Four-Dimensional Tic-Tac-Toe

Four-dimensional tic-tac-toe can be played on an imaginary hypercube by sectioning it into two-dimensional squares. A $4 \times 4 \times 4 \times 4$ hypercube, for example, would be diagramed as shown in Figure 1. On this board a win of four in a row is achieved if four marks are in
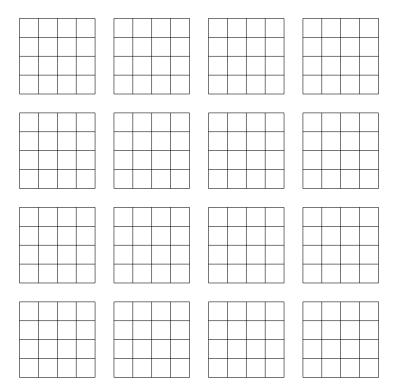

Figure 1: Four-Dimensional Tic-Tac-Toe

a straight line on any cube that can be formed by assembling four squares in serial order along any orthogonal or either of the two main diagonals. Figure 2 shows five examples of winning configurations. For example, if you occupy the four cells labeled 2, you win.

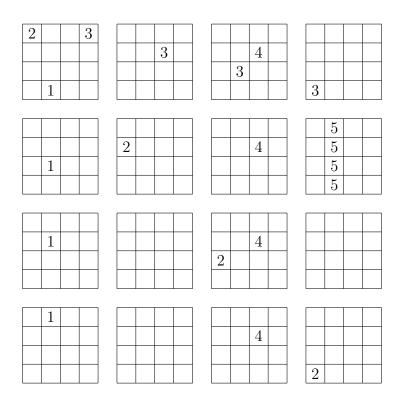You can extend constructions of this type to play tic-tac-toe of any dimension!

Figure 2: Four-Dimensional Tic-Tac-Toe