Help

Just like decimal and binary, each hexadecimal digit has a place and a value. In this case, the place is a power of 16 and the value is selected from the set {0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F}.

A hexadecimal number (often abbreviated as "hex" is a combination of its digits multiplied by powers of 16. To eliminate confusion between various formats, we will put a 0x or a $ before the number to mean hexadecimal.

A **nibble** is defined as 4 binary bits, or one hexadecimal digit. Each value of the 4-bit nibble is mapped into a unique hex digit, as shown in Table 2.1.

## TABLE 2.1

| Hex Digit | Decimal  Value | Binary Value |
|-----------|----------------|--------------|
| 0         | 0              | 0000         |
| 1         | 1              | 0001         |
| 2         | 2              | 0010         |
| 3         | 3              | 0011         |
| 4         | 4              | 0100         |
| 5         | 5              | 0101         |
| 6         | 6              | 0110         |
| 7         | 7              | 0111         |
| 8         | 8              | 1000         |
| 9         | 9              | 1001         |
| A or a    | 10             | 1010         |
| B or b    | 11             | 1011         |
| C or c    | 12             | 1100         |

| D or d | 13 | 1101 |
| E or e | 14 | 1110 |
| F or f | 15 | 1111 |

As illustrated in Figure 2.1, to convert from binary to hexadecimal we can:

1) Divide the binary number into right justified nibbles,

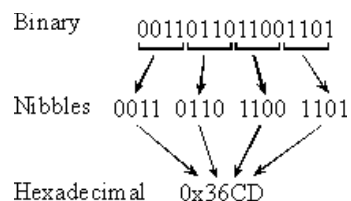2) Convert each nibble into its corresponding hexadecimal digit.

Binary        0011011011001101

Nibbles    0011  0110  1100  1101

Hexadecimal      0x36CD

*Figure 2.1*

As illustrated in Figure 2.2, to convert from hexadecimal to binary we can:

1) Convert each hexadecimal digit into its corresponding 4-bit binary nibble,

2) Combine the nibbles into a single binary number.

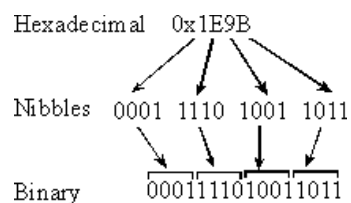Hexadecimal    0x1E9B

Nibbles    0001  1110  1001  1011

Binary        0001111010011011

*Figure 2.2*

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