EGC221
Class Notes
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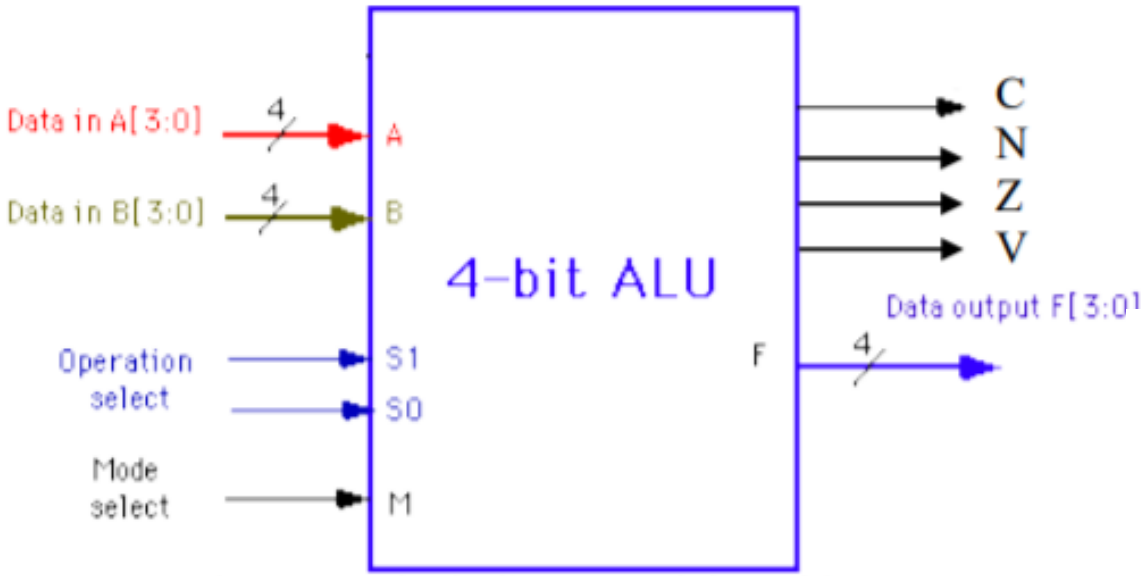


Figure 1: Block diagram of the 4-bit ALU.

