1. Convert the following unsigned numbers as specified. For the conversions to binary, you can use either successive subtraction or successive division.
   i. \((1001110111)_2\) to decimal
   ii. \((1001111101101101)_2\) to hex
   iii. \((631)_{10}\) to binary
   iv. \((631)_{10}\) to hex

2. Perform the specified operation assuming the signed numbers are (a) sign magnitude and (b) two's complement. Identify if overflow occurs. For the case of subtraction, first take the negation of the number, then perform addition.
   i. \((10111) - (11100)\)
   ii. \((10101) + (01011)\)
   iii. \((011011) + (000111)\)
   iv. \((001110) - (011011)\)

3. Convert the following decimal numbers to 8-bit binary (a) sign magnitude and (b) two's complement numbers. You must show all of your work in deriving your answer.
   i. \(-34\)
   ii. \(-45\)
   iii. \(+23\)
   iv. \(-62\)

4. Design a circuit that can tell whether a 4-bit two's complement number \((A3A2A1A0)\) is greater than 0.

5. Design a circuit that can tell whether a 4-bit sign-magnitude number \((A3A2A1A0)\) is greater than or equal to 0. Note: if you think this is just a wire connected to \(A3\) you're missing something!

6. Design a circuit that can determine whether a 4-bit two's complement number \((A3A2A1A0)\) is larger than another 4-bit two's complement number \((B3B2B1B0)\). You may use premade gates such as full adders, basic gates like AND, OR, NOT. If you use full adders, be sure to make sure your circuit works even if an overflow occurs.
   Hint: If \(A>B\), do you know anything about \(A-B\) or \(B-A\)?