Homework 10

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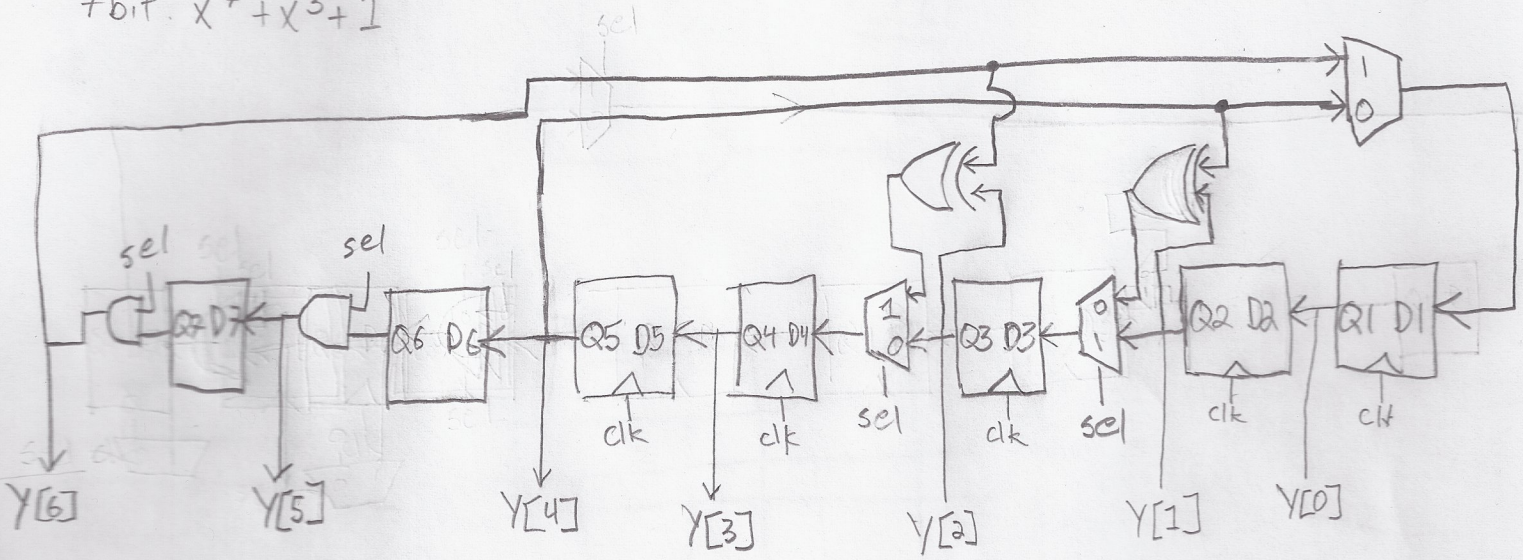
1. Primitive Polynomials:

5bit: $x^5 + x^2 + 1$

7bit: $x^7 + x^3 + 1$

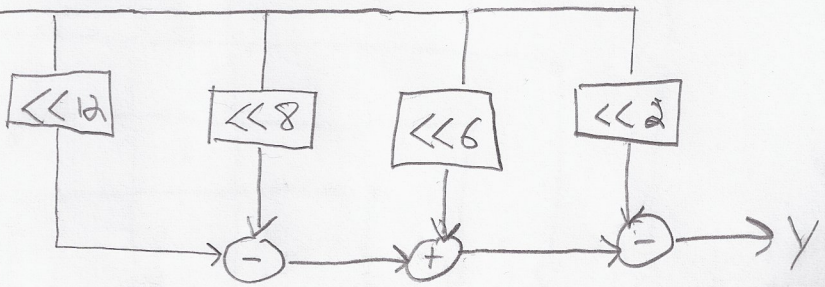
sel=0 → 5 bit

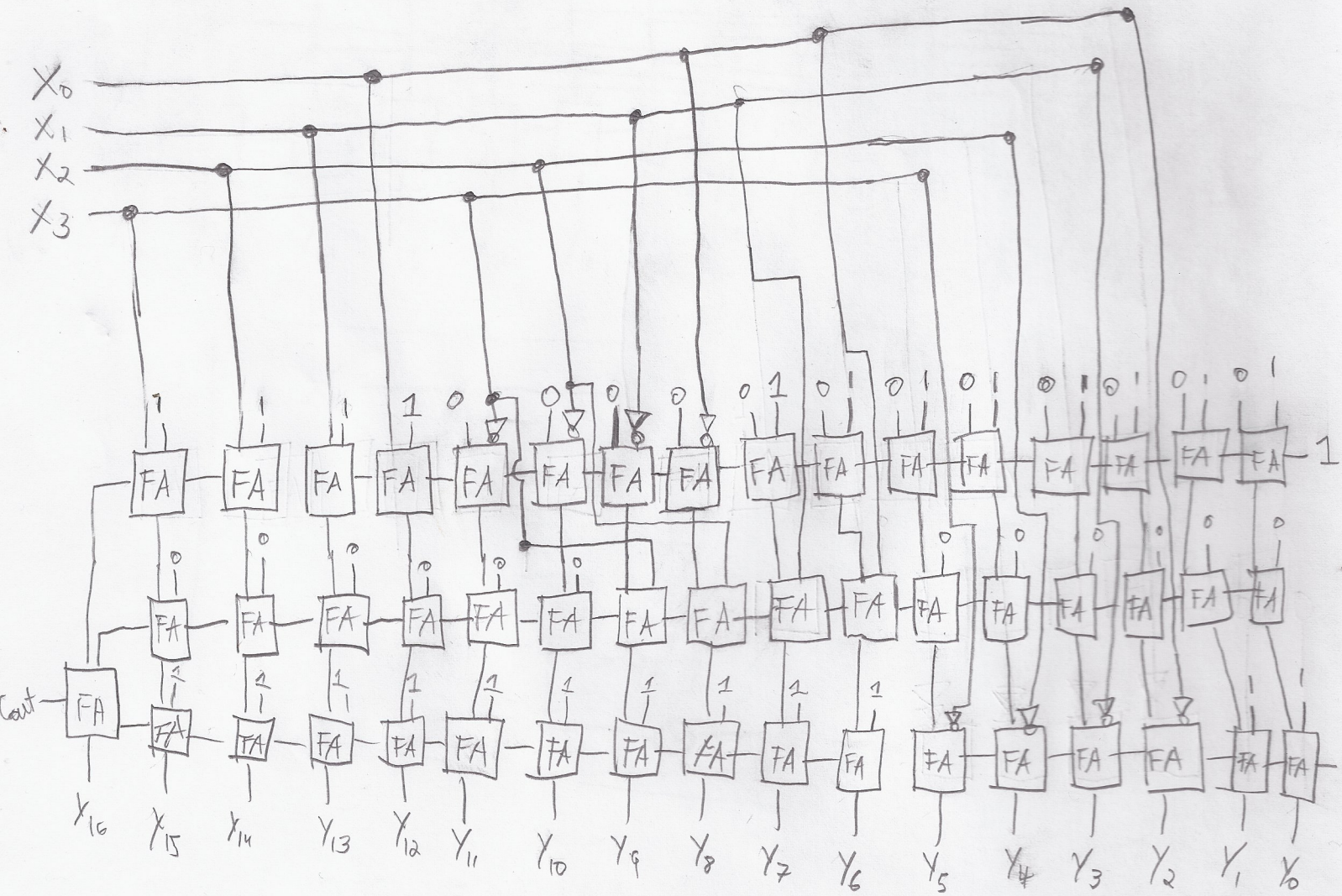
sel=1 → 7 bit



$3900_{10} = F3C_{16} = 0b111100111100 = 1000\bar{1}01000\bar{1}00 = 2^{12} - 2^8 + 2^6 - 2^2$