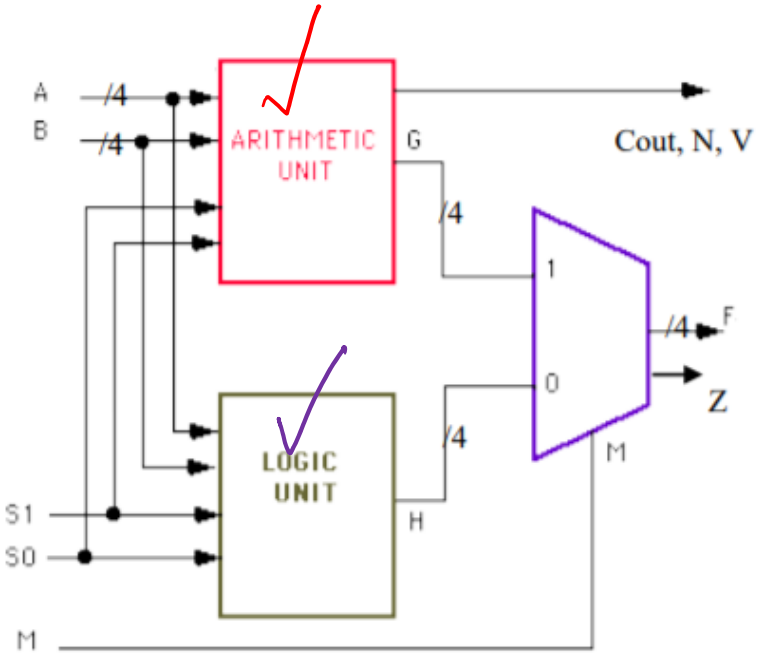


Figure 2: Block diagram of the ALU

ALU using basic chips

