

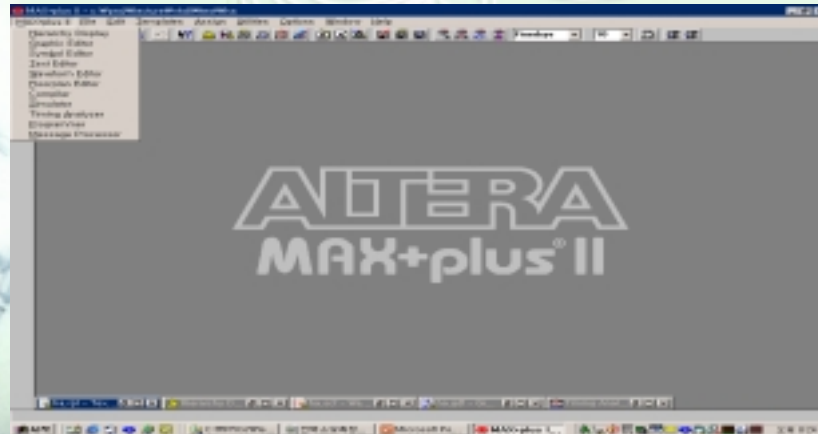
2001 -2학기 실험 :컴퓨터시스템 설계

경운대학교 컴퓨터공학과
이 훈 재
Hjlee@kyungwoon.ac.kr

MAX -plus II 툴 사용

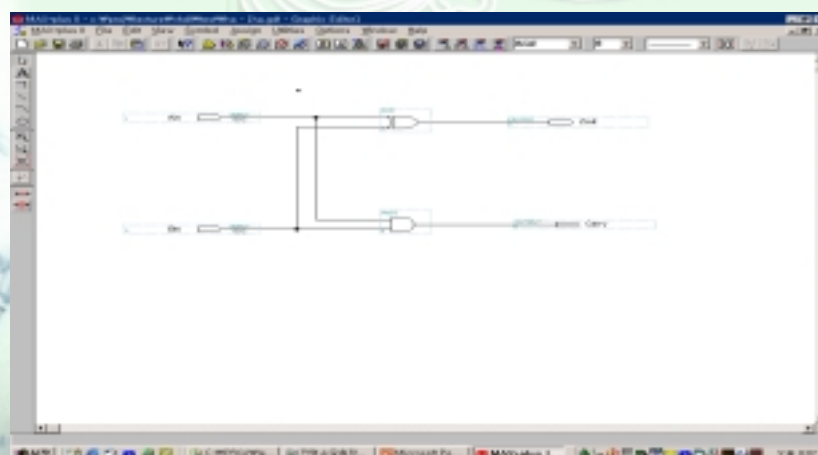
- MAX -plus II 툴 메뉴바
 - ☞ Hirachical Display : report file 확인 (*.rpt)
 - ☞ Graphic Editor : gate/symbol level 설계(*.gdf)
 - ☞ Text Editor : VHDL 설계(*.vhd)
 - ☞ Symbol Editor : 계층적 Graphic 설계(*.sym)
 - ☞ Compiler
 - ☞ Waveform Editor : 파형 입출력 설계(*.scf)
 - ☞ Simulator : 파형 시뮬레이션
 - ☞ Timing Analyzer : 입출력 시간 delay 출력
 - ☞ Programmer : 롬 프로그래머

