Digital and Embedded Systems
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Tutorial 1 – Number Representation

1. Convert the following numbers:

GIVEN		CONVERT TO	
Decimal	77	Binary, 8-bit signed	
Decimal	-100	Binary, 8-bit signed	
Decimal	99	Hex, 8-bit signed	
Decimal	-5	Hex, 8-bit signed	
Decimal	-23	Hex, 8-bit signed	
Binary, signed	1101 1100	Hex, 8-bit signed	
Binary, signed	1101 1100	Decimal	
Decimal	81	Octal, 12-bit, unsigned	
Octal, unsigned	777	Decimal	
Hex, unsigned	FA	Octal, 9-bit, unsigned	
Binary fixed pt.	11.0101	Decimal	
Decimal	0.85	Binary fixed pt. (4 deci.)	
Decimal FP	-16.25	IEEE FP	

IEEE FP	0 0111 1111 1110000 00000000 00000000	Decimal FP
IEEE FP	1 1000 0010 0110000 00000000 00000000	Decimal FP

2. Negate the following 8-bit numbers using 2's complement:

1011 1100

1000 0000

3. Transform 8-bit 2's complement numbers into 16-bit 2's complement representation.

Given	Pos. Binary (8)	Neg. Binary (16)	Neg. Hex (16)
$3A			
$BB			

4. Convert the following FP numbers to IEEE FP format (only up to 4 binary FP digits):

Given	Sign, Exponent	FP Bit sequence
0		
–1		
+1.1		
–65.75		
33.44		
1'000'000		
1'048'576		