DISKOS
A Puzzle Game

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DISKOS is a puzzle-game that uses 12 domino disks and a 4x4 checkerboard. The diskos are labeled (1,2), (1,3), (1,4), (1,5), (2,3), (2,4), (2,6), (3,5), (3,6), (4,5), (4,6) and (5,6). As a puzzle we ask the player to place the 12 diskos on the checkerboard so that the four occurrences of each of the numbers 1 through 6 appear on the corner of a square on the checkerboard. The squares can thus be of size 2x2, 3x3 or 4x4. This puzzle has been adapted for play by the sighted impaired at the Indiana School for the Blind in Indianapolis. An example that uses the eight numbers 1 through 8 follows.

(1,5)	(3,5)	(1,6)	(3,6)
(4,5)	(2,5)	(4,6)	(2,6)
(1,7)	(3,7)	(1,8)	(3,8)
(4,7)	(2,7)	(4,8)	(2,8)

Squares on the Numbers from 1 through 8

For the blind, the numbers are raised domino pips that can easily be manipulated by touch alone. Notice that in DISKOS there are only six different numbers and, in fact, there are exactly six solutions to the puzzle, not counting rotations and reflections as different. We ask the reader to try to find all six. In the next issue the solutions will be given and we will explain the mathematics behind the puzzle.

Meanwhile a mildly entertaining two-person game can also be played using the 12 DISKOS. The players alternately place a DISKO of their choice on the checkerboard with the proviso that no two DISKOS can be placed in a row or column unless all the numbers on both DISKOS are different. The players choose their plays from a face-up pool of DISKOS and the last person to be able to play wins the game.

There is a forced win for one of the players in this game and we invite the reader to find it.

