CE/CZ1005 Digital Logic Tutorial 3

Digital arithmetic

1. Perform the following unsigned operations.

   a. Binary: 1100110 + 1111001

   b. Binary: 11100011 - 1011101

2. Perform the following two's complement additions. Clearly indicate whether or not an overflow occurs.

   a. 11010100 + 11101011

   b. 10111111 + 11011111

   c. 01011101 + 00110001

   d. 01100001 + 00011111

3. Perform the following two's complement subtractions. Clearly indicate whether or not an overflow occurs. Check by converting to decimal values.

   a. 00110110 - 01000101

   b. 01110101 - 11010110

   c. 11010111 - 11101100

   d. 10000011 - 10001111

4. Perform the following unsigned binary multiplications.

   a. 110101 x 1110

   b. 010110 x 1101

5. Perform the following 2's complement binary multiplications.

   a. 110101 x 1110

   b. 010110 x 1101

Answers

1.

a. 11011111
b. 10000110

2.

a. 10111111 (no overflow)
b. 10011110 (no overflow)
c. 10001110 (overflow)
d. 10000000 (overflow)

3.

a. 11110001 (no overflow)
b. 10011111 (overflow)
c. 11101011 (no overflow)
d. 11110100 (no overflow)

4.

a. 1011100110
b. 100011110

5.

a. 000010110
b. 110111110