

CSCI 2330 – Integer Logic Exercises

Let ux be an arbitrary unsigned int and let x and y be arbitrary signed ints (in 32 bits). Assume that all constants are signed. For each statement below, decide whether the statement is always true or potentially false. If the latter, demonstrate with a **counterexample** (i.e., given a specific value of the variable(s) that disproves the statement).

Hint: T_{min} is often a useful counterexample.

1. $ux \geq 0$ **is true**

2. $ux > -1$ **is true**

3. **if** $x > 0 \ \&\& \ y > 0$ **then** $(x + y) > 0$

4. **if** $x > y$ **then** $-x < -y$

5. **if** $x \geq 0$ **then** $-x \leq 0$

6. **if** $x \leq 0$ **then** $-x \geq 0$

7. **if** $x \ \& \ 7 == 7$ **then** $(x \ll 30) < 0$

8. $(x \ | \ -x) \gg 31 == -1$ **is true**