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MONTEY
A Word Game Hustle

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

MONTEY is played using the four words MEN, MOT, YET, and YON arranged in a 2 x 2 grid. The bystander will choose, unbeknown to us, one of the words and jot it down. We turn our back as he places a chess king on his word and moves it one square in any direction as often as he wishes. As 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.

MEN	MOT
YET	YON

It can be somewhat difficult to follow the moves without enlisting the help of algebraic group theory. Call the moves H,V,D and add O for no move at all. The table gives the result of one move (the row heading) followed (+) by another (the column heading). Note that $X + X$ is always 0, $X, + 0 = X$, and $X + Y = Z$ whenever X, Y , and Z are all different and none is equal to 0. This table is essentially the same as a nim-sum table, but in this form, group theorists usually call it the Klein four group. As an example of its use suppose the bystander calls the sequence D,H,D,V,H,D,V. 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. Thus, if he started on MEN he would have ended on YON. If we had computed a final 0, we would know that the two words were the same.

+	0	H	V	D
0	0	H	V	D
H	H	0	D	V
V	V	D	0	H
D	D	V	H	0

A rather baffling extension of MONTEY is provided by using the letters of LEXICOGRAPHY. Prepare the alphabetical word list as in the diagram on the white page and also prepare eight cards with the words written separately on them. The bystander jots down his secret choice of one of the words on a sheet of paper. With our back turned, he covers his word with the card whose word matches it. He will now replace that card with a card whose word matches it 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 position 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 able to name his written word as HAG.

We could construct an 8 x 8 addition table that works for LEXICOGRAPHY like the 4 x 4 does for MONTEY but choose instead to make a simple modification in the 4 x 4. Notice that the eight words can be paired into four sections based on their third letters G,Y,P or X. We think of the 8 x 8 as a 4 x 4 whose elements are the pairs of third letter "opposites." 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 will never call D, but we must still keep track of it. Tabulate the 3's separately noting only whether there is an even number or an odd number of them. A 3 flips the choice between top and bottom of a word pair. It is very easy to surreptitiously touch forefinger to thumb at the call of a 3 and untouch the fingers on the next 3 to keep tabs of 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. Notice that you may "cast out" pairs if you wish ($3 + 3 = 0$ also) and quickly get this to $1 + 3 + 2$ or D' , but in 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.

(The above description is to appear in the February, 1998 issue of WORD WAYS, The Journal of Recreational Linguistics. A. Ross Eckler, Ed. Spring Valley Road, Morristown, NJ 07960. Martin Gardner was instrumental in the start-up of this fine journal over 25 years ago.)

MONTEY-like games can be constructed from other groups. There is exactly one other order four group, the integers mod 4, and we have an example on our display table at the Gathering that uses it in a 4-color wallpaper group. Also, it is easy to 4-color a standard checkerboard that one can play MONTEY on and predict the start or end color. In addition, we have constructed several simple electronic switching circuits that allow play of such games on cubes of dimension one, two, three or four. (See us for the details.)

For a final example we offer the five city map on the white page. Each city has highways #1,2,3, and 4 leading from it. (This is the USA, so stay on the right side of the road!) A little thought will convince you that the roads obey the mod 5 table shown.

+	0	1	2	3	4
0	0	1	2	3	4
1	1	2	3	4	0
2	2	3	4	0	1
3	3	4	0	1	2
4	4	0	1	2	3

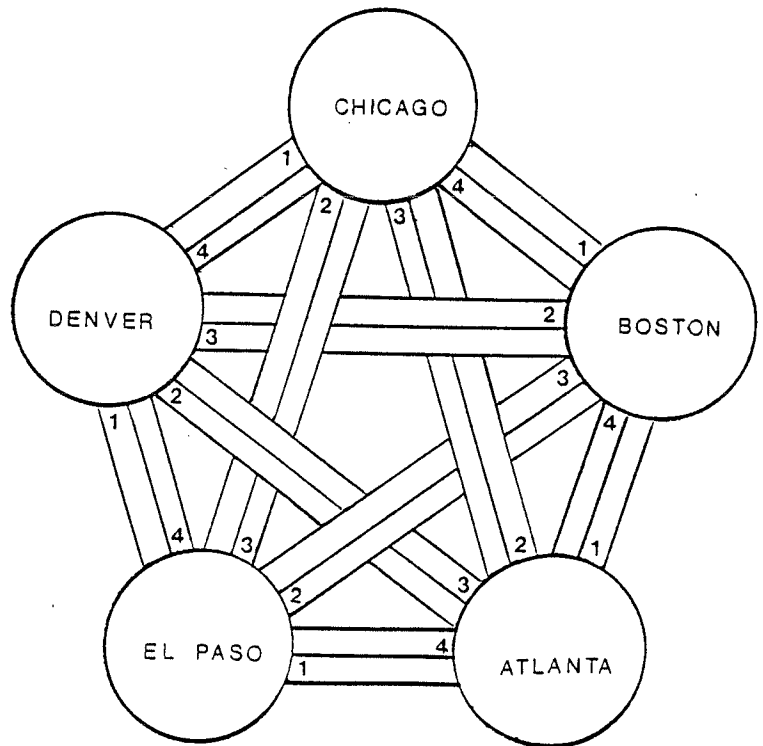
As usual, 0 means you didn't go anywhere. Have someone secretly pick out a city and call out the route numbers as he selects a tour. When he stops you can amaze him by immediately telling him which one road leads back to his start city. Or, if he tells you his start (or end) city you can quickly give him the end (or start). The details are left as an exercise.

CIG	COY
HAG	HEY
LIP	LOX
RAP	REX

LEXICOGRAPHY

MEN	MOT
YET	YON

MONTEY



ROAD MAP