# Octal Notation Encyclopedia Article

## Octal Notation

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# Octal Notation

Octal notation is a method of representing octal (base 8) numbers using the eight numerals 0-7. Octal notation uses positional notation and powers of 8 to express to express numbers in a manner similar to that of the familiar decimal system. In the decimal number system, the positions of the digits 0 through 9 determine their values. Consider the decimal number 375; the digits 5, 7, and 3 are understood to be multiplied by increasing powers of 10. Explicitly, $375_{10} = (3 \times 10^2) + (7 \times 10^1) + (5 \times 10^0) = 300 + 70 + 5$. Octal 567 is the same number as decimal 375: $567_8 = (5 \times 8^2) + (6 \times 8^1) + (7 \times 8^0) = 5x64 + 6x\ 8 + 7 \times 1 = 320 + 48 + 7 = 375$.

Each octal digit is the equivalent **value** of three binary digits. For example, octal 235 can be converted to a binary number by transforming each of its three digits to a binary triple. The leading 2 is 010 in binary notation, that is, $(0 \times 2^2) + (1 \times 2^1) + (0 \times 2^0) = 0 + 2 + 0 = 2$; the 3 is 011 by $(0 \times 2^2) + (1 \times 2^1) + (1 \times 2^0) = 0 + 2 + 1 = 3$; and the 5, similarly, is equivalent to binary101. Thus octal 235 equals binary 010010101. **Hexadecimal notation** is more commonly used in contemporary computer work than octal notation.