MAX-plus II 툴 메뉴



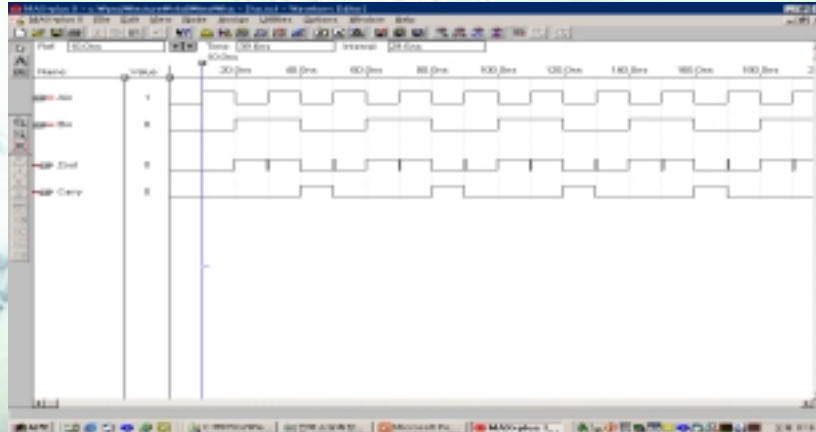
Ex1)Half Adder :
-Graphic Editor

*Menu : Enter Symbol / Set Project to current file

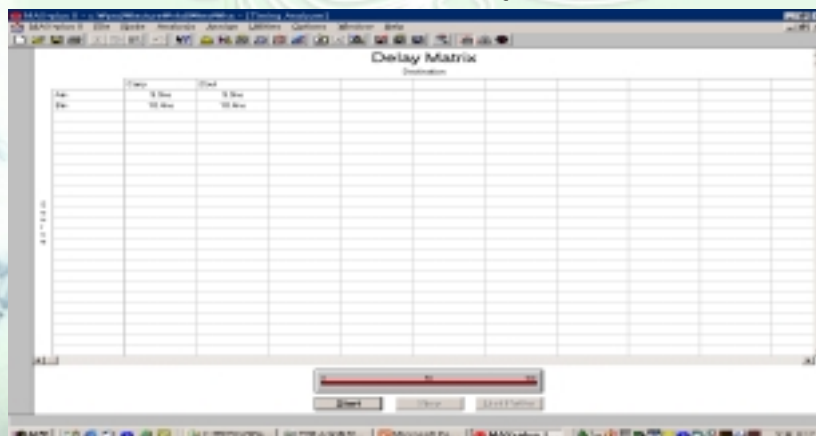


Ex1)Half Adder - Waveform Editor

*Menu : Insert Node → List

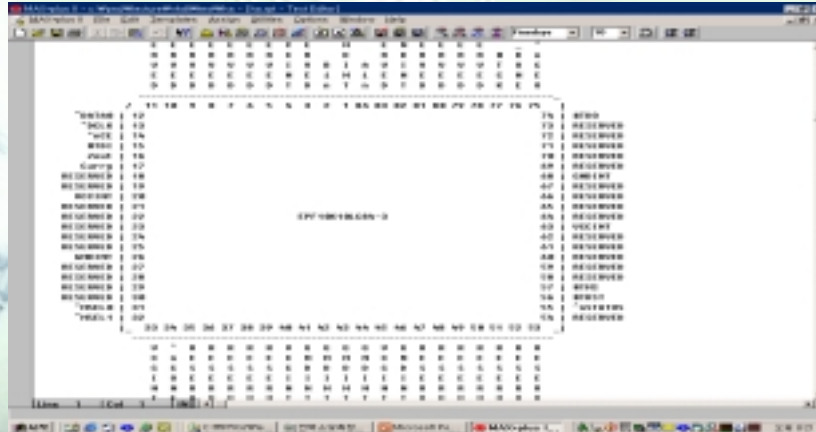


Ex1)Half Adder - Timing Analyzer



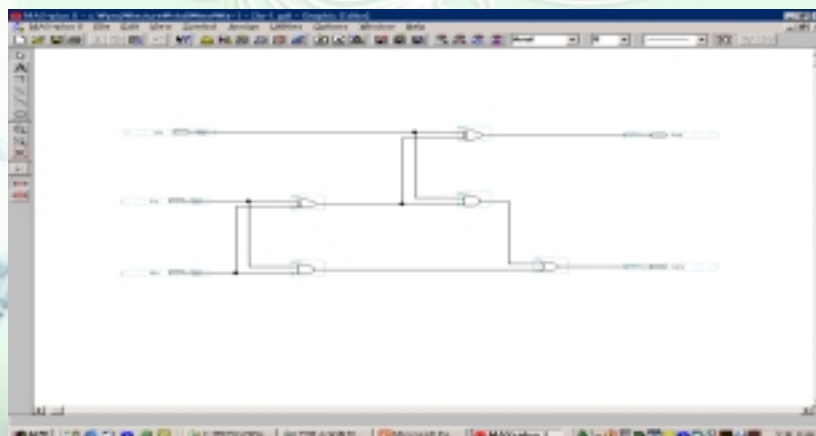
Ex1) Half Adder

- Hierarchy Display → RPT

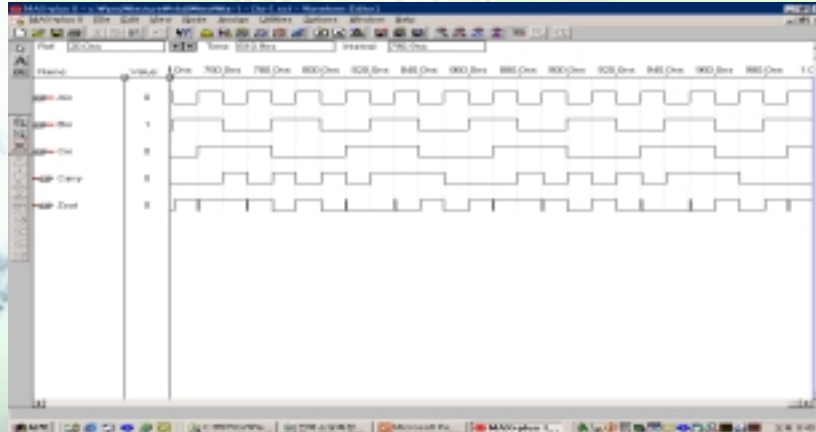


Ex2) Full Adder -1

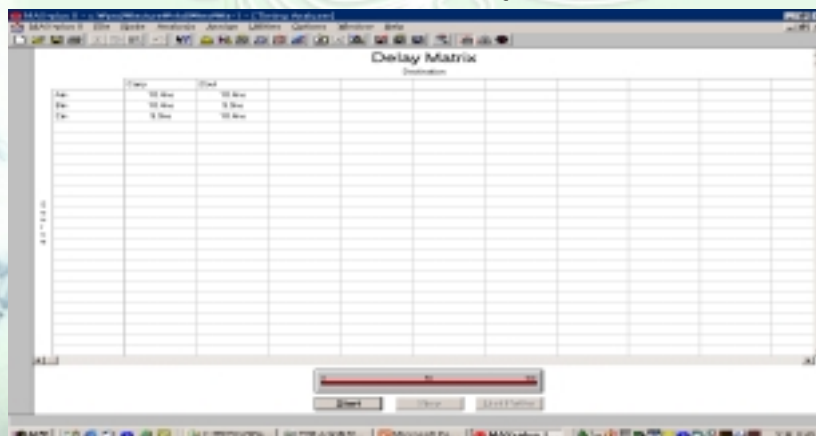
- Graphic Editor



Ex2)Full Adder -1 - Waveform Editor

