

CXCC 104 – Math Lesson 1

Hexadecimal

a) Complete the empty cells in the conversion table:

Dec	0	1	2	3	4	5	6	7	8	9
Hex	0x0	0x1	0x2	0x3	0x4	0x5	0x6	0x7	0x8	0x9

Dec	10	11	12	13	14	15	16	17	18	19
Hex	0xA	0xB	0xC	0xD	0xE	0xF	0x10	0x11	0x12	0x13

Dec	20	21	22	23	24	25	26	27	28	29
Hex	0x14	0x15	0x16	0x17	0x18	0x19	0x1A	0x1B	0x1C	0x1D

Dec	30	31	32							
Hex	0x1E	0x1F	0x20							

b) Complete the following hexadecimal sequences:

a)	0x54	0x55	0x56	0x57	0x58	0x59	0x5A
	84	85	86	87	88	89	90
b)	0x9A	0x9B	0x9C	0x9D	0x9E	0x9F	0xA0
	154	155	156	157	158	159	160
c)	0x74	0x76	0x78	0x7A	0x7C	0x7E	0x80
	116	118	120	122	124	126	128
d)	0xA7	0xA8	0xA9	0xAA	0xAB	0xAC	0xAD
	167	168	169	170	171	172	173
e*)	0x2048	0x204C	0x2050	0x2054	0x2058	0x205C	0x2060
	8264	8268	8272	8276	8280	8284	8288

c) (*Harder) In the row below each of the cells in question (b) use the calculator to convert to decimal.

Binary

Remember $2^4 = 2 \times 2 \times 2 \times 2$
= 16

2^4 is “two to the power of 4” and is sometimes seen in computers as 2^4
(^ is “carat”)

2^0 we take in mathematics to be 1

Power	2^8	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
Hex	256	128	64	32	16	8	4	2	1

d) Complete the empty cells in the conversion table:

Binary	Decimal	Hexadecimal
0000	0	0x0
0001	1	0x1
0010	2	0x2
0011	3	0x3
0100	4	0x4
0101	5	0x5
0110	6	0x6
	7	0x7
1000	8	0x8
1001	9	0x9
1010	10	0xA
1011	11	0xB
1100	12	0xC
1101	13	0xD
1110	14	0xE
1111	15	0xF
10000	16	0x10

e) Complete the following binary to decimal conversion table:

	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0	Convert to decimal	Hex
a)	0	0	0	0	0	1	1	1	$2^2+2^1+2^0 = 4+2+1=7$	0x7
b)	0	0	1	0	1	0	1	0	$2^5+2^3+2^1 = 32 + 8 + 2 = 42$	0x2A
c)	1	0	0	1	1	0	0	1	$2^7+2^4+2^3+2^0 = 128+16+8+1 = 153$	0x99
d*)	1	1	1	1	1	1	1	1	hint $2^8 - 1 = 256 - 1 = 255$	0xFF
e*)	0	1	1	1	1	1	1	1	$2^7 - 1 = 128 - 1 = 127$	0x7F
f)	0	0	0	0	1	1	1	1	$0x0F = 15$	0x0F
g*)	1	0	0	1	1	1	0	0	$156 = 128 + 16 + 8 + 4 = 2^7+2^4+2^3+2^2$	0x9C
h*)	1	1	0	0	1	0	0	0	$200 = 128 + 64 + 8$	0xC8

f) Beside each row in (e), write the hexadecimal equivalent

g) Complete the following binary to hexadecimal conversion table:

	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0	Convert to Hexadecimal
a)	0	0	0	0	1	1	1	1	0x0F
b)	0	0	1	0	1	0	1	0	0x2A
c)	0	1	1	0	1	0	1	1	0x6B
d)	0	1	1	1	1	1	1	0	0x7E
e)	0	0	1	1	1	0	1	0	0x3A