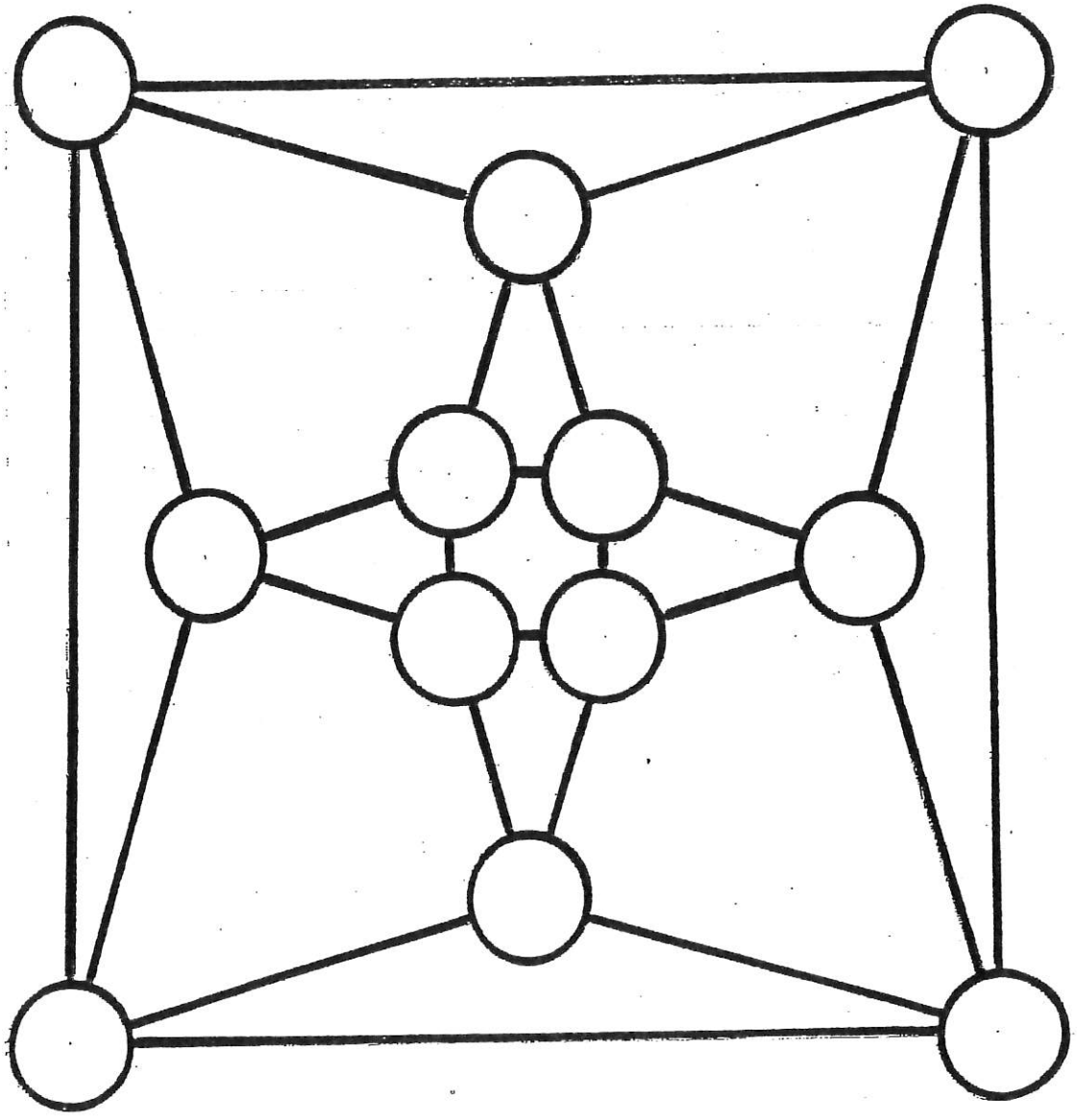
DISKOS REVISITED

A new Puzzle: Place the 12 DISKOS on the 4x4 grid so that in each row and column exactly one of each number, 1-6, occurs. A correct placement will result in the grid becoming a magic square and each row or column will sum to the same total when all the pips in that row or column are added.

Game 1: Two players select at random six DISKOS from a face-down mix of the 12. They alternately play a DISKO of their choice on the grid following the placement rules of the new puzzle above. The last player to be able to place a DISKO wins.

Game 2: Similar to Game 1 except that now the players must place a DISKO so that it matches a number with all DISKOS already in its row and column.

Another Puzzle: Place the 12 DISKOS on the grid below so that two DISKOS are joined by an edge only if they have a pip in common. The grid is the Schlegel graph of the cuboctohedron. This puzzle is a favorite of students at the Indiana School for the Blind where a special embossed version was constructed. There are six solutions.



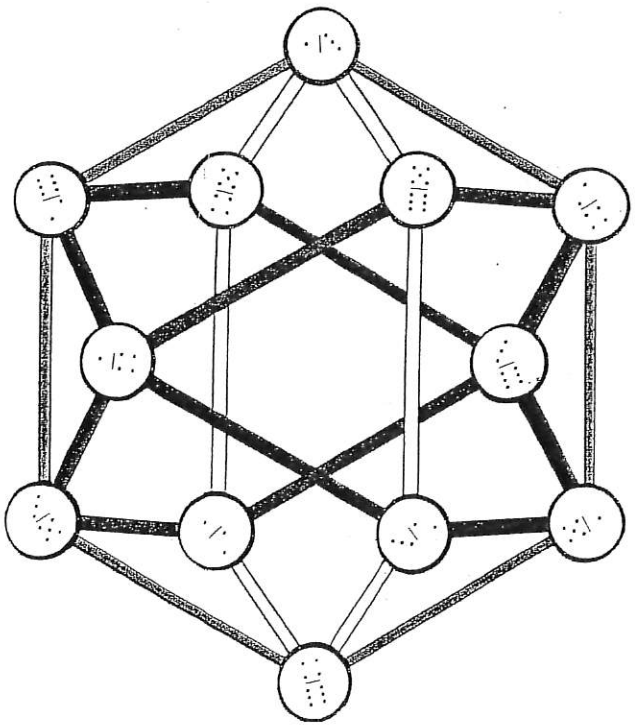
DISKOS ONCE AGAIN

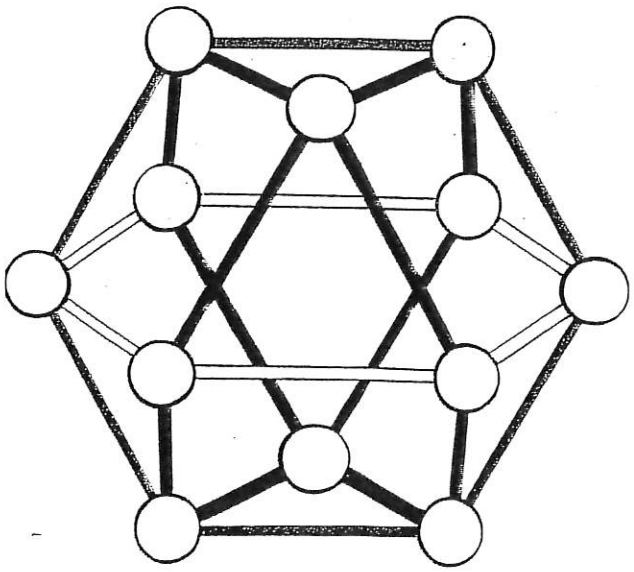
SOME MAGIC: The 12 diskos can be arranged end to end with matching pips just as is commonly done with dominoes. Place the diskos face down and stir them around but surreptitiously palm one of them. Sneak a peek at your stolen disko and write the two numbers down on a slip of paper with the written comment "Your chain will end on these two numbers!" Now let your subject make a chain with the remaining diskos. His or her chain will always end as predicted. This is due to a mathematical concept called an Euler path.

