

EE314 Digital Circuits Laboratory

Experiment 1 Preliminary

1)

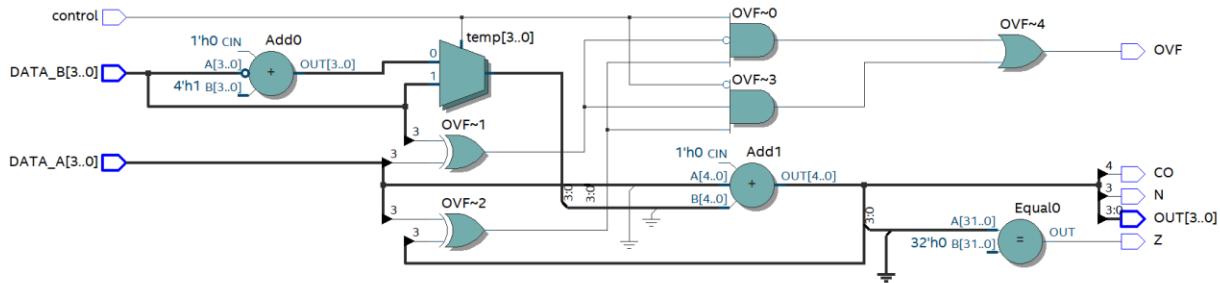


Figure 1: RTL Schematic of Arithmetic Unit

```

Windows PowerShell      Anaconda Prompt (anaconda)      +
+ | v
|-5 | 0 | ADD | 0xb | 0xb | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
0 | -7 | SUB | 0x7 | 0x7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
5 | -4 | SUB | 0x9 | 0x9 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 |
4 | -2 | ADD | 0x2 | 0x2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
-1 | 4 | ADD | 0x3 | 0x3 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
-5 | 2 | SUB | 0x9 | 0x9 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 |
-6 | 6 | ADD | 0x0 | 0x0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 |
-6 | -2 | SUB | 0xc | 0xc | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
3 | -7 | SUB | 0xa | 0xa | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 |
4 | 7 | SUB | 0xd | 0xd | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
51000.00ns INFO cocotb.regression
51000.00ns INFO cocotb.regression
*****
E (s) RATIO (ns/s) **
*****
1.78      28632.20  **
*****
4.80      10624.99  **
*****
make[1]: Leaving directory '/d/METU-EE/EE-Sem-6/EE314/EXP1/Experiment1Materialsv2-20250317/AUTest/Tests'
(base) D:\METU-EE\EE-Sem-6\EE314\EXP1\Experiment1Materialsv2-20250317\AUTest\Tests>

```

Figure 2: Test Results for Arithmetic Unit

2)

