

Student Names: Ömer Faruk Özdemir / Mustafa Fatih Kurt

Student IDs: 2016 4000 48 / 2016 400 294

Session ID: FF 12

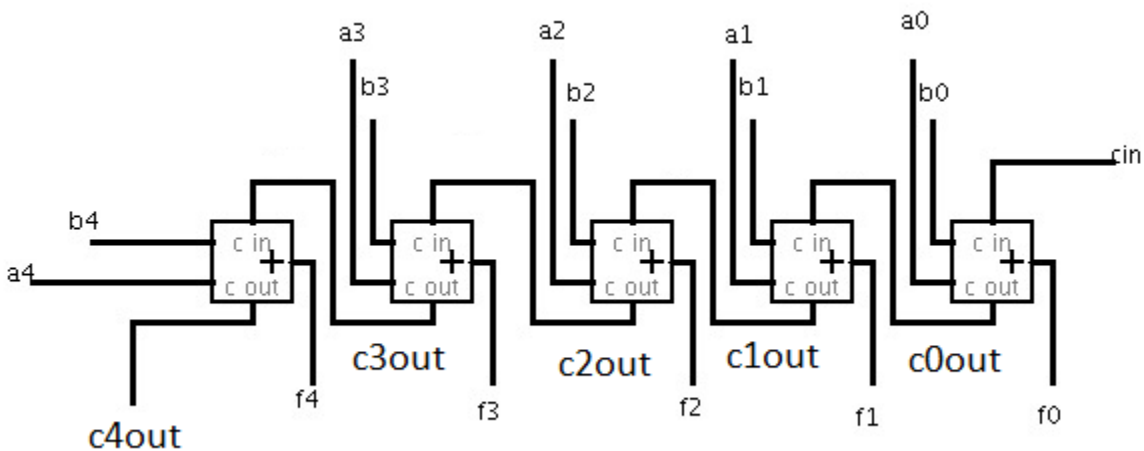
Group ID: 6

CMPE 240 Experiment 6 Preliminary Work

We have used multi bit cables. $X = x_4x_3x_2x_1x_0$ $Y = y_4y_3y_2y_1y_0$ meaning $Y[3:1] = 00y_3y_2y_1$

Muxes inputs used as 11 10 01 00 meaning least significant bit is at right. Select inputs used as s0
s1
meaning least significant bit is at top.

5 bit adder is like this



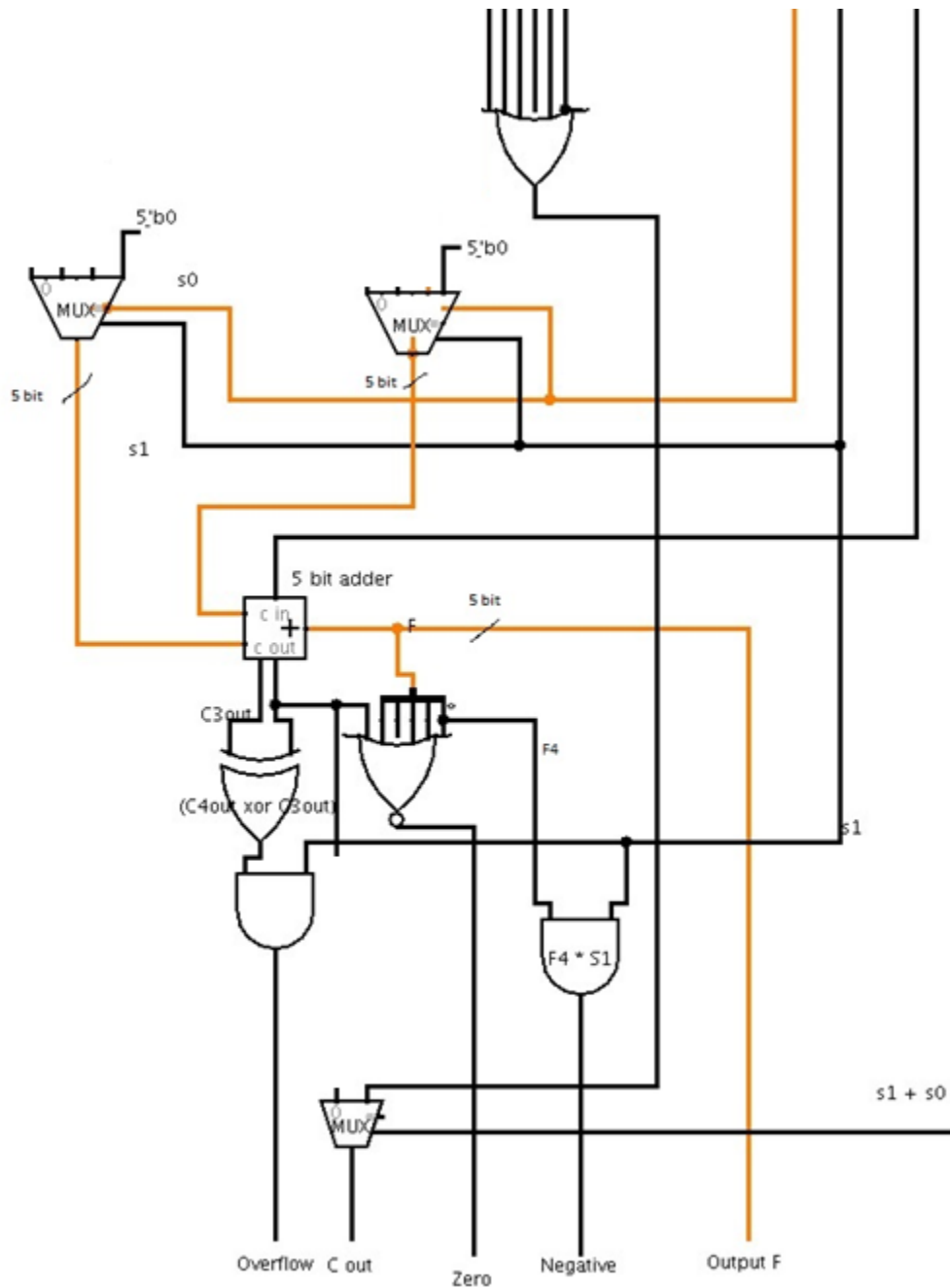
This part calculates $X-Y$ and ors it. If $X=Y$ output is 0. If $X \neq Y$ output is 1.

