Lab 3
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CS 301
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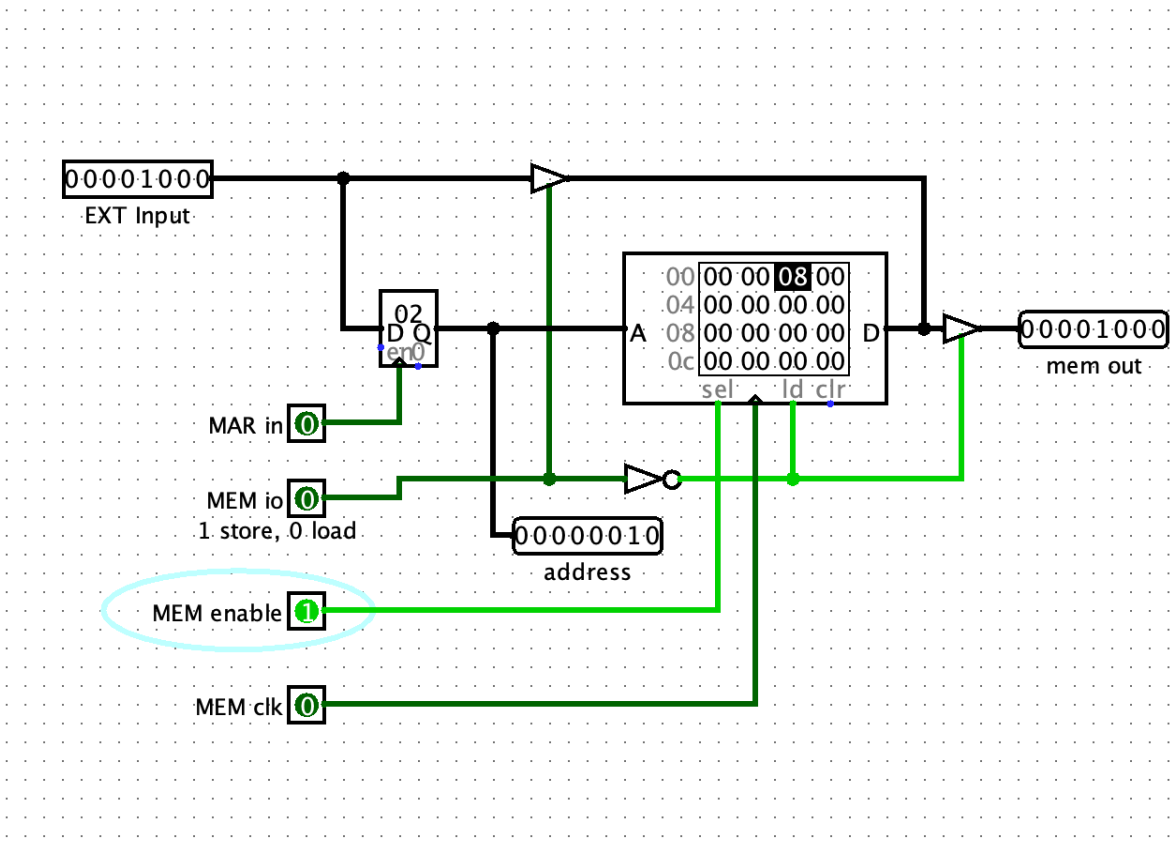
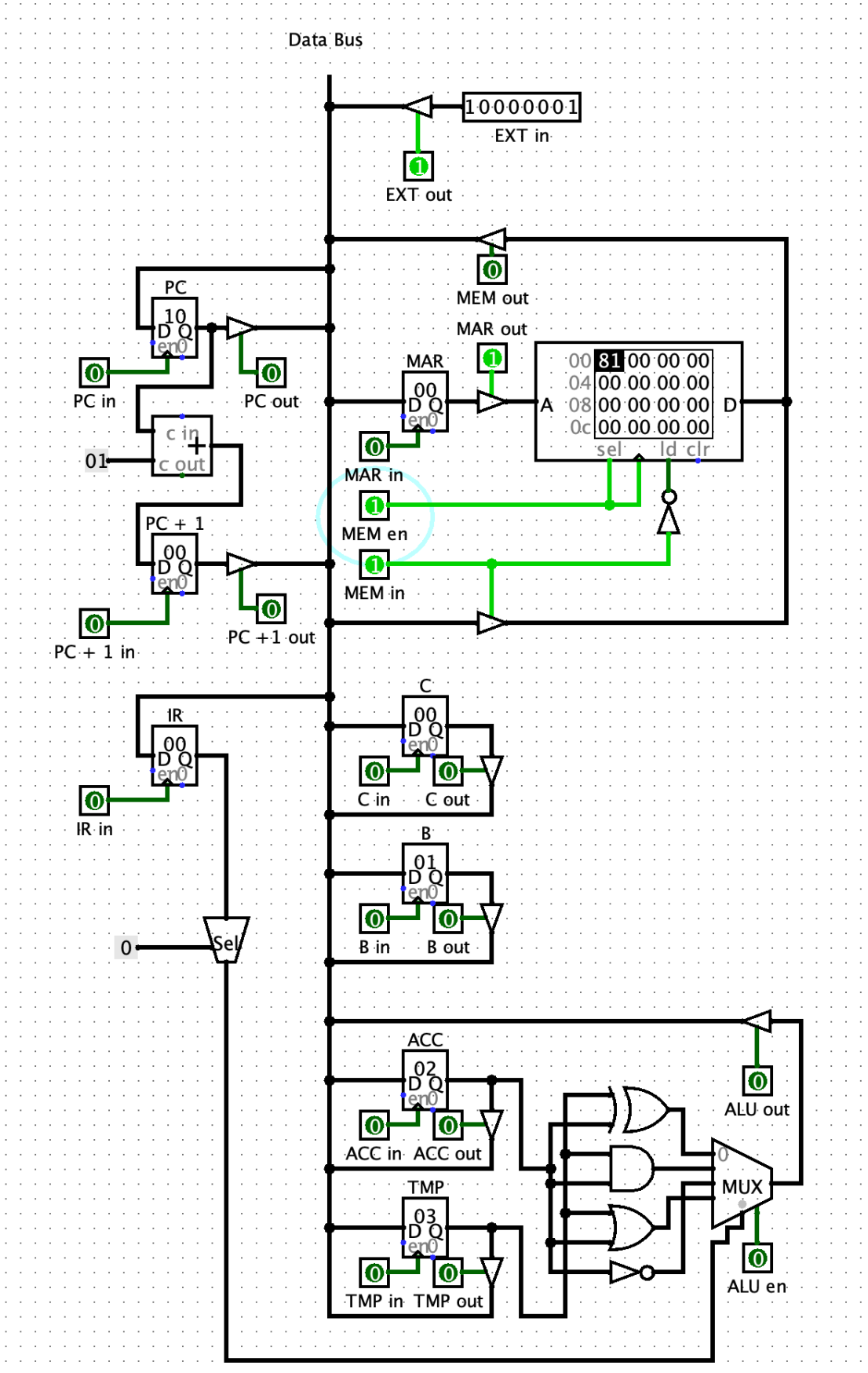

