

CMSC 442/653
Instructor: Dr. Lomonaco
Homework 3

- **Listening Assignment:** Gilbert & Sullivan's *Pirates of Penzance* (or see the movie.). [https://en.wikipedia.org/wiki/The_Pirates_of_Penzance_\(film\)](https://en.wikipedia.org/wiki/The_Pirates_of_Penzance_(film))
- **Optional Reading assignment:** Peterson & Weldon, "Error-Correcting Codes," MIT Press, (Second Edition), Chapter 6.

1) Let

$$p(x) = x^{12} + x^9 + x^8 + x^6 + x^4 + x + 1$$

and

$$q(x) = x^{11} + x^{10} + x^6 + x^5 + x^4 + x^3 + 1$$

- a) Compute by hand $GCD((p(x), q(x)))$ over the ring $GF(2)[x]$
 - b) Use Mathematica to check your answer.
- 2) Create a Log/AntiLog table for $GF(2^5)$ using the primitive (hence, irreducible) polynomial $p(x) = x^5 + x^2 + 1$.
- 3) Create a Log/AntiLog table for $GF(3^2)$ using the primitive (hence, irreducible) polynomial $p(x) = x^2 + x + 2$.