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This part gives output IA and IB and ICin as zero. Outputs F as 0, Cout as $X \neq Y$, negative and overflow as 0 zero as 1.

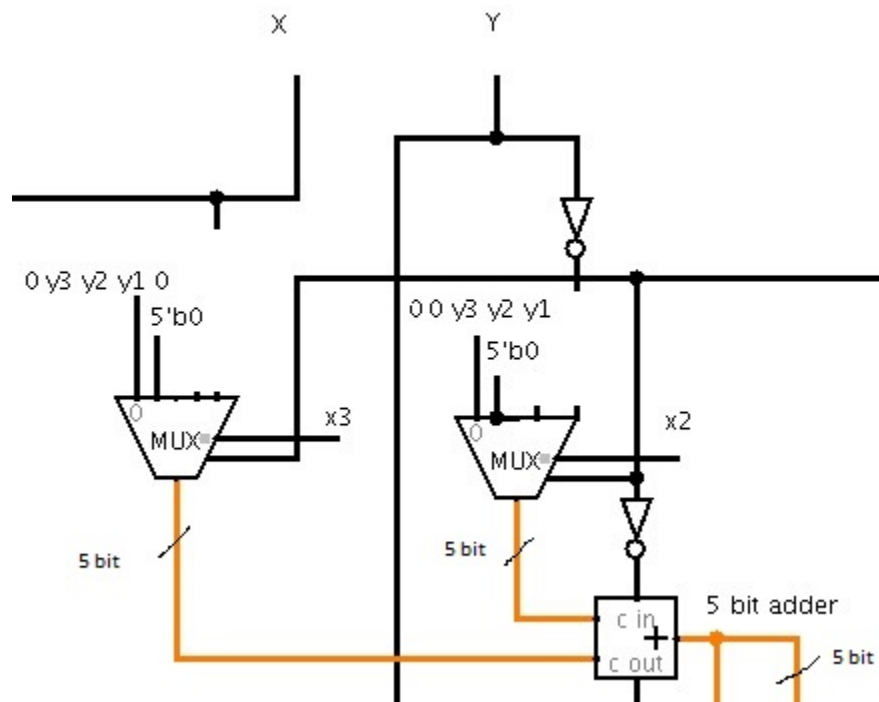
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b)S=01



