COSMIN POHOATA, Yale University

Perfect k-hash codes

A code of length n over an alphabet of size $k \geq 3$ is a subset $\mathcal{F}$ of $\{0,1,\ldots,k-1\}^n$. Such a code is called a perfect k-hash code if for every subset of k distinct elements (or "codewords") of $\mathcal{F}$, say $\left\{c^{(1)},\ldots,c^{(k)}\right\}$, there exists a coordinate i such that all these elements differ in this coordonate, namely $\left\{c_i^{(1)},\ldots,c_i^{(k)}\right\} = \{0,1,\ldots,k-1\}$. The problem of finding the maximum size of perfect k-hash codes is a fundamental problem in theoretical computer science, which turns out to be related with multiple famous questions in extremal and additive combinatorics. In this talk, we will quickly survey the state of the art and discuss some of these intriguing connections (and various natural open questions which arise).