

1116-Q1-1363      **Deborah E. Seacrest\*** ([debbie.seacrest@umwestern.edu](mailto:debbie.seacrest@umwestern.edu)) and **Tyler P. Seacrest** ([tyler.seacrest@umwestern.edu](mailto:tyler.seacrest@umwestern.edu)). *On Prisoners, Hats, and Sperner Labelings*. Preliminary report.

Suppose  $n$  prisoners are given hats by a prison warden, and the hat labels range from 1 to  $s$ , with repetition permitted. Each prisoner can see the other hats but not their own. The goal of the prisoners is for all  $n$  prisoners to simultaneously shout the same number, and for that number to be on at least one of the hats. We show that the prisoners have a strategy that gives a probability of success at least  $\frac{n}{n+s-1}$ , and that this is best possible. The proof uses Sperner labelings to demonstrate optimality. (Received September 18, 2015)