

SOFTWARE 1:

BINARY AND TERNARY

STUDENT RUBRIC

DEMO RUBRIC

At this point, you may be a novice at circuit minimization, and that's okay, but reviewing the prerequisite modules for this lab may help to greatly with your design and debug process. Your first task is to find the logic that leads to Z_0 , Z_1 , Z_2 , and Z_3 (see the table in the instructions). You will need to create a circuit based on the equations for these three variables. If you need some guidance on how to organize your LogicWorks design, refer back to the second exercise of the first lab. Hex keyboards work best for input, but binary switches will also suffice.

Completion Requirements:

- ✓ The resulting circuit has either a (4-bit) binary display, a hex display, or both for the ternary bit Z.
- ✓ All hex outputs are the input modulo 3.
- ✓ The resulting circuit should be "sufficiently" organized, and use only AND-2, OR-2, and INVERT gates.

REPORT RUBRIC

Scoring (out of 3 points):

- ✓ **[1 point]** Theory:
 - Explain the difference between binary and ternary with respect to their bases, and how the weighting of each bit is determined.
 - Explain the radix economy. What is it? How is it determined? Why is a lower radix economy better, and why do we care? Apply these concepts to binary and ternary.
- ✓ **[1 point]** Deliverables:
 - Provide a basic explanation of how your circuit converts binary to the Z value of a ternary number in the provide range.
 - Include the equations for Z_0 through Z_3 .
 - If you reduced your equations (and you should, where possible), how did you do it? Provide a BRIEF explanation of combining logical operators.
- ✓ **[0.4 points]** Discussion section. Should conform to standard lab report guidelines.
- ✓ **[0.6 points]** Question 1: Reduce gates
 - You will be graded on the viability of your suggestion. Strong answers should incorporate technical knowledge from current and future sections.