國立清華大學 電機工程學系
105 學年度第一學期
EE-6250 超大型積體電路測試 VLSI Testing
Homework #2 (佔學期總成績 10 分)
(每人一組) Due on Dec. 22, 2016
<u>Late Homeworks will NOT be accepted !</u>

1. Consider the implementation of a 256-pattern Pseudo-Random Pattern Generator with a Linear-Feedback Shift Register.

    (a) (25%) Derive the **out-tap architecture** for a LFSR with the following characteristic polynomial:
    $$p(x) = x^8 + x^6 + x^5 + x^1 + 1$$

    (b) (25%) Derive the generated sequence of patterns produced by this LFSR. (Hint: you can derive the next-state function in a matrix form and write a simply program to derive the sequences of all patterns that could be produced by this LFSR). **Please verify if this is a maximum-length generator**.

    (c) (25%) Convert the **in-tap architecture** of the above LFSR.

    (d) (25%) What is the total number of different patterns that could be produced by LFSR with the following characteristic polynomial:
    $$q(x) = x^8 + 1$$

Note: 繳交資料: (1) Combine your answers to the above questions (a)-(d) into a single PDF file. (2) Append to the above combined file your source code of your C or C++ program. (3) Attach a cover page with your 系所，中英文姓名，學號等資訊 before submitting your all-in-one file to our【清華大學-數位學習系統】(http://lms.nthu.edu.tw).