and a fifth card of any rank (such as 4 aces and a 9). If you have 4 aces, then no one can have any hand with an ace, so that no royal flush is available.
- A **full house** contains 3 matching cards of 1 rank and 2 matching cards of another rank.
- A **flush** contains any 5 cards of the same suit. These skip around in rank or sequence but are from the same suit.
- A **straight** contains 5 cards of consecutive rank but from more than one suit.
- **3 of a kind** means you have 3 cards of the same rank, plus two unmatched cards.
- **2 pair** is made up of two cards of one rank, plus two cards of another rank (different from the first pair), plus one unmatched card.
- **Pair** means you have 2 cards of the same rank, plus 3 other unmatched cards.

**Aside: High card** is the lowest-ranking (called a "nothing") hand, when no two cards have the same rank, the five cards are not consecutive, and they are not all from the same suit. In the diagram below it is tracked as "Bust".

Write an application that simulates picking 5 cards from a deck 100,000 times, and keep track of how many times each type of hand occurs. Then, display the percentage of the time that each hand can appear in 100,000 draws. How often does a royal flush appear?

You can match the output below (I've hidden the results to leave it a surprise!) or come up with your own display. Show some creativity!

**This application simulates 100,000 poker hands (5 cards each) and tallies the number of each type of hand listed below.**

Run Simulation

Probability of:

Bust	?
One pair	?
Two pairs	?
Three of a kind	?
Straight	?
Flush	?
Full House	?
Four of a kind	?
Straight flush	?

Your application will calculate these.

Check

0.00%

This should always sum to 100%.

## Notes

- Use appropriate comments to explain the more complex parts of your code.
- Try using arrays or collections to model a deck of cards.
- Only use 1 deck of cards for your simulation. A selected card is not placed back in the deck. Aces high.



Note: The coding for this assignment is relatively straightforward, but the logic may seem complex.