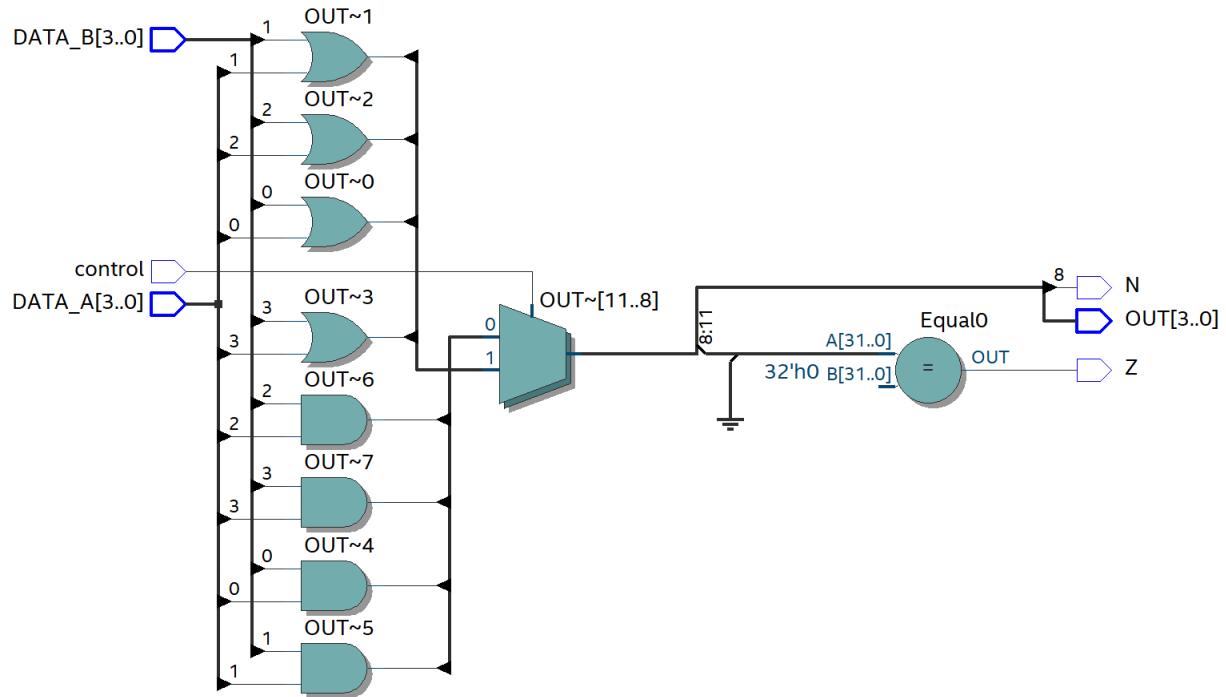


Figure 3: RTL Schematic for Logic Unit

```

Windows PowerShell      Anaconda Prompt (anaconda)  +
- 0 0  OR  0xf  0  1  0  0
- 3 4  OR  0xd  1  1  0  0
- 8 6  AND  0x0  0  0  1  1
  0 2  OR  0x2  0  0  0  0
  3 -2 AND  0x2  0  0  0  0
  0 -5 OR  0xb  0xb  1  1  0  0
 -1 6  AND  0x6  0x6  0  0  0  0
  7 3  OR  0x7  0x7  0  0  0  0
 -6 -6 AND  0xa  0xa  1  1  0  0
 -2 -8 OR  0xe  0xe  1  1  0  0

51000.00ns INFO      cocotb.regression
51000.00ns INFO      cocotb.regression
*****
E (s) RATIO (ns/s) **
*****
1.33      38478.32  **
*****
1.98      25755.20  **
*****
make[1]: Leaving directory '/d/METU-EE/EE-Sem-6/EE314/EXP1/Experiment1Materialsv2-20250317/LUTest/Tests'
(base) D:\METU-EE\EE-Sem-6\EE314\EXP1\Experiment1Materialsv2-20250317\LUTest\Tests>

```

Figure 4: Test Results for Logic Unit

3)

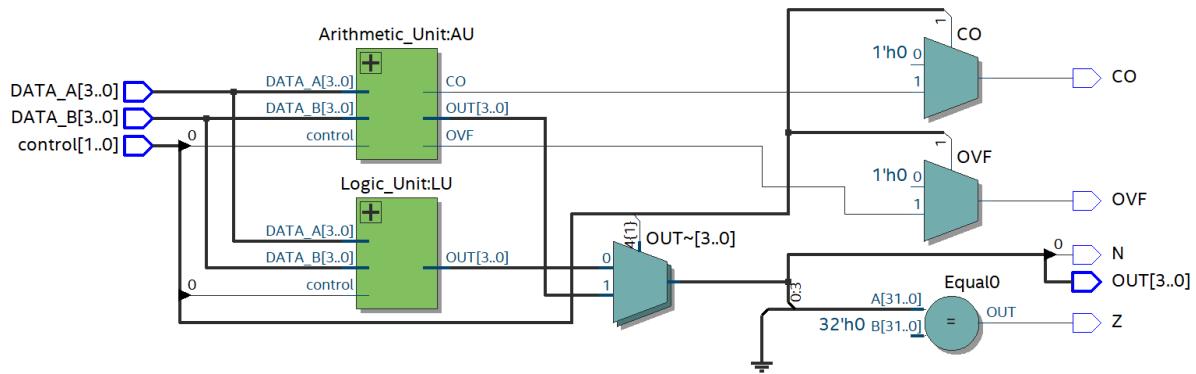


Figure 5: RTL Schematic of ALU

```
Windows PowerShell * Anaconda Prompt (anaconda) + - X
4 0 OR 0x4 0x4 0 0 0 0 0 0 0 0 0 0 0 0
-5 -7 AND 0x9 0x9 0 0 0 0 0 0 1 1 1 0 0
7 -7 OR 0xf 0xf 0 0 0 0 0 0 1 1 1 0 0
2 -6 ADD 0xc 0xc 0 0 0 0 0 0 1 1 1 0 0
-4 -5 SUB 0x1 0x1 1 1 0 0 0 0 0 0 0 0 0
-4 4 OR 0xc 0xc 0 0 0 0 0 0 1 1 1 0 0
-5 1 OR 0xb 0xb 0 0 0 0 0 0 1 1 1 0 0
7 1 SUB 0x6 0x6 1 1 0 0 0 0 0 0 0 0 0
1 5 AND 0x1 0x1 0 0 0 0 0 0 0 0 0 0 0
5 4 ADD 0x9 0x9 0 0 0 1 1 1 1 0 0 0 0

51000.00ns INFO cocotb.regression
51000.00ns INFO cocotb.regression
*****
E (s) RATIO (ns/s) **
*****
2.00 25502.75 **
*****
2.53 20190.74 **

make[1]: Leaving directory '/d/METU-EE/EE-Sem-6/EE314/EXP1/Experiment1Materialsv2-20250317/ALUTest/Tests'
(base) D:\METU-EE\EE-Sem-6\EE314\EXP1\Experiment1Materialsv2-20250317\ALUTest\Tests>
```

Figure 6: Test Results for ALU