**Prelab 4 Digital to Analog Conversion**

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| Input State | | | | | Simulation | Theoretical |
|  | VA | VB | VC | VD | VO (V) | VO (V) |
| 0 | 0 | 0 | 0 | 0 | -2.021 mV | 0 |
| 1 | 0 | 0 | 0 | 1 | -0.310 | -0.3125 |
| 2 | 0 | 0 | 1 | 0 | -0.623 | -0.625 |
| 3 | 0 | 0 | 1 | 1 | -0.935 | -0.9375 |
| 4 | 0 | 1 | 0 | 0 | -1.248 | -1.25 |
| 5 | 0 | 1 | 0 | 1 | -1.560 | -1.5625 |
| 6 | 0 | 1 | 1 | 0 | -1.873 | -1.875 |
| 7 | 0 | 1 | 1 | 1 | -2.185 | -2.1875 |
| 8 | 1 | 0 | 0 | 0 | -2.498 | -2.5 |
| 9 | 1 | 0 | 0 | 1 | -2.810 | -2.8125 |
| 10 | 1 | 0 | 1 | 0 | -3.123 |  |
| 11 | 1 | 0 | 1 | 1 | -3.435 |  |
| 12 | 1 | 1 | 0 | 0 | -3.748 |  |
| 13 | 1 | 1 | 0 | 1 | -4.060 |  |
| 14 | 1 | 1 | 1 | 0 | -4.373 |  |
| 15 | 1 | 1 | 1 | 1 | -4.685 |  |

Figure 1: Input State / Output, Theoretical vs Simulation.

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Figure 2: DAC Using an Op-Amp – Multisim Configuration 5.

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Figure 3: DAC Input Configuration and Vo output