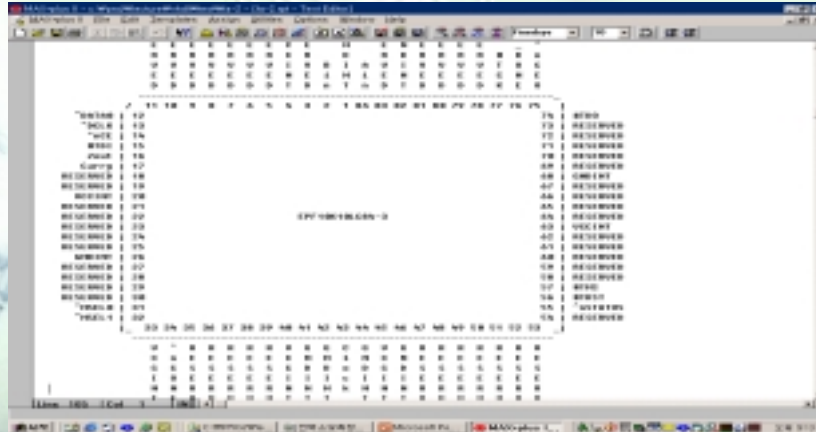


Ex2)Full Adder -1 - Timing Analyzer



The screenshot shows a software window titled "Delay Matrix" with a subtitle "Simulation". The window contains a table with three columns: "Day", "Week", and "Time". The first row of the table has the values "1", "1", and "10:00" respectively. The second row has "2", "1", and "11:00". The third row has "3", "1", and "12:00". Below the table, there is a "Simulation" button and a "Delay Matrix" label. The window also has a standard Windows taskbar at the bottom with various icons.

