1) Number Conversion
    a. Convert the following unsigned binary numbers to decimal:
        i. 11111 = 31
        ii. 10001 = 17
        iii. 101 = 5
        iv. 001 = 1
    b. Convert the following decimal numbers to binary:
        i. 1111 = 10001010111
        ii. 0000 = 0
        iii. 135 = 10000111
        iv. 16 = 10000
    c. Convert the following octal numbers to binary:
        i. 1111 = 1001001001
        ii. 731 = 111011001
        iii. 777 = 111111111
        iv. 1 = 1
    d. Convert the following binary numbers to octal:
        i. 101 010 111 001 = 5271
        ii. 1 001 = 11
    e. Convert the following decimal numbers to octal:
        i. 512 = 1000
        ii. 127 = 177
    f. Convert the following octal numbers to decimal:
        i. 101 = 65
        ii. 2345 = 1253
    g. Convert the following binary numbers to hexadecimal:
        i. 1010 0010 0100 1111 = A24F
        ii. 1 0001 1001 1111 = 119F
    h. Convert the following hexadecimal numbers to binary:
        i. abcdef = 101010111100110111101111
        ii. 3A2B = 11101000101011
        iii. FACE = 1111101011001110
        iv. BAD = 101110101101
        v. DAD = 110110101101
        vi. FADE2 = 11111010110111100010
    i. Convert the following decimal numbers to hexadecimal:
        i. 1023 = 3FF
        ii. 65535 = FFFF
        iii. 4321 = 10E1
        iv. 1111 = 457
        v. 13579 = 350B

j. Convert the following hexadecimal numbers to decimal:
    i. abcdef = 11259375
    ii. FACE = 64206
    iii. BAD = 2989
    iv. DAD = 3501

2) Which of the following binary numbers are even? How can you tell if a binary number is even or odd? Note that a number divisible by 2 is even. Otherwise, it is odd.
    a. 1010010101 = odd
    b. 1111111000 = even
    c. 10101010101010101010 1 = odd
    d. 10000000000000000000000001 = odd
    e. 11111111111111111111111111111 = odd
    f. 11111111111111111111111111110 = even
    - If the LSB is 1 the number is odd otherwise the number is even.

3) Convert 1023_{10} to binary and negate it using two's complement. Compute -1023+1023 in binary. What results you expect and why?
    a. 1023 to binary = 1111111111
    b. 1111111111 two's complement = 0000000001
    c. 0000000001 + 1111111111 = 0000000000
    - I expected to get 0 as a result and that is what happened

4) Convert the decimal fraction 1 5/16 (1.3125) to binary. Use a "binary period" to separate the integral part and the fraction part.
    a. 1 5/16 (1.3125) = 1.0101

5) Given n bits, how many signed numbers can be represented using the sign-and-magnitude method, the one's complement method, and the two's complement method?
    a. sign-and-magnitude = $-(2^{n-1} -1)$ to $+(2^{n-1} -1)$
    b. one's complement = $-(2^{n-1} -1)$ to $+(2^{n-1} -1)$
    c. two's complement = $-(2^{n-1})$ to $+(2^{n-1} -1)$

6) In two's complement method, why is there one more negative number than there are positive numbers?
    a. Because two's complement is designed to circumvent the duplicate zero problem found in the sign-and-magnitude and one's complement methods. In this method, negative numbers are represented by ones' complement plus one. By doing so, the negative numbers in a sense are shifted to the left (smaller) by one. The negative zero represented by ones' complement becomes -1 to the two's complement method.