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Amin Emad*, emad2@illinois.edu, and **Jun Shen** and **Olgica Milenkovic**. *Symmetric Group Testing*.

We describe a generalization of the combinatorial group testing problem termed symmetric group testing. Unlike in classical binary group testing, the roles played by the input symbols zero and one are “symmetric” while the outputs are drawn from a ternary alphabet. In addition, we propose generalized group testing by introducing thresholds in the symmetric group testing setup. Furthermore, we consider the probabilistic group testing with a Poisson distribution on the number of defectives. Using an information-theoretic approach, we derive sufficient and necessary conditions for the number of tests required for noise-free and noisy reconstructions in all these cases. Furthermore, we extend the notion of disjunct (zero-false-drop) and separable (uniquely decipherable) codes to the case of symmetric group testing. For the new family of codes, we derive bounds on their size based on probabilistic methods and provide construction methods based on coding theoretic ideas (Received September 19, 2011)