

## Handout 13: Yet More Error-Correcting Codes

*Due Friday, Week 8**UCSB 2014*

Pick **two** of the **four** problems below, and solve them!

1. On a previous HW, you found a 4-ary code of length 4 and distance 3 that contained 16 elements. Prove that this is the maximum number of elements possible: i.e. that no 4-ary code of length 4, distance 3 can contain more than 16 elements.
2. Generalize question 2: what is the maximum number of codewords in a  $q$ -ary length  $n$  distance  $d$  code?
3. Suppose you have two mutually orthogonal Latin squares of order  $q$ . Create a  $q$ -ary code of length 4, distance 3.
4. Generalize question 3: suppose you have  $n - 2$  MOLS of order  $q$ . Create a  $q$ -ary length  $n$ , distance  $n - 1$  code with  $q^2$  many elements.