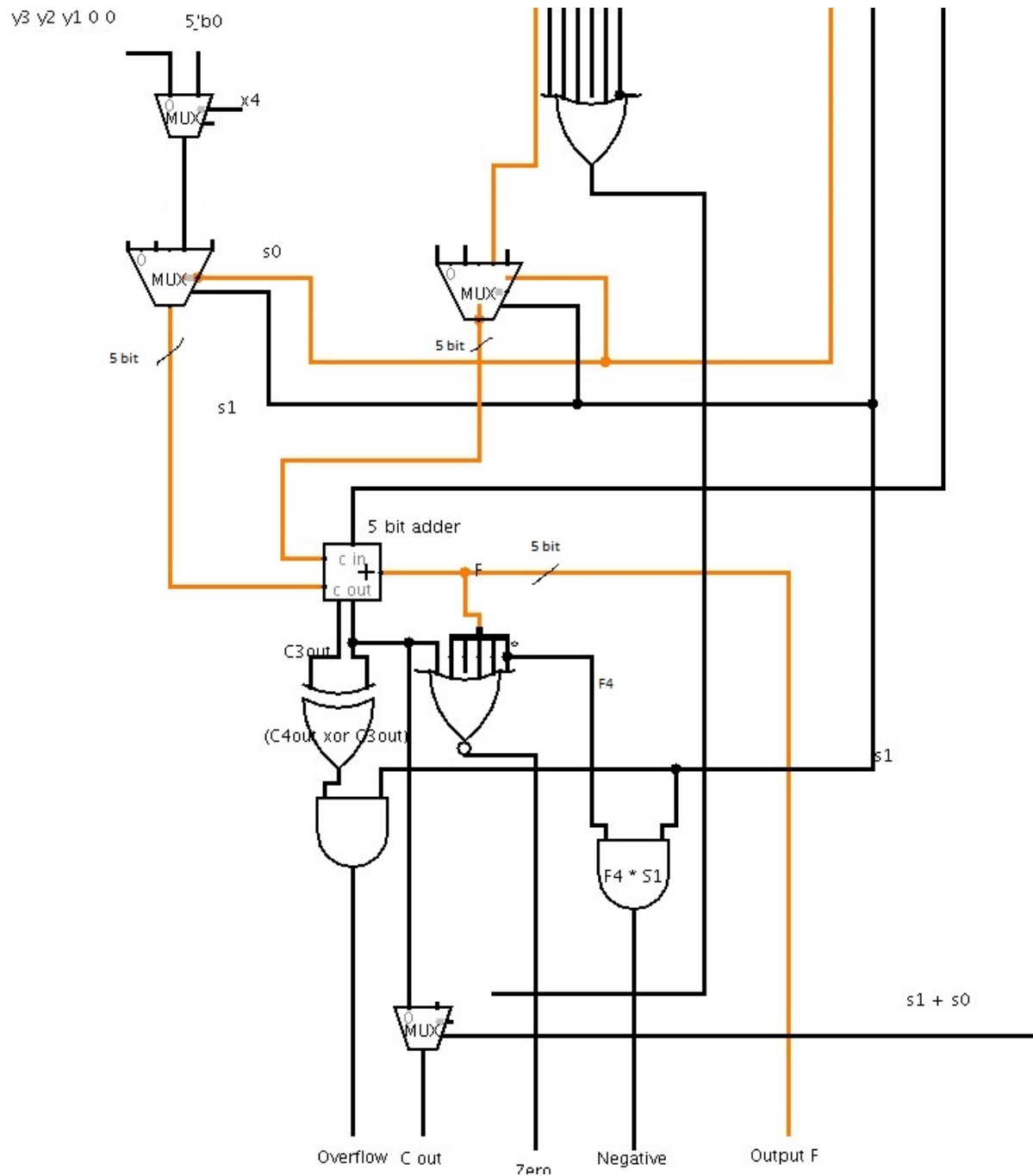
This part calculates multiplier's 2 first term according to x2 and x3 and adds them. Gives output as IB

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This part gives 1A as multipliers last term. 0 if x_4 is 0. $y_3y_2y_100$ if x_4 is 1. Gives Cin as 0. Outputs negative and overflow as 0.

This part gives X and Y[3:0]/2 as IA and IB, gives Cin as 0. Outputs accordingly.