Ex3) 2-bit Real Adder - Hierarchy Display → RPT



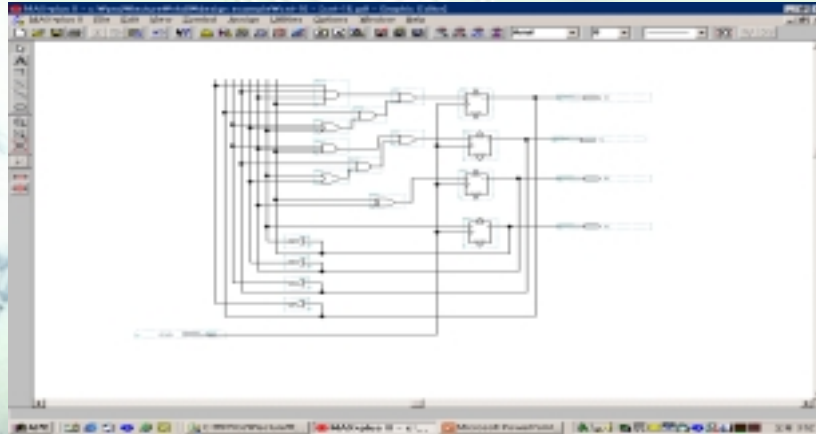
Ex4) 16진 카운터 설계

clock	D	C	B	A
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1

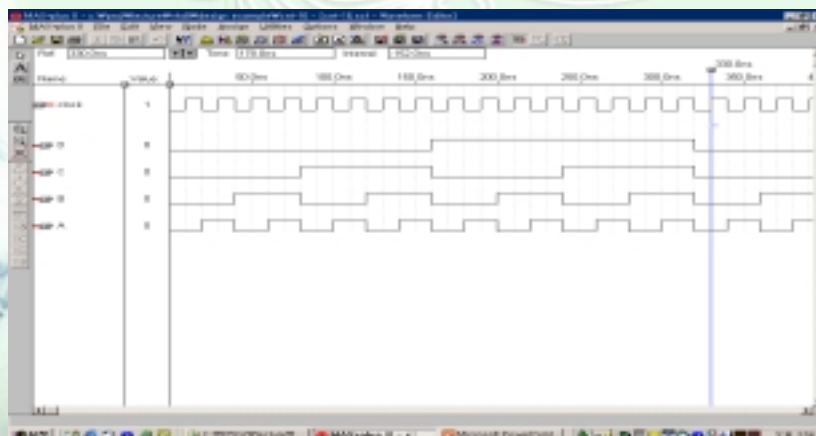
clock	D	C	B	A
8	1	0	0	0
9	1	0	0	1
10	1	0	1	0
11	1	0	1	1
12	1	1	0	0
13	1	1	0	1
14	1	1	1	0
15	1	1	1	1

- $A = \neg A$
- $B = \neg B A + B / A$
- $C = \neg C BA + C (/B + /A)$
- $D = \neg DCBA + D (/C + /B + /A)$

Ex4) 16진 카운터 설계 -Graphic Editor



Ex4) 16진 카운터 설계 - Waveform Editor



The screenshot shows the 'Delay Matrix' application. The main window contains a large grid for plotting delay data. The vertical axis is labeled 'Origin' and the horizontal axis is labeled 'Destination'. The grid is currently empty. Below the grid is a legend bar with a red line and a scale from 0 to 60. At the bottom, there are buttons for 'Reset', 'Clear', and 'Print Matrix'.

[illegible]

