**DLD STEM In-Class Exercise – Week 1 Monday AM**

Problem 1. Find the decimal equivalent of the following binary numbers:

11002 = 12

1011 10012 = 185

1001 1101 01012 = 2517

Problem 2. Find the binary equivalent of the following decimal numbers:

6710 = 0100 0011

9410 = 0010 1111

13010 = 1000 0010

Problem 3a. Find the output of this circuit. Complete the truth table.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|  | |  |  |  |  |  | | --- | --- | --- | --- | --- | | **X** | **Y** | **!XY** | **X!Y** | **Z** | | **0** | **0** | 0 | 0 | 0 | | **0** | **1** | 1 | 0 | 1 | | **1** | **0** | 0 | 1 | 1 | | **1** | **1** | 0 | 0 | 0 | |

Extra credit: This circuit performs the \_\_\_XOR function.

Problem 4a. Find the output of this circuit. Complete the truth table. It would be useful to compute intermediate output values (such as E XOR F, etc)

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|  | |  |  |  |  |  | | --- | --- | --- | --- | --- | | Cin | E | F | Cout | Sum | | 0 | 0 | 0 | **0** | **0** | | 0 | 0 | 1 | **0** | **1** | | 0 | 1 | 0 | **0** | **1** | | 0 | 1 | 1 | **1** | **0** | | 1 | 0 | 0 | **0** | **1** | | 1 | 0 | 1 | **1** | **0** | | 1 | 1 | 0 | **1** | **0** | | 1 | 1 | 1 | **1** | **1** | |