CS 3843 HW1 – Number Bases (100%) Spring 2020

(100Numerals

A *numeral* is a symbolic representation of a number. For the purposes of this class, we will define a numeral as a sequence of digits (symbols).

Binary	Decimal	Hex
0000	0	0
0001	1	1
0010	2	2
0011	3	3
0100	4	4
0101	5	5
0110	6	6
0111	7	7
1000	8	8
1001	9	9
1010	10	A
1011	11	B
1100	12	C
1101	13	D
1110	14	E
1111	15	F

Number Bases

If we have an n-digit numeral $d_{n-1}d_{n-2} \ldots d_0$ in base b, then the value of that numeral is $\sum_{i=0}^{n-1} d_i\, b^i$, which is just fancy notation to say that instead of a 10's or 100's place we have a b's or b^2's place.

The most common bases we will use in this class are 2, 10, and 16, which are called binary, decimal, and hexadecimal (or hex), respectively. In base b, each digit d_i can only be one of b fixed symbols (0-1 for binary, 0-9 for decimal, etc.).

The table on the right shows the equivalent numerals for the numbers 0 through 15 in these three major number bases. We differentiate between these bases by using the prefix '`0b`' for binary and '`0x`' for hexadecimal.

Exercises:

Complete the table below by converting the numbers into the other two common bases. (Show all the steps)

Binary	Decimal	Hexadecimal
0b10010011		
		0x16
	63	
0b100100		
		0xC30
	0	
		0xBAD
	437	