

Number Systems

Hexadecimal

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Number Systems

- Hexadecimal
 - Group sets of 4 binary bits
 - 0-9
 - Represent them with their decimal values
 - 10-15
 - Represent them with letters of the alphabet
 - 10 \leftrightarrow A (or a)
 - 11 \leftrightarrow B (or b)
 - 12 \leftrightarrow C (or c)
 - 13 \leftrightarrow D (or d)
 - 14 \leftrightarrow E (or e)
 - 15 \leftrightarrow F (or f)

Number Systems

- Use hexadecimal (hex) as a shorthand for binary
- Group sets of 4 binary bits and represent them with the hexadecimal equivalent
 - 1011 → B 0110 → 6 1110 → E
 - 10110110 → B6 01101110 → 6E
 - 1011011001101110 → B66E
- Often it is easier if a space is inserted when writing these
 - 1011 0110 0110 1110 → B66E
- When it is not obvious from the context you need to indicate the binary representation that the hex represents
 - Address = B66E → binary equivalent is unsigned binary → 46,702
 - Data value = B66E → binary equivalent is 2's complement → -18,834

Number Systems

- Use hexadecimal (hex) as a shorthand for binary
 - Multiple ways to indicate a hex value
 - 12CDh h at end
 - h12CD h at beginning
 - \$12CD \$ at beginning
 - 0x12CD 0x at beginning
 - Different processors/people use different shorthand

Number Systems

- Use hexadecimal (hex) as a shorthand for binary

	Unsigned Binary	Signed Magnitude	1's Complement	2's Complement	BCD
50	0011 0010	0011 0010	0011 0010	0011 0010	0101 0000
	h32	32h	\$32	0x32	32h
-50	N/A	1011 0010	1100 1101	1100 1110	N/A
		B2h	\$CD	0xCE	

h96	96h	\$96	0x96	96
Unsigned Binary	Signed Magnitude	1's Complement	2's Complement	BCD
150	-22	-105	-106	96