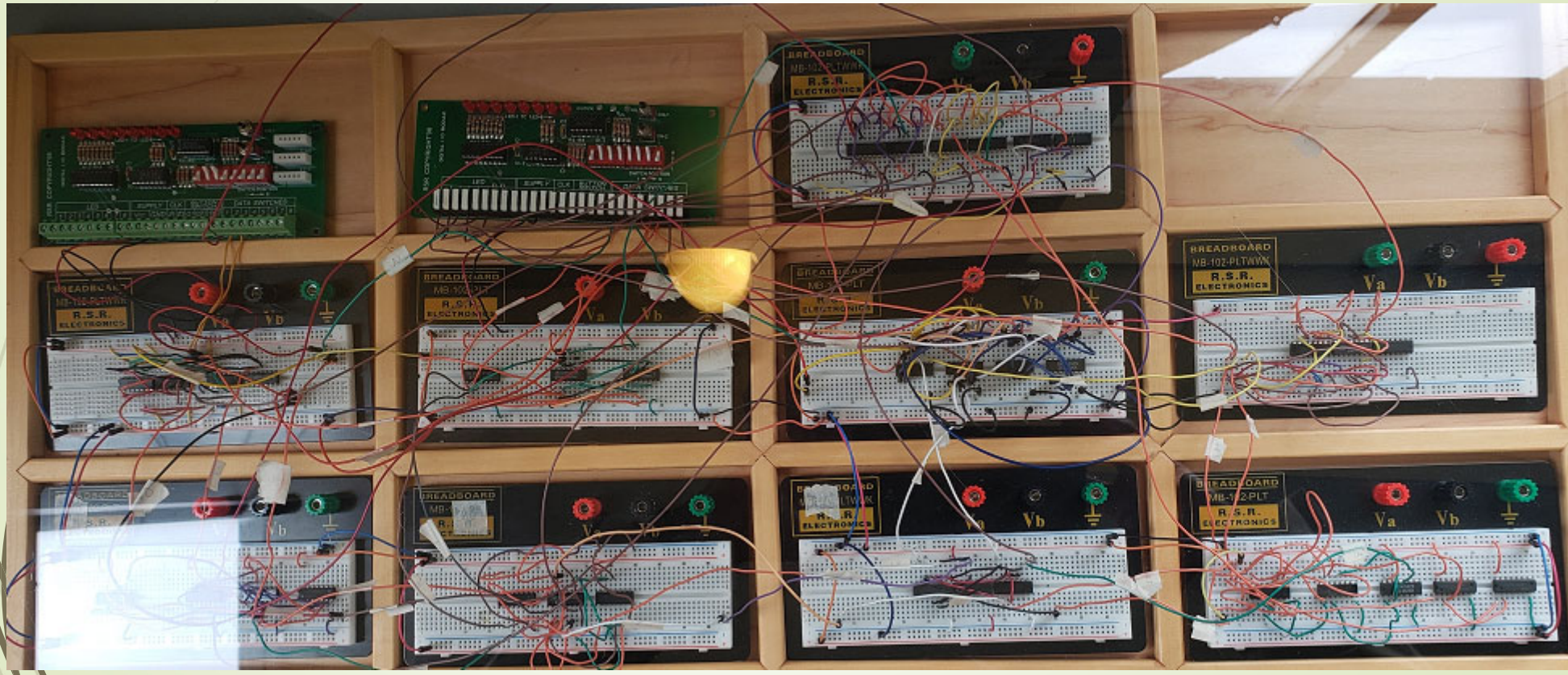
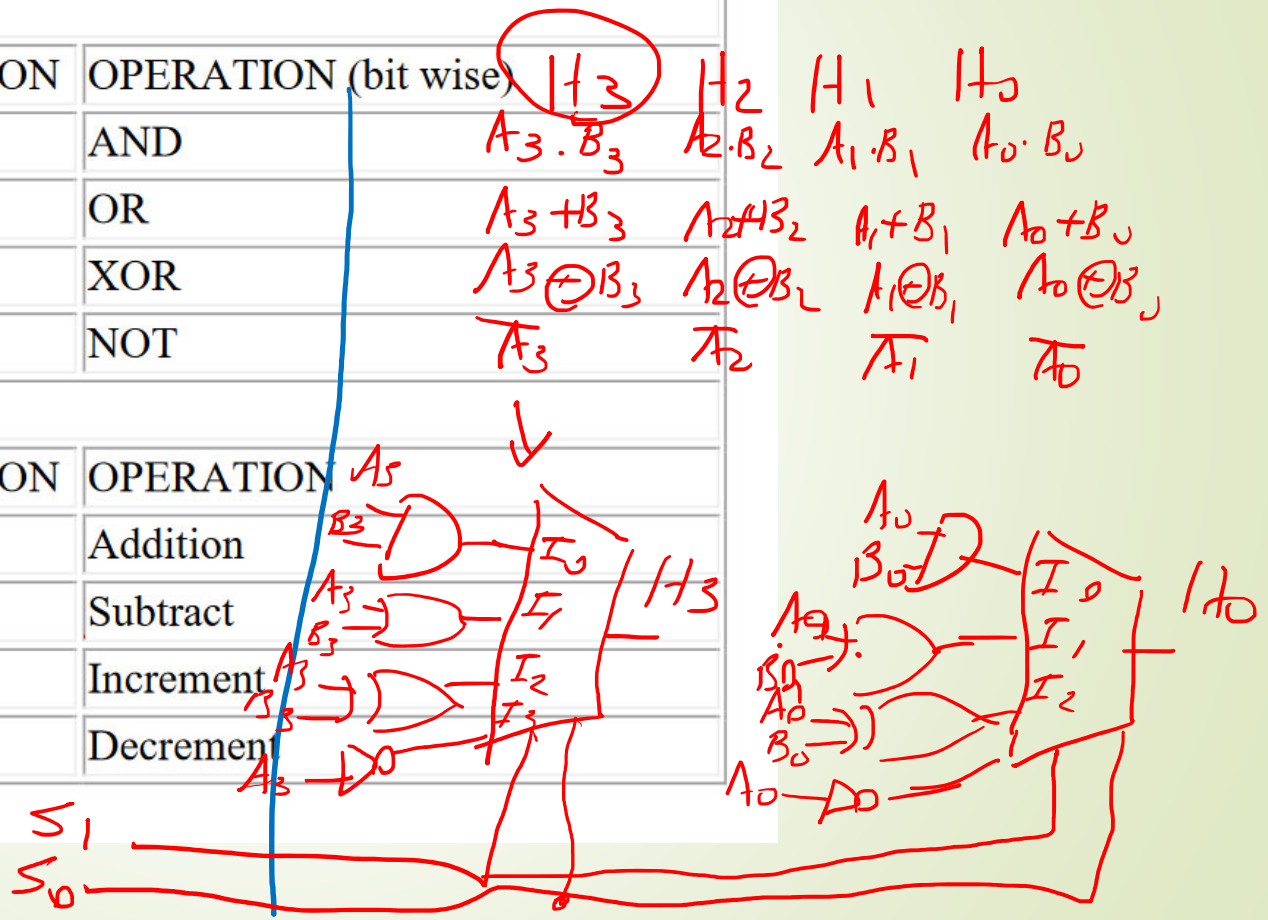
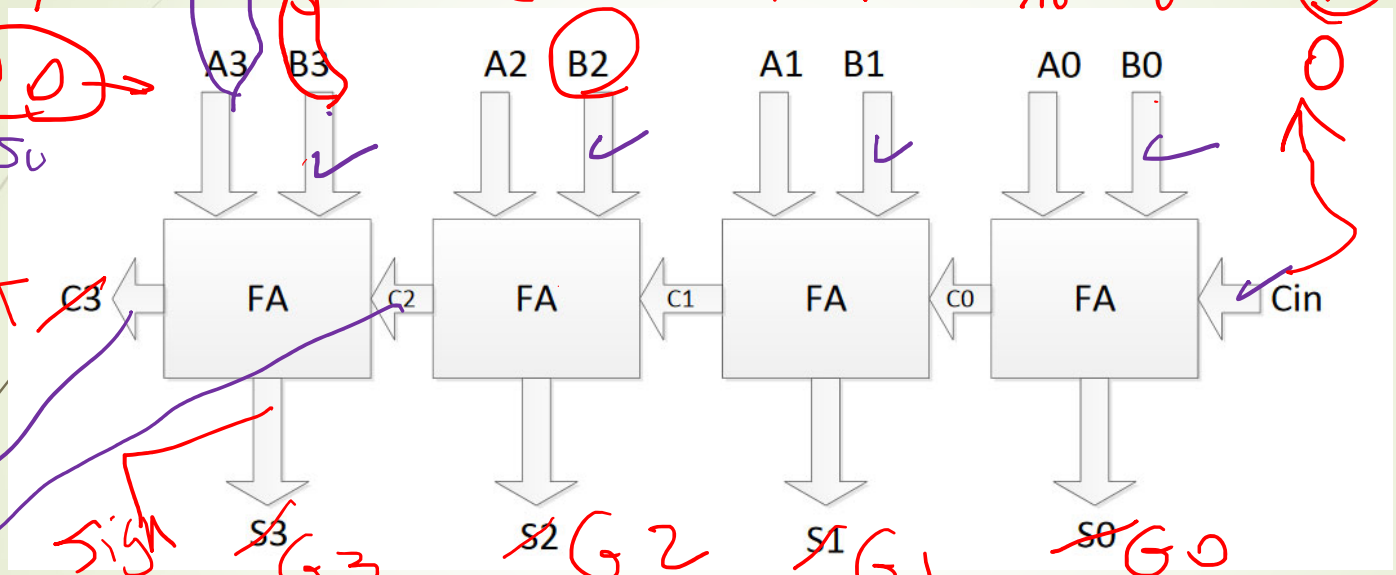