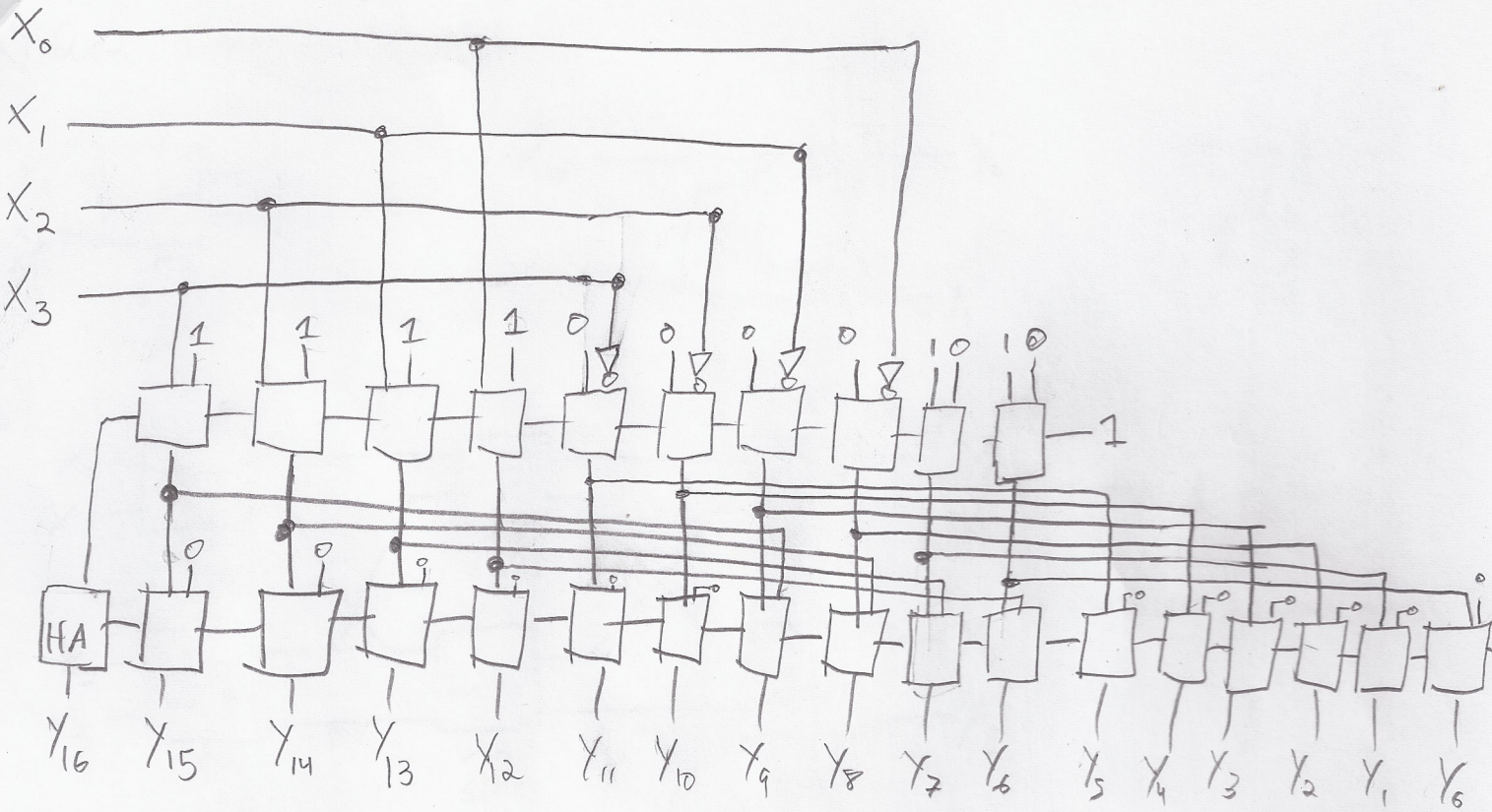
② $X[3:0]$

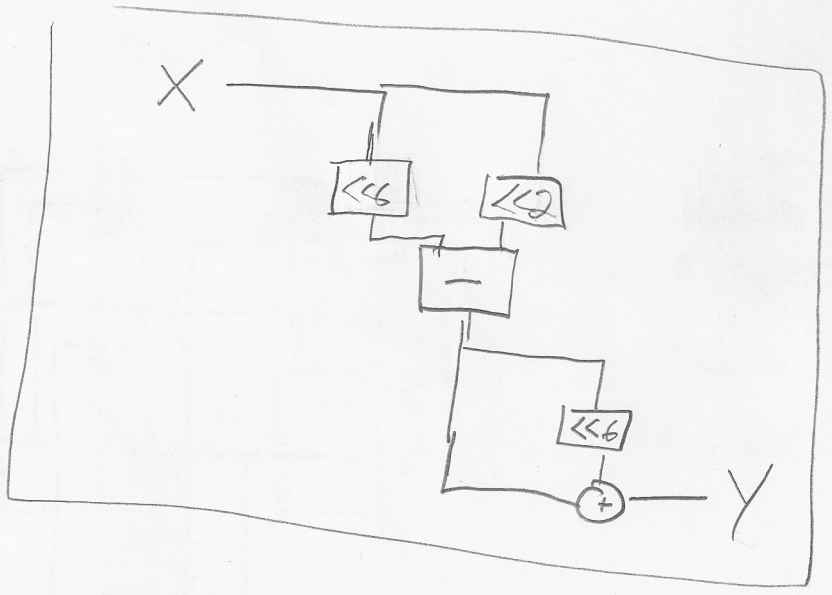


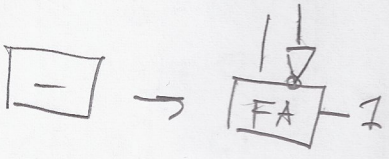


49 Full Adders

We can reduce the number of Adders by noticing that $2^{12} - 2^8 + 2^6 - 2^2 = [2^6 - 2^2]2^6 + [2^6 - 2^2]$ so that we just need 1 subtraction stage and we simply add that result to a shifted by 6 result for stage 2.



