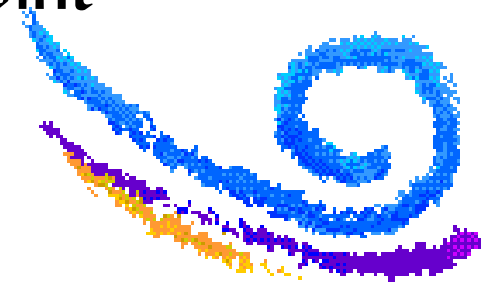


Internationalization

Overview

In the beginning ...

- ▶ Computers mostly for scientific / engineering work
 - Small memory
 - Emphasis on calculations
 - Programs written in binary
 - Data was mostly decimal, binary, floating point



Business applications

- ▶ After World War II, business began to see the usefulness of computers
- ▶ Need for character string data became apparent
 - To store descriptive information, names, addresses, etc.
- ▶ Initially development work was done mainly in the United States, the United Kingdom, and parts of Europe
 - So representing character strings using classic Latin characters (a-z, A-Z, 0-9, some punctuation) was sufficient



Character sets

- ▶ Over time, two major ways of representing character data in computer systems became paramount
 - EBCDIC (Extended Binary Coded Decimal Interchange Code) - used by IBM mainframes (and, later, AS/400)
 - ASCII (American Standard Code for Information Interchange) - used by everyone else
- ▶ Both of these are flawed, however, when it comes to reaching out beyond the Latin character set



Other languages - who cares?

- ▶ In Europe, the geography dictates a practical need to be multi-lingual
- ▶ In the United States, there has been a more parochial vision
 - The demographic is a vast, mostly mono-lingual continuous geographic area
- ▶ But the melting pot factor enters in:
 - There are more Poles in Chicago than any other city outside of Warsaw
 - There are more Mongolians in Denver than any other city outside Mongolia



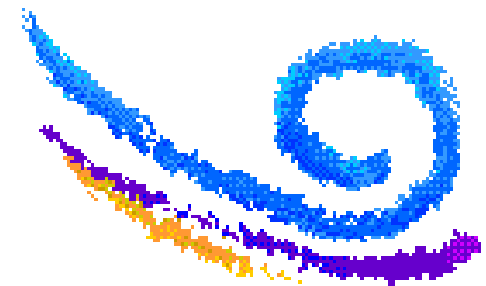
Internationalization Issues

- ▶ So if you want to include customers who use different character sets, you need to find a way to represent all the possible characters you are likely to encounter
 - Even in the same language or character set, you find different ways of representing dates, times, currency strings
 - Different writing directions (left to right, right to left, top to bottom) influence how you communicate
 - Different rules for family and given names need to inform computer logic for what is a "valid" value in a name



Internationalization Issues, 2

- ▶ Comparisons of strings cannot be just by binary coding sequence
 - What's the correct way to organize a Japanese phone book?
- ▶ Computers make it possible to deal with all these issues
 - But it is not easy, and it takes a lot of hard work
- ▶ Fundamental guiding principle:
 - User friendly means programmer difficult





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