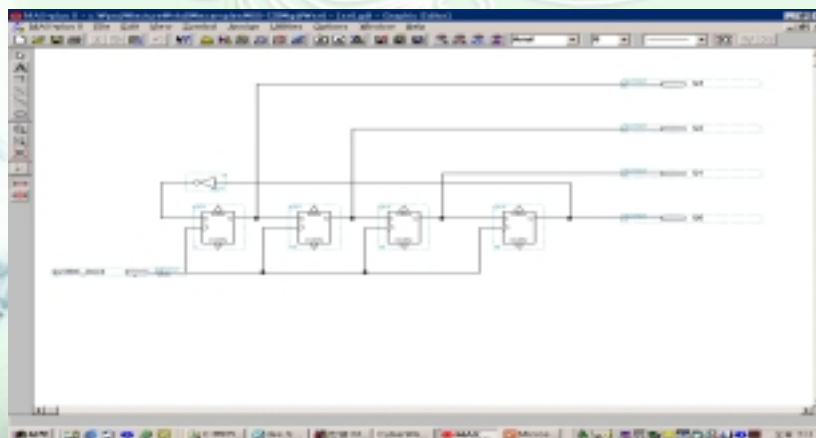
Ex5) 4 -비트 SR with feedback

•4-bit Jhonson's Counter

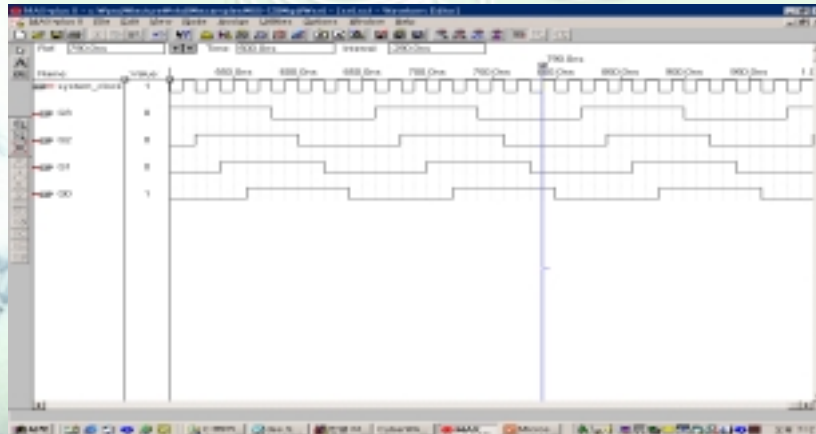
- $D = \neg A$
- $C = D$
- $B = C$
- $A = B$

clock	D	C	B	A
0	1	0	0	0
1	1	1	0	0
2	1	1	1	0
3	1	1	1	1
4	0	1	1	1
5	0	0	1	1
6	0	0	0	1
7	0	0	0	0

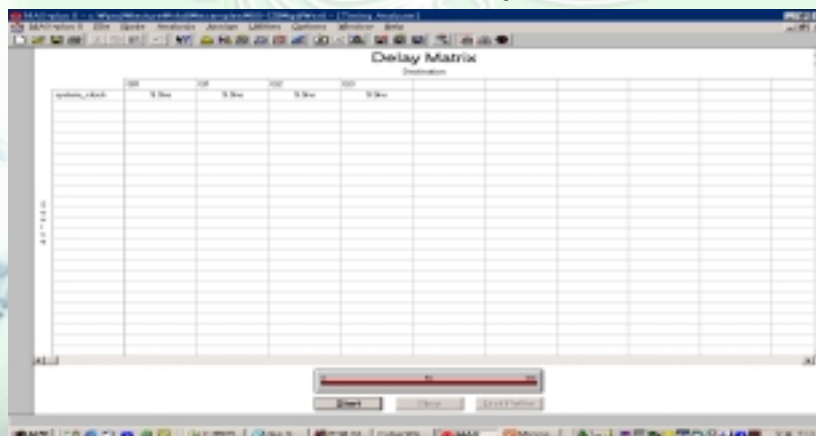
Ex5) 4 -비트 SR with feedback -Graphic Editor



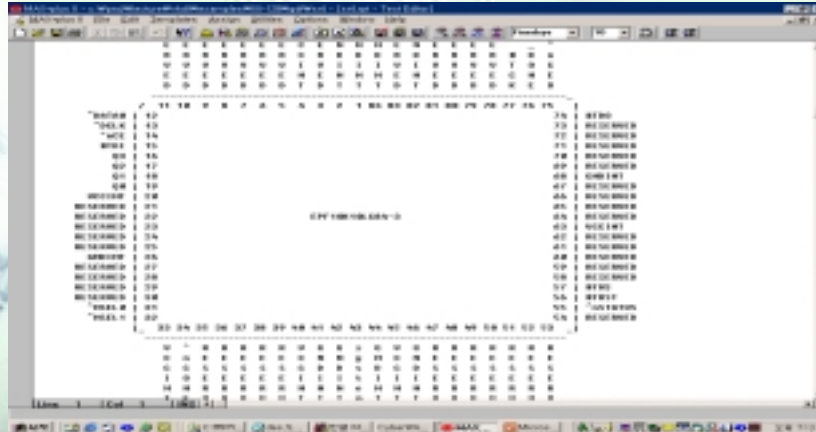
Ex5) 4 -비트 SR with feedback - Waveform Editor



