CMSC 442/653
Spring 2009
Instructor: Dr. Lomonaco
Homework 6
***** CORRECTED VERSION *****

- Listen to Gilbert & Sullivan's ***Pirates of Penzance*** (or see the movie.)
- **Reading Assignment:** Review relevant slides on "Overview of Coding Theory" found at http://www.cs.umbc.edu/~lomonaco/f06/653/Slides653.html
- **Optional Reading assignment:** Peterson & Weldon, "Error-Correcting Codes," MIT Press, (Second Edition), Chapter 5, Section 5.1.

Problem.

Let V be a binary linear code given by the parity check matrix

$$H = \begin{pmatrix} 0 & 0 & 0 & 1 & 1 & 1 & 1 & 0 \\ 0 & 1 & 1 & 0 & 0 & 1 & 1 & 0 \\ 1 & 0 & 1 & 0 & 1 & 0 & 1 & 0 \\ 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \end{pmatrix}$$

a) Use H to construct a maximal likelihood an error/syndrome table without constructing the standard array.

b) Demonstrate how your error/syndrome table can be used to decode the received vector $r = 1101\ 1010$.

a) Find a generator matrix G of V.

d) Use the generator matrix to create a list of all code vectors of V Then use this list to determine the minimum distance d of V.

e) What is the length n of this code?

f) What is the dimension k of this code?

e) What is the name of this famous code?