

DSA
Alternate Base Systems
for Cross-Curricular Fun & Engineering Applications

OVERVIEW OF WHAT BASES ARE: DECIMAL

DESCRIPTION OF DECIMAL BASE:

We are all familiar with the decimal base, which is what we use most of the time when we're using numbers. Many people speculate that our use of decimal stems from our having ten fingers; it has also been noted that cultures which *don't* count on their fingers often have different number bases, like several Mexican and Southwest American indigenous languages.

HISTORY OF DECIMAL BASE:

Decimal counting has been used verbally by the majority of cultures since as long as anyone has counted. For writing numbers, decimal has typically been one of the bases, but not the only one. For example, Romans used decimal writing for integers, but for fractions used duodecimal, or dozenal numbers. The Arabs first developed a positional decimal system, and our modern ways of writing numbers came about in the sixteenth and seventeenth centuries. After the French Revolution, the French wanted to create universally applicable systems which could be utilized everywhere globally. The French created the decimal-based metric system which we use today.

USE OF THE DECIMAL BASE:

The decimal base, or metric system, is used in science globally and is increasingly used in industry globally. For a number of reasons, industry and the general public in the United States have not fully converted to the decimal-based metric system, although the "Metric Conversion Act of 1975" and the "Omnibus Trade and Competitiveness Act of 1988" encourage conversion within the United States of America. See this link for further information/handouts you can use:

<http://www.nist.gov/pml/wmd/metric/upload/1136a.pdf>

EXAMPLES:

Here is a number in base-10: 201.

What does it mean? It means:
two one-hundreds,
zero tens, and
one one.

Can you explain the base-10 number: 12,573

What does it mean? It means:
_____ tens of thousands
_____ thousands
_____ hundreds
_____ tens
_____ ones

QUESTIONS:

- 1.) If decimal counting really arose from finger-counting, what other systems might have arisen? For example, how might a culture have developed octal counting? Duodecimal counting? Quaternary counting?
- 2.) Is decimal a convenient base for daily use? Why or why not?