Practice Problem 2.3 (solution page 180)

A single byte can be represented by 2 hexadecimal digits. Fill in the missing entries in the following table, giving the decimal, binary, and hexadecimal values of different byte patterns:

Decimal	Binary	Hexadecimal
0	0000 0000	**0x00**
158	1001 1110	0x9E
76	0100 1100	0x4C
145	1001 0001	0x91
174	1010 1110	0xAE
60	0011 1100	0x3C
241	1111 0001	0xF1

Hex digit	0	1	2	3	4	5	6	7
Decimal value	0	1	2	3	4	5	6	7
Binary value	0000	0001	0010	0011	0100	0101	0110	0111
Hex digit	8	9	A	B	C	D	E	F
Decimal value	8	9	10	11	12	13	14	15
Binary value	1000	1001	1010	1011	1100	1101	1110	1111

Figure 2.2 **Hexadecimal notation.** Each hex digit encodes one of 16 values.

Aside Converting between decimal and hexadecimal

For converting larger values between decimal and hexadecimal, it is best to let a computer or calculator do the work. There are numerous tools that can do this. One simple way is to use any of the standard search engines, with queries such as

Convert 0xabcd to decimal

or

123 in hex

Decimal	Binary	Hexadecimal
117	0111 0101	**0x75**
189	1011 1101	**0xBD**
245	1111 0101	**0xF5**

16|158 = 0x9E = 1001 1110
16|9 ... 14
0 ... 9

16|76 = 0x4C = 0100 1100
16|4 ... 12
0 ... 4

16|145 = 0x91 = 1001 0001
16|9 ... 1
0 ... 9

1010/1110 = 0xAE = 10 × 16¹ + 14 × 16⁰ = 174

0011/1100 = 0x3C = 3 × 16¹ + 12 × 16⁰ = 60

1111/0001 = 0xF1 = 15 × 16¹ + 1 × 16⁰ = 241

0x75 = 7 × 16¹ + 5 × 16⁰ = 117
= 0111 0101

0xBD = 11 × 16¹ + 13 × 16⁰ = 189
= 1011 1101

0xF5 = 15 × 16¹ + 5 × 16⁰ = 245
= 1111 0101