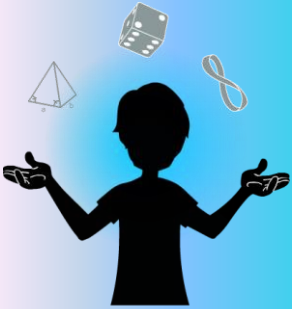


Math Magic

- 5 Victories -



AMAZINGMATHS

Materials:

- Magic trick video
- 1 deck of cards per team
- Pens
- Paper

How to do the Magic Trick

PREPARATION:

Place 5 indicator cards on the top of the deck (i.e. Ace, 2, 3, 4, 5, of the same suit).

TRICK:

1. The magician places the 5 indicator cards on the table. He then asks the spectator to add 4 cards on each of them in order to create 5 piles of 5 cards each.
2. The magician asks the spectator to choose one card from each pile and note it down on a piece of paper. The spectator then stacks the piles in whichever order he prefers. Either the spectator or the magician then redistributes the cards into 5 new piles of 5 cards each. He must, however, make sure to place 5 cards in the same row before starting the next rows.
3. Once the cards are placed on the table, the magician asks in which column is the spectator's first chosen card. The magician is then able to identify the card that was chosen by the spectator at the beginning of the trick.

Here is how the magician can identify the card: The magician starts by finding the 1st indicator card (i.e. the Ace). The first card chosen by the spectator is in the same row as the first indicator card. Therefore, when the spectator indicates in which column his card is located in, the magician only needs to look at which row the indicator card is in in order to identify the corresponding card in the column pointed by the spectator.

The magician then repeats this process to identify the rest of the cards.

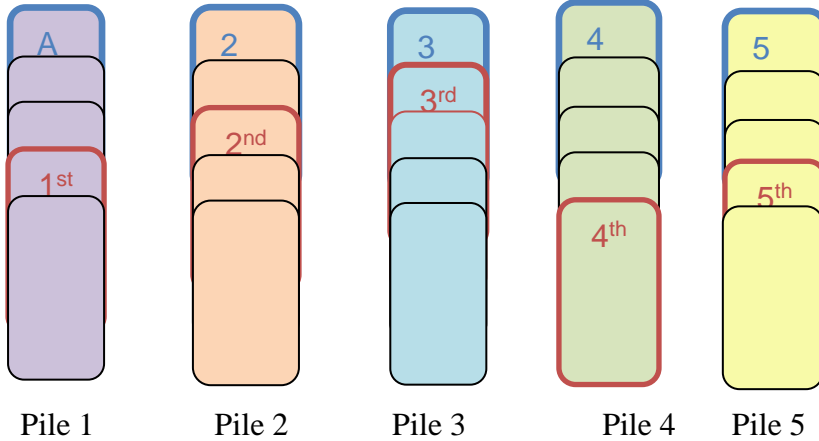


Mathematical Explanation

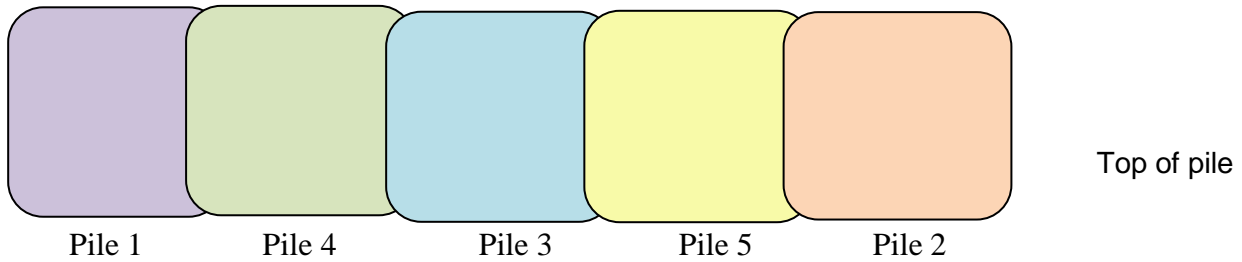


Why this Trick Works

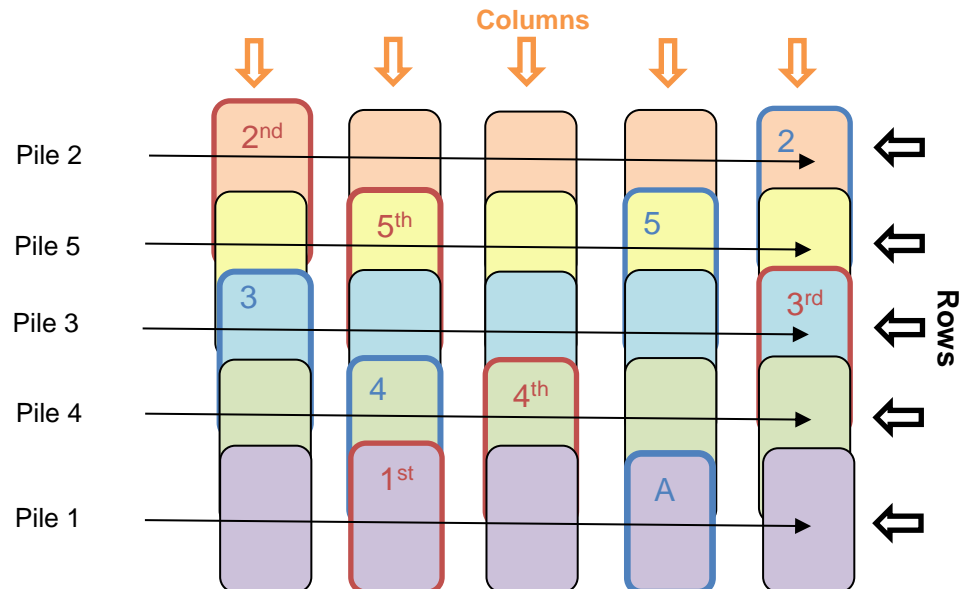
The first time we distribute the cards, we obtain a layout such as the one below. The blue outlined cards represent the indicator cards, the red outlined cards represent the cards the spectator chose and the order in which they were chosen. (The colours of the cards are for explanatory purpose only, to show how the cards move from being in a column together to being in a row together later.)



By stacking the piles in any order, we end up with a layout similar this one (the order of the piles may be different):



By distributing the cards from the top of the pile, we get 5 new piles all composed as such:



We can then notice that all the cards that were in the same pile at the beginning of the trick now find themselves in the same row, including the pile's indicator card. When the spectator indicates in which column his card is in, the magician looks in which row the corresponding indicator card is in. This allows the magician to know in which row is the spectator's card is, because the chosen card is the card that is at the intersection of the column indicated by the spectator and the row of the indicator card. For example, when asked to point at the column that has the first card the spectator chose (1st), the magician looks to see which row the indicator card (A) is in. The spectator's card will always be in the same row as the indicator card.