Solutions for Homework 2  
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1. The truth table is that of XOR.

2. A simplified circuit (i.e. not the most obvious circuit) is best. Draw the Circuit for

\[(A+B) + (A+C) + (B+C)\]

3. We use our 4 bit ALU for subtraction. Though it can be handled without much difficulty, we ignore overflow and assume subtraction results in a proper 4 bit signed integer. (We could handle this by simply looking at the sign bits of A and B when calculating L and G. Overflow only occurs when they are of differing signs which of course means it is short work to determine which is larger.) 

E is is simply 1 when \(A-B = 0\), i.e. \(A = B\). L = 1 when the sign bit of \(A - B\) is 1, i.e. \(A - B < 0\) and thus \(A < B\). G = 1 when both E and L are equal to zero.

![Circuit Diagram](image-url)
4. Given our circuit in question 3, this is straightforward. When $E = 1$, we add, when $E = 0$, we subtract. The answer will be a 5 bit signed integer.