Ex5) 4 -비트 SR with feedback - Timing Analyzer



Ex5) 4 -비트 SR with feedback - Hierarchy Display → RPT



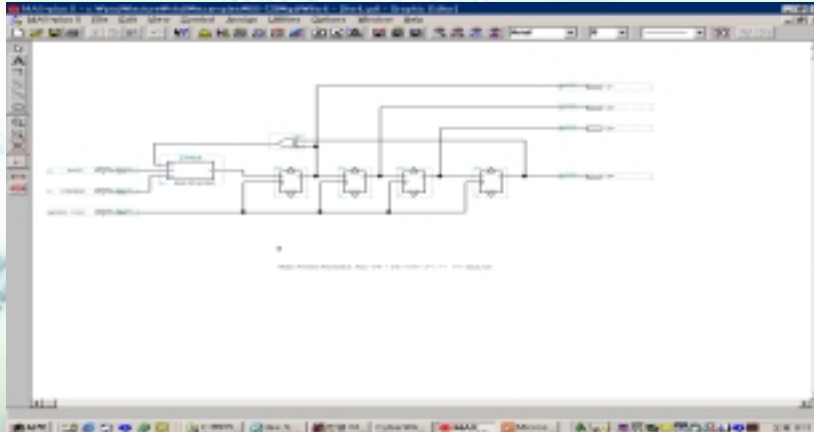
Ex6) 4 -비트 LFSR

- Primitive Polynomial(원시다항식)
- $P(x) = x^4 + x + 1 \rightarrow \text{주기} = 2^4 - 1 = 15$
- Randomness

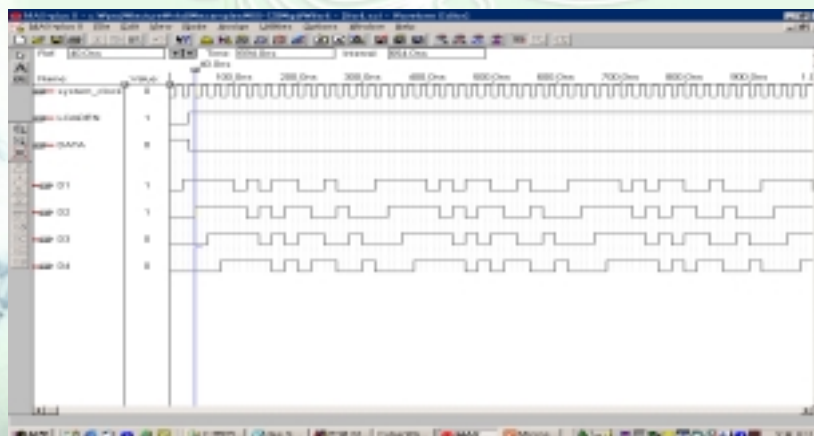
clock	D1	D2	D3	D4
0	1	0	0	0
1	1	1	0	0
2	1	1	1	0
3	1	1	1	1
4	0	1	1	1
5	1	0	1	1
6	0	1	0	1
7	1	0	1	0

clock	D1	D2	D3	D4
8	1	1	0	1
9	0	1	1	0
10	0	0	1	1
11	1	1	0	1
12	0	1	1	0
13	0	0	1	1
14	0	0	0	1
15	1	0	0	0

Ex6) 4 -비트 LFSR -Graphic Editor



Ex6) 4 -비트 LFSR - Waveform Editor



Delay Matrix

Source	Destination	Delay
192.168.1.100	192.168.1.100	0.000
192.168.1.100	192.168.1.101	0.000
192.168.1.100	192.168.1.102	0.000
192.168.1.100	192.168.1.103	0.000
192.168.1.100	192.168.1.104	0.000
192.168.1.101	192.168.1.100	0.000
192.168.1.101	192.168.1.101	0.000
192.168.1.101	192.168.1.102	0.000
192.168.1.101	192.168.1.103	0.000
192.168.1.101	192.168.1.104	0.000
192.168.1.102	192.168.1.100	0.000
192.168.1.102	192.168.1.101	0.000
192.168.1.102	192.168.1.102	0.000
192.168.1.102	192.168.1.103	0.000
192.168.1.102	192.168.1.104	0.000
192.168.1.103	192.168.1.100	0.000
192.168.1.103	192.168.1.101	0.000
192.168.1.103	192.168.1.102	0.000
192.168.1.103	192.168.1.103	0.000
192.168.1.103	192.168.1.104	0.000
192.168.1.104	192.168.1.100	0.000
192.168.1.104	192.168.1.101	0.000
192.168.1.104	192.168.1.102	0.000
192.168.1.104	192.168.1.103	0.000
192.168.1.104	192.168.1.104	0.000

[illegible]

Ex6) n -비트 LFSR

- n -bit Primitive Polynomial

- ∝ n=1: $p(x) = x + 1$

- ∝ n=2: $p(x) = x^2 + x + 1$

- ∝ n=3: $p(x) = x^3 + x + 1$

- ∝ n=4: $p(x) = x^4 + x + 1$

- ∝ n=5: $p(x) = x^5 + x^2 + 1$

- ∝ n=6: $p(x) = x^6 + x + 1$

- ∝ n=7: $p(x) = x^7 + x + 1$

- ∝ n=8: $p(x) = x^8 + x^4 + x^3 + x^2 + 1$