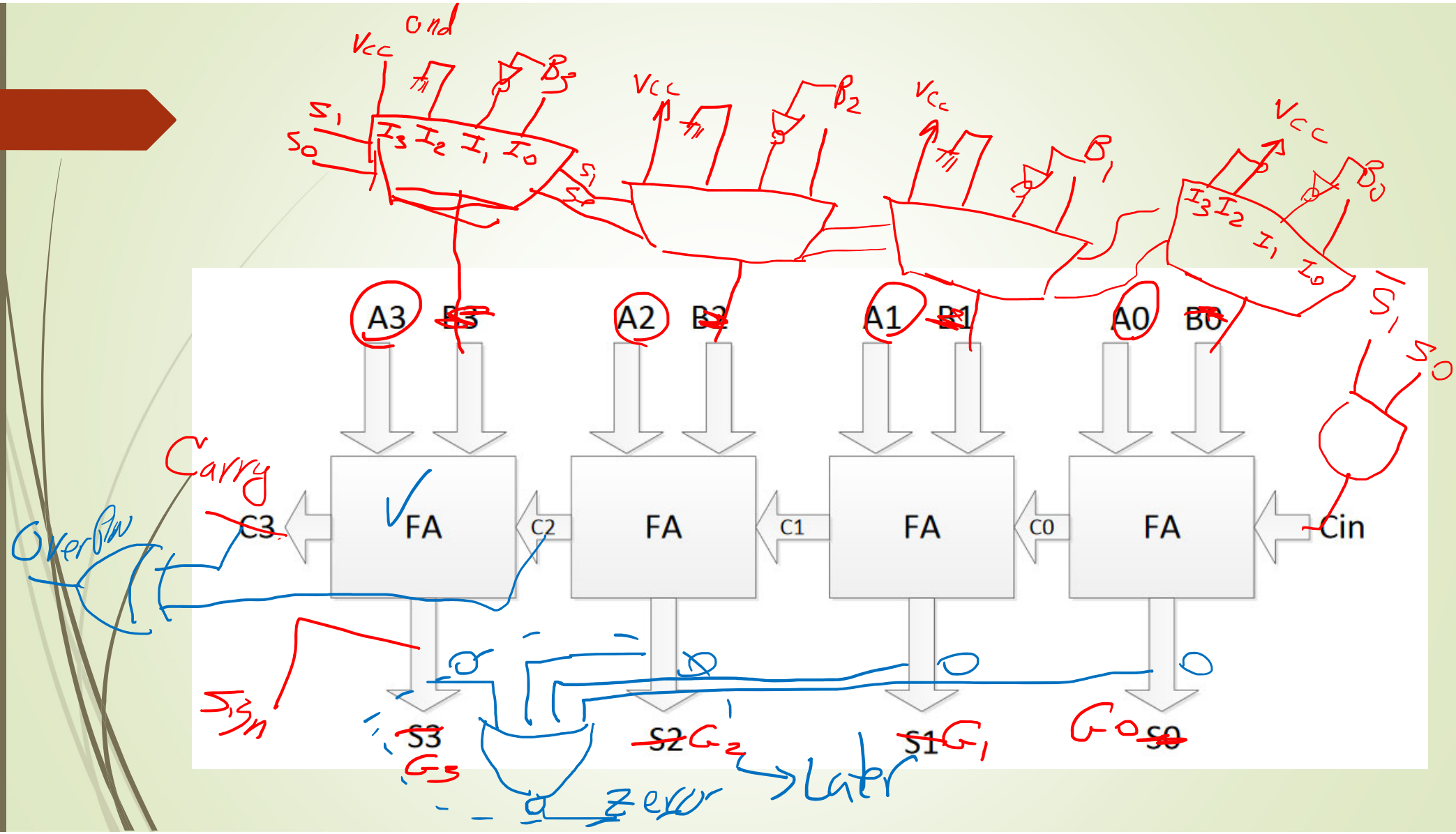
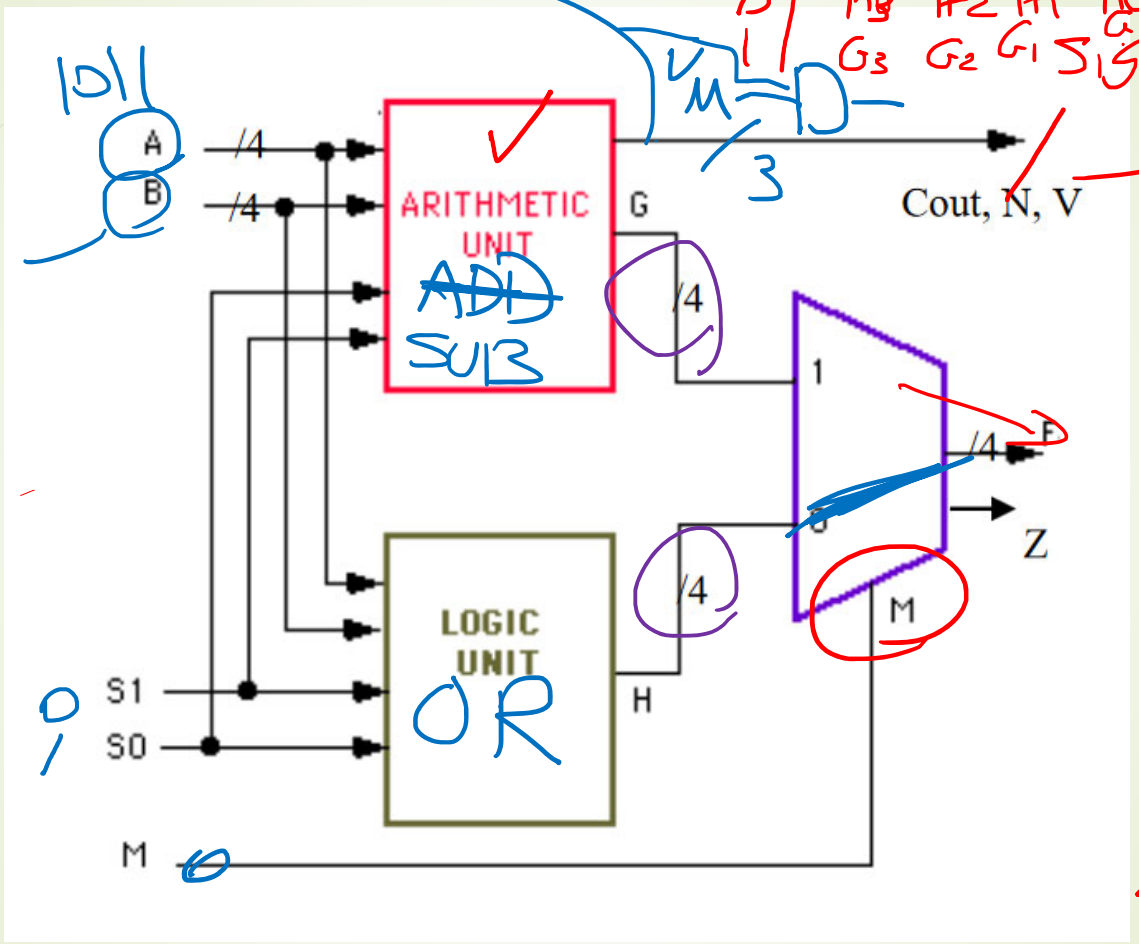


