CIS 450: Lab 1

Part 1: Puzzles

Note: Each expression has inputs which produce cause the expression to return false.

1. (y>>4)<<4 <= y
2. (x<<4)>>4 <= x
   1. x = -2147483648, y = -2147483648
3. dx \* dy == (double) (x\*y)
   1. x = -881153, y = -881173
   2. x = 2147483647, y = 2147483647
   3. x = -2147483648, y = -2147483648
   4. x = 66535, y = 66535
4. ux == (unsigned) (float) ux
   1. x = -881153, y = -881173
   2. x = 2147483647, y = 2147483647
5. uy == (unsigned) (double) uy
6. x > y implies -x < -y
   1. x = 0, y = -2147483648
7. y \* y \* y \* y >= 0
   1. x = -881153, y = -881173
   2. y = 255
8. (int) (ux – uy) == (x – y)
9. x >= 0 implies – x <= 0
10. x <= 0 implies -x >= 0
    1. x = -2147483648, y = -2147483648
11. y != 0 implies y != -y
    1. x = 0, y = -2147483648
    2. x = -2147483648, y = -2147483648
12. ux >> 3 == x/8
13. X >> 3 == x/8
    1. x = -881153, y = -881173
14. dx \* dx \* dx \* dx >= 0.0
15. x > 0 and y > 0 implies x\*x + y+y > 0
    1. x = 2147483647, y = 2147483647

Part 2: Floating Point

1. Problem One
   1. 22/7 = 11.0010010010010010010010
   2. 0x40490FDB = 11.0010010000111111011011
2. Problem Two
   1. 30547 / 21600 = 1.01101010000010011101110
   2. 577 / 408 = 1.01101010000010100000101
   3. With A, the approximation is less than the actual value. With B, the approximation is great than the actual value.
   4. 0000 0111.1100. This value can be stored exactly with a double and float. Floats may only store up to and including 7 digits while Doubles may store (inclusive)15.
   5. The largest odd number which can be stored as a float is 16,777,215. The largest odd number which can be stored as a double is 9,007,199,254,740,991.
   6. The largest even number which can be stored as a float is 16,777,214. The largest even number which can be stored as a double is 9,007,199,254,740,990.