Ordinary playing cards can be used as substitutes for diskos since each card can be regarded as having a suit on one end and a denomination on the other. The 12 cards are chosen by first choosing the 16 cards of four denominations, say aces, kings, queens, and jacks. Then put aside 4 cards, one of each denomination and one of each suit. The remaining 12 act like the 12 diskos (remember one end of the card represents the suit and the other end the denomination.).

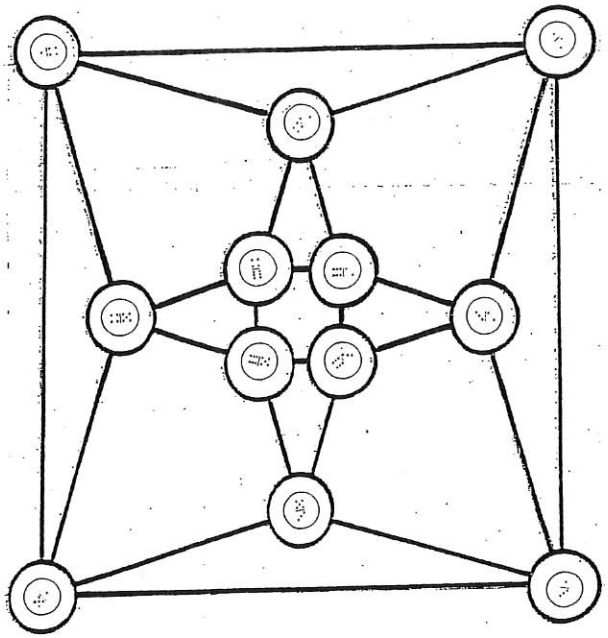
FACT: Have you noticed that the numbers 1 through 6 could be represented as the faces on a die? The individual diskos are the 12 edges of the die labeled by the two die faces the edge bounds. This gives a valuable clue on how to play the games we have suggested.

Several possible answers to our puzzles appear below.

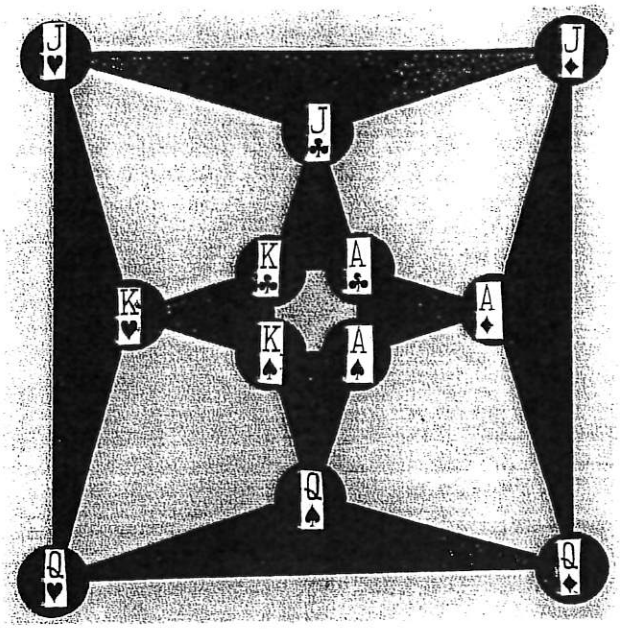




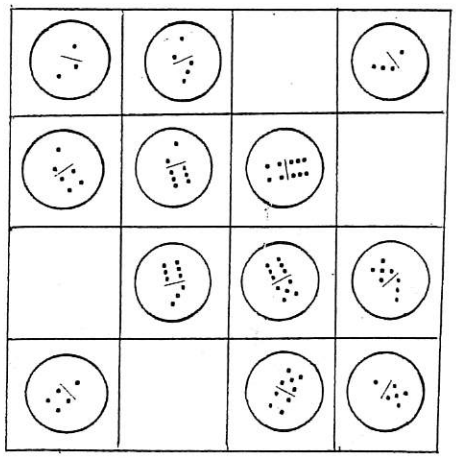
"Keep Away" using diskos on another depiction of a cuboctohedron. Can you discover an arrangement where all nodes match along the edges?



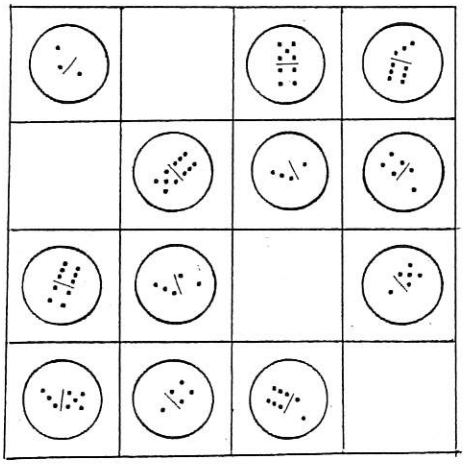
Diskos on a
cuboctohedron.
Note the common
number in the 4-Gons.



Cards on a
cuboctohedron.
Note what is
common in the 3-Gons.



Disko Squares



A Disko Magic Square