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Pledge: I pledge my honor that I have abided by the Stevens Honor System.

For each function below, trace through it with reasonably small integer values. What does each function do?

**Requirement:** You should assume integers are only **8 bits** for the purpose of this exercise. The sign bit is the leftmost of the 8 bits.

**int** **mystery1**(**int** a, **int** b) {

**int** c = a - b,

d = (c >> 7) & 1,

mystery = a - c \* d;

**return** mystery;

}

Trace: mystery1(3, 7) returns: 7

Trace: mystery1(8, 7) returns: 8

Summary: If int a is less than b, then the program returns b. If int a is greater than b, then the program return a.

**int mystery2**(**int** x) {

**return** (x && !(x & (x - 1)));

}

Trace: mystery2(1) returns: 1

Trace: mystery2(2) returns: 1

Trace: mystery2(3) returns: 0

Trace: mystery2(4) returns: 1

Trace: mystery2(5) returns: 0

Trace: mystery2(6) returns: 0

Trace: mystery2(7) returns: 0

Trace: mystery2(8) returns: 1

Summary: If x is a power of 2, the code returns 1. If x is not a power of 2, then the program returns 0.

**int** **mystery3**(**int** x, **int** y) {

**int** s, c;

s = x ^ y;

c = x & y;

**while** (c != 0) {

c = c << 1;

x = s;

y = c;

s = x ^ y;

c = x & y;

}

**return** s;

}

Trace: mystery3(5, 7) returns: 12

Trace: mystery3(2, 8) returns: 10

Summary: This function uses bitwise operators to add x and y and returns their sum.