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 expression below, decide whether the expression is **true** for all variable values or potentially **false**. If the latter, find a **counterexample** to demonstrate (i.e., give specific value(s) of the variable(s) for which the expression is false).

Hint: $\mathtt{T}_{\mathtt{min}}$ often causes surprising results.

1. `ux >= 0`

2. `ux > -1`

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

4. ***if*** `x >= 0` ***then*** `-x <= 0`

5. ***if*** `x <= 0` ***then*** `-x >= 0`

6. ***if*** `x > y` ***then*** `-x < -y`

7. ***if*** `x & 7 == 7` ***then*** `(x << 30) < 0`

8. `(x | -x) >> 31 == -1`