HIDDEN MAGIC COIN

One of the most beautiful coin tricks is often explained as a feat of extrasensory perception. But it is really an example of the mathematical concept of parity. Ask someone to toss a handful of coins on a table. After a quick peek at the result, turn your back and ask the person to turn over pairs of coins at random—as many pairs as he or she likes. Then ask the person to cover up one coin. When you turn around, you can tell immediately whether the covered coin is showing heads or tails. Can you work out the mathematical secret at the heart of this trick?
Answer
Before you turn your back, you check to see how many coins are showing heads. You know that the number of heads will increase by two, decrease by two or stay the same for every pair of coins that is turned over. Therefore, if the initial number of heads is odd, the number will remain odd, no matter how many pairs of coins are turned.
When you turn back around, you count the number of heads that are now showing. If the number is odd, as at the start (or even, as at the start), the covered coin must be a tail. If the number of heads is even for an odd start (or odd for an even start), the covered coin must be a head.
This simple trick helps demonstrate the importance of parity: the odd-even parity of this system is preserved as long as pairs of coins (not individual coins) are turned over.