## Computer Organization: Data Representation Assignment Part 1

1. Convert the following decimal fractions to binary with a maximum of six places to the right of the binary point:
   1. 37.67125
   2. 184.03529
   3. 279.384225
   4. 327.78125
2. Convert the following binary fractions to decimal:
   1. 0111.1101
   2. 1010011.10001
   3. 10001001.0111
   4. 10001001.0111
   5. 10001001.0111
   6. 110001.10101
3. Convert the hexadecimal number AC16 to binary.
4. Convert the hexadecimal number 8B01 to binary.
5. Convert the hexadecimal number 5C02 to binary.
6. Represent the following decimal numbers in binary using 8-bit signed magnitude, one’s complement, two’s complement, and excess-127 representations.
   1. −107
   2. −45
   3. 60
   4. 44
   5. 89
   6. −44
   7. −60
7. What decimal value does the 8-bit binary numbers 00010001, 10011110 and 10011110 have if:
   1. It is interpreted as an unsigned number?
   2. It is on a computer using signed-magnitude representation?
   3. It is on a computer using one’s complement representation?
   4. It is on a computer using two’s complement representation?
   5. It is on a computer using excess-127 representation?
8. Given the two binary numbers 11111100 and 01110000:
   1. Which of these two numbers is the larger unsigned binary number?
   2. Which of these two is the larger when it is being interpreted on a computer using signed two’s complement representation?
   3. Which of these two is the larger when it is being interpreted on a computer using signed two’s complement representation?
9. To add two two’s complement numbers together, what must be true?
10. What is the most common representation used in most computers to store signed integer values and why?
11. Add the following unsigned binary numbers.
    1. 01110101 and 00111011
    2. 00010101 and 00010001
    3. 01101111 and 00010001
12. Subtract the following signed binary numbers as using two’s complement arithmetic.
    1. 01110101 and – 00111011
    2. 00110101 and – 00001011
    3. 01101111 and – 00010001