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	-23	Hex, 8-bit signed	
Binary, signed	1101 1100	Hex, 8-bit signed	
Binary, signed	1101 1100	Decimal	
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. 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		

4. Using kmaps find the equations for the following outputs and state transitions, draw the relevant circuit.

D2	D1	D0	A	B
0	0	0	0	1
0	0	1	1	1
0	1	0	0	0
0	1	1	0	1
1	0	0	1	1
1	0	1	0	0
1	1	0	1	0