00001000
EXT Input
02
D Q
en 0
MAR in
0
MEM io
0
1 store, 0 load
00000010
address
MEM enable
1
MEM clk
0
00 00 00 08 00
04 00 00 00 00
A 08 00 00 00 00 D
0c 00 00 00 00
sel ld clr
00001000
mem out


Data Bus
10000001
EXT in
EXT out
MEM out
MAR out
PC
10
D Q
en
PC in
PC out
MAR
00
D Q
en
00 81 00 00 00
04 00 00 00 00
08 00 00 00 00
0c 00 00 00 00
A
D
sel
ld
clr
c in
+
c out
01
MAR in
PC + 1
00
D Q
en
MEM en
MEM in
PC + 1 in
PC +1 out
C
00
D Q
en
IR
00
D Q
en
C in
C out
IR in
B
01
D Q
en
B in
B out
0
Sel
ACC
02
D Q
en
ACC in
ACC out
ALU out
TMP
03
D Q
en
TMP in
TMP out
MUX
ALU en

8 Bit CPU

For instruction 00, do 8-bit **XOR**, test 00000010 XOR 00000011 = 00000001
Do the XOR operation with the values in register B and C, and store the result in C.

1. EXTin, EXTout, IRin. // Load '00' in register IR for XOR operation.
2. EXTin, EXTout, Bin. // Load '00000010' in register B.
3. EXTin, EXTout, Cin. // Load '00000011' in register C.
4. Cout, TMPin. // Load contents of C into TMP
5. Bout, ACCin. // Load contents of B into ACC
6. ALUout, Cin. // Store result in register C

For instruction 01, do 8-bit **AND**, test 00000010 AND 00000011 = 00000010
Do the AND operation with the values in register B and C, and store the result in B.

1. EXTin, EXTout, IRin. // Load '01' in register IR for AND operation.
2. EXTin, EXTout, Bin. // Load '00000010' in register B.
3. EXTin, EXTout, Cin. // Load '00000011' in register C.
4. Cout, TMPin. // Load contents of C into TMP
5. Bout, ACCin. // Load contents of B into ACC
6. ALUout, Bin. // Store result in register B

For instruction 10, do 8-bit **NOT**, test NOT 00000010 = 11111101
Do the NOT operation with the value in register C and store the result in register B.

1. EXTin, EXTout, IRin. // Load '10' in register IR for NOT operation.
2. EXTin, EXTout, Cin. // Load '00000010' in register C.
3. Cout, ACCin. // Load contents of C into ACC
4. ALUout, Bin. // Store result in register B

For instruction 11, do 8-bit **OR**, test 00000010 OR 00000011 = 00000011
Do the OR operation with the values in register B and TMP, and store the result in C.

1. EXTin, EXTout, IRin. // Load '11' in register IR for OR operation.
2. EXTin, EXTout, Bin. // Load '00000010' in register B.
3. EXTin, EXTout, TMPin. // Load '00000011' in register TMP.
4. Bout, ACCin. // Load contents of B into ACC
5. ALUout, Cin. // Store result in register C

Memory load micro instructions

Address	Machine Code
00000000	10000001
00000001	00010110
00000010	00000101
00000011	00001000

1. Set EXTin to address
2. EXTout, MARin
3. Set EXTin to machine code
4. EXTout, MEMin
5. MEMen