Homework 1

1. For the 4-bit binary values in the table below, show the equivalent decimal values when the data is interpreted as unsigned binary or signed binary.

Binary	Unsigned	Signed
0b0000	0	0
0b0001	1	1
0b0111	7	7
0b1000	8	-8
0b1001	9	-7
0b1111	15	-1

2. Fill in the table below, converting between binary, hexadecimal, and decimal as necessary.

Binary	Hexadecimal	Decimal
0b1011111011101111	0xBEEF	48879
0b1101 1110 1010 1101	0xDEAD	57005
0b1111000000001011	0xF00B	61451
0b100000000	0x100	256
0b 1 0000 0000 0000	0x1000	4096
0b10100000000	0x 500	1280

3. A microprocessor has a 12-bit program counter and a 12-bit instruction register. What was the exact maximum number of *bits* that could be needed in a program memory for this processor?

   2^12 * 12 = 49152 bits

4. The Intel 8088 microprocessor was used in the original IBM Personal Computer. The 8088 had a 20-bit address bus. How many unique memory locations could be addressed?

   2^20 = 1048576 locations

5. Regarding the Cortex-M3. . .

   (a) What is the reset value of registers R0 through R12?

   undefined

   (b) At reset, where does the initial value of R15 come from?

   Address 4 in program memory