Table 1: Functions of ALU				
Logic				
M	S1	S0	FUNCTION	OPERATION (bit wise)
0	0	0	A · B	AND
0	0	1	A + B	OR
0	1	0	A ⊕ B	XOR
0	1	1	A'	NOT
Arithmetic				
M	S1	S0	FUNCTION	OPERATION
1	0	0	A + B	Addition
1	0	1	A - B	Subtract
1	1	0	A + 1	Increment
1	1	1	A - 1	Decrement




A3
B3
A2
B2
A1
B1
A0
B0
FA
FA
FA
FA
C3
C2
C1
C0
Cin
S3
S2
S1
S0


A3
B3
A2
B2
A1
B1
A0
B0
FA
FA
FA
FA
C3
C2
C1
C0
Cin
S3
S2
S1
S0
Carry
OverFlow
Zero
Later


A
B
/4
/4
ARITHMETIC UNIT
ADD
SUB
G
/4
Cout, N, V
1
/4
F
Z
LOGIC UNIT
OR
/4
H
M
S1
S0
M

Lab report

- This lab report is work 20 points (twice as a regular lab report)
- You are required to write a detailed report.
  - Start with the truth table, equation, and circuit of a full adder.
  - Take that step by step to build the arithmetic circuit.
  - Show why you used multiplexers: need to show function tables and discuss why and how Mux's did the job.
  - You need to do this at every level.
- Resulting simulation at every level need to clearly illustrated and discussed.
  - Don't give me many undocumented simulation. Make sure grid size is 1 microsecond and window size is 16 microsecond. You should present two simulations for each arithmetic and logic operations.