

MONTEY, A WORD GAME HUSTLE

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Three-card monte ("find the lady") is a scam sometimes perpetrated on the streets of large cities. The sharper places a queen and two other cards face downward, shuffles them around, and invites the bystanders to bet on which card is the queen. Somehow, the bystanders are always wrong. In monte, as in the shell game, thimblorig and other like hustles, the scam artist will use sleight of hand to perform his tricks. In our word game Montey (name derived from "etymon") we will use abstract algebra instead of sleight of hand to astound the audience.

YON

YET

MOT

MEN

Montey is played with the four words MEN MOT YET YON arranged in a 2x2 grid (at left). The bystander will choose (unknown to us) one of the words and jot it down.

We turn our back as he places a checker on his word and moves it, king-wise, one square in any direction as often as he wishes. Each time he moves, he calls out "horizontal", "vertical" or "diagonal" as the case may be. When he is satisfied with his moves, he tells us either the word he started with or the word he ended with. We are then able to quickly name the other word.

| | O | H | V | D |
|---|---|---|---|---|
| O | O | H | V | D |
| H | H | O | D | V |
| V | V | D | O | H |
| D | D | V | H | O |

It can be somewhat difficult to follow the moves without enlisting the help of algebraic group theory. Call the moves H, V and D, and add O for no move at all. The table at the left gives the result of one move (the row heading) followed by another (the column heading). Note that $X + X$ is always O, $X + O = X$, and $X + Y = Z$, where X, Y and Z are all different and not O.

This table is essentially the same as the nim-sum table in the article "Wordnim and Grundyword" in the August 1993 Word Ways. It is called by group theorists the Klein four group. As an example of its use, suppose the bystander calls the sequence DHDVHDV. We mentally compute $D + H = V$, $+ D = H$, $+ V = D$, $+ H = V$, $+ D = H$, $+ V = D$, and will know that the start and end words differ diagonally. If he started on MEN he would have ended on YON. If we had computed a final O, we would know the two words are the same.

A rather baffling extension of Montey is provided by using the letters of LEXICOGRAPHY. Prepare the alphabetical word list as in the diagram (next page) and also prepare eight cards with the words written separately on them. The bystander jots down his secret choice of word on a sheet of paper. With our back turned, he covers his word choice with a card whose word matches a letter in his word in some one position (1st,

2nd or 3rd). He calls out the position of the match to us. He then repeats the procedure by replacing the current card (to be used again if he wishes) with a new card that matches the former card in some position, again calling out the number of the match. He does this as often as he cares to and, upon stopping, names the last word showing. We can then name the written word below the card.

For example, suppose he writes HAG. A proper sequence could then be HEY (call 1), COY (call 3), LOX (call 2), REX (call 3), HEY (call 2)--that is, he calls out 1,3,2,3,2 and reports the last word is HEY. We are then able to name his written word, HAG.

We could construct an 8x8 addition table that works for Lexcography like the 4x4 does for Montey, but choose instead to make a simple modification in the small 4x4. Notice that the eight words can be paired into four sections based on their 3rd letters G, Y, P or X. We think of the 8x8 as a 4x4 whose elements are paired "opposites" on the 3rd letter. Each pair has a Top and a Bottom element. Now a 1 means a horizontal move H, 2 means a vertical move V, and 1+2 will be the diagonal move D. (The bystander never calls D, but we must keep track of it.) Tabulate the 3's separately, noting whether there are an even or odd number of them. A 3 flips the choice between Top and Bottom of a word pair. It is easy to surreptitiously touch forefinger to thumb at the call of a 3, and untouch the fingers on the next 3 to keep tabs on the parity of 3's.

Using ' for an active 3, the former sequence 1,3,2,3,2 computes as 1+3 = 1', +2 = D', +3 = D, +2 = 1. Hence we know the written word and the last word are directly horizontally placed from each other.

As a final example suppose the calls are 1,3,2,3,1,3,2,1,2. You may "cast out" pairs if you wish and quickly obtain 1+3+2 or D', but if you compute as you go this is 1+3 = 1', +2 = D', +3 = D, +1 = 2, +3 = 2', +2 = 0', +1 = 1', +2 = D'. If HAG were the start, then the last word would be LOX, i.e. diagonal to HAG and opposite.

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|------------|------------|
| CIG | COY |
| HAG | HEY |
| LIP | LOX |
| RAP | REX |