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The limited hats game.

The hats game consists of n players and one adversary. The adversary will place hats of k different colors on the heads of the players, the players will then be able to see what hat everyone (not including themselves) is wearing, no communication is allowed. Each player must then “guess” their hat color. The goal is for the n players to find a strategy to maximize the minimum number of correct guesses that are guaranteed. It is known that $\lfloor n/k \rfloor$ is the maximal number of correct guesses which can be guaranteed and strategies exist to achieve this bound.

We will consider the “limited hats game” which has a similar setup, except now the adversary has a restricted supply of hats. By giving a hyper-hypercube interpretation of the problem we will derive an upper bound for the guaranteed number of correct guesses. It is unknown if the bound is sharp. (Received September 28, 2005)