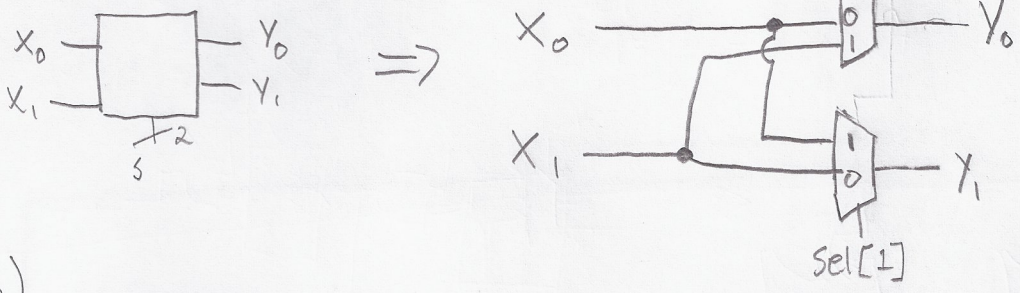




26 Full Adders

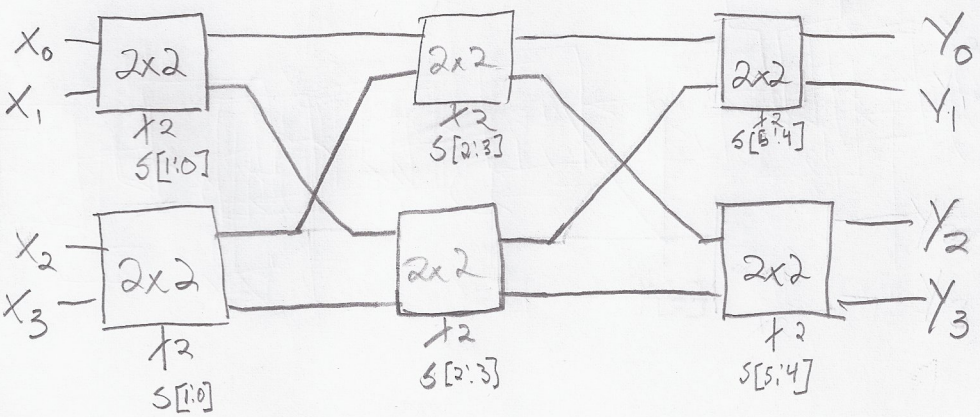
(3)

a) 2x2 Cross Bar Switch



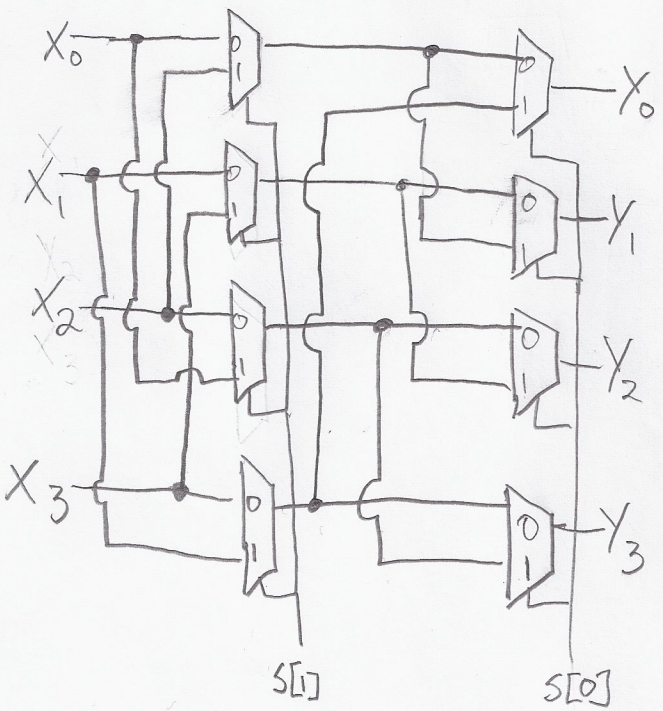
sel	Y_0 Y_1
0 0	X_0 Y_0
1 0	X_0 X_0
0 1	X_1 X_1
1 1	X_1 X_0

b)



Need a controller to select permutations

4.



Rotate 0: S[1:0] = 00
Rotate 2: S[1:0] = 10
Rotate 1: S[1:0] = 01
Rotate 3: S[1:0] = 11