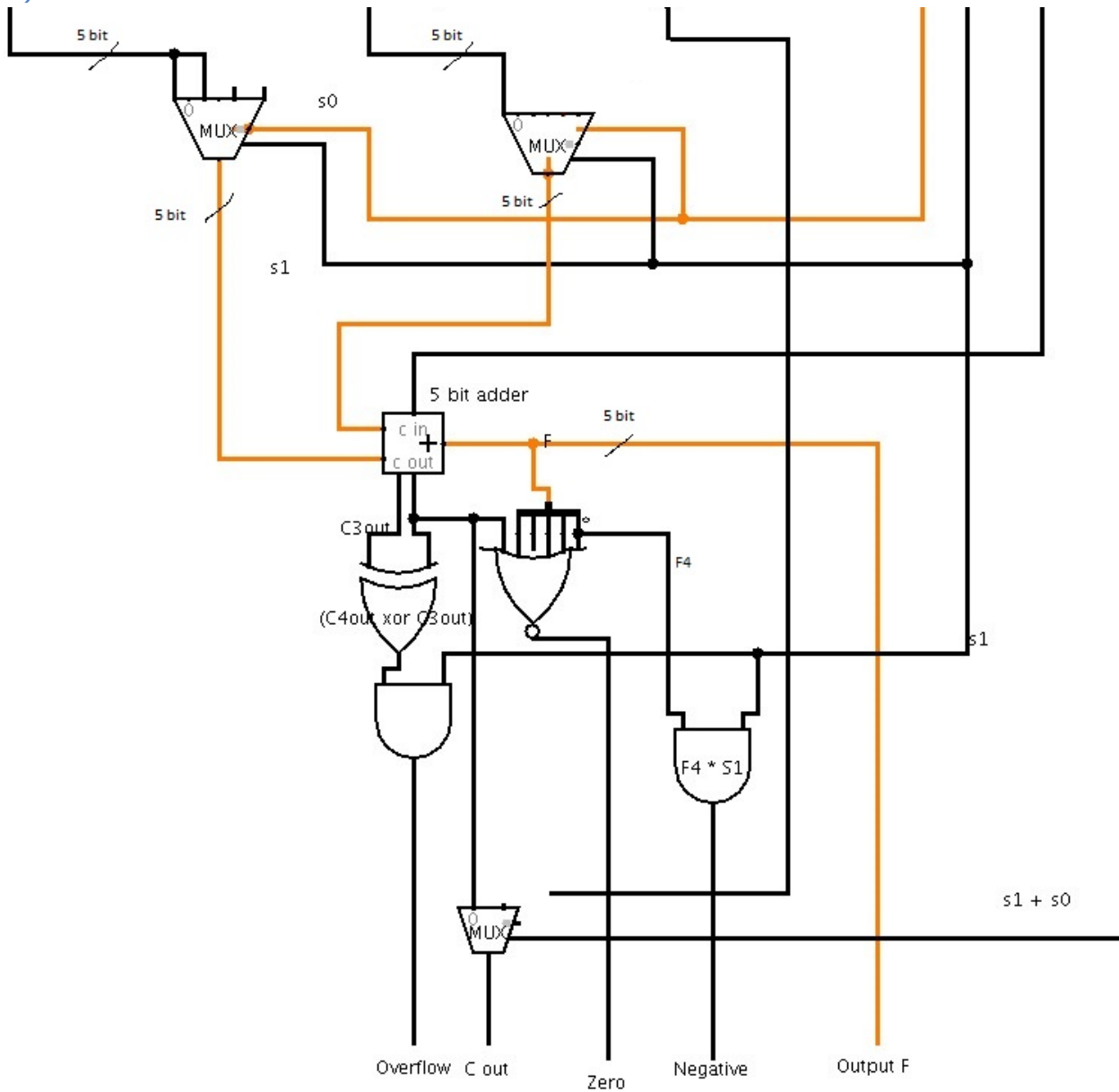
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d) S=11



This part gives X and Y as IA, IB, Cin as 1. Outputs outputs accordingly.

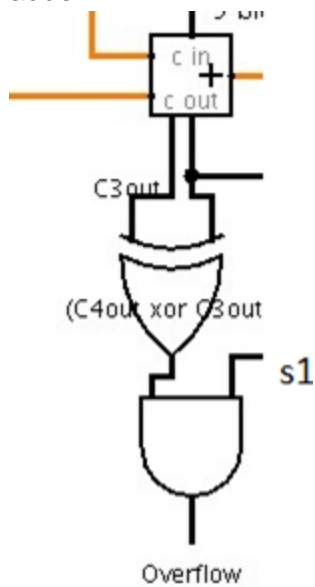
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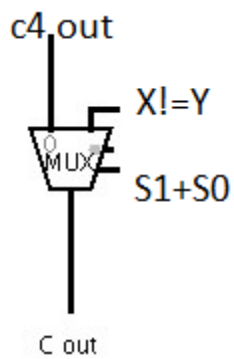
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Overflow: If $s1$ is 0 outputs overflow as 0. If not overflow is $c3_{out} \text{ xor } c4_{out}$. From last 5bit adder.



Cout: if $S=00$ outputs as $X \neq Y$ (it is calculated at top 5 bit adder, explained in $S=00$ case)
Else it outputs $c4_{out}$ from last 5 bit adder.



Step 2: Merge all operations with select inputs and organize outputs, Try to minimize your implementation by using repetitions, draw final circuit as the minimized final design of the ALU.

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