

Homework 8

Assigned: March 31, 2025

DUE: April 7, 2025 by 11:59PM in Gradescope

Show all work for full credit.

1. Give an example application of random number generators not described in class or slides. Make sure to explain in detail how random numbers play an important role in your example. **(20 pts)**
2. In a LFSR of any length, why isn't state S0 (encoded as all zeros) be used? Justify your answer with a Fibonacci LFSR of length 4 with any number of taps. **(20 pts)**
3. Draw the Fibonacci LFSR for the polynomial $P(x) = x^6 + x^4 + x^2 + 1$ that uses 2-input XOR gates. **(20 pts)**
4. Draw the Galois LFSR for the polynomial $P(x) = x^6 + x^4 + x^2 + 1$ that uses 2-input XOR gates. **(20 pts)**
5. Given the polynomials in Questions 3 and 4 above, which implementation is better from the perspective of clock speed? That is, which LFSR implementation can be clocked faster? Justify your answer. **(20 pts)**