Course Details

- Office hours will be held in MGH 450
  - Monday:
    9:00 AM - 10:00 AM
    2:30 PM - 3:30 PM
  - Tuesday:
    11:00 - 12:00 PM
    3:30 PM - 4:30 PM
  - Wednesday:
    3:15 - 4:15 PM
  - Thursday:
    10:30 AM - 11:30 AM
- Software licensing (to use for Projects 2 and 3)
  - Visual Studio
  - Check out procedures

Digital Representation

Or, where do the letters come from?

This week you'll create a Web page!

Technologies of writing and publishing
The computer as a writing tool

How does it work?

The display screen

The screen is a grid of rectangular regions, called pixels, each one of which can be made black or white (or a color).

Patterns of black and white (or colors) can be used to create meaningful marks, such as letters or other characters.

Saving the text

- But the marks on the computer screen are transient
- The letters and words need to be saved somewhere so they can be viewed, printed, or edited at a later time
- They are saved in computer memory in a file
Little, teeny letters?

But computer memory (e.g. your file) doesn’t actually contain letters or characters.

It was a dark and stormy night

Character codes

- Instead, what it contains are character codes.
- The character codes represent the characters.

<table>
<thead>
<tr>
<th>Character</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>65</td>
</tr>
<tr>
<td>B</td>
<td>66</td>
</tr>
<tr>
<td>C</td>
<td>67</td>
</tr>
<tr>
<td>a</td>
<td>97</td>
</tr>
<tr>
<td>b</td>
<td>98</td>
</tr>
<tr>
<td>c</td>
<td>99</td>
</tr>
</tbody>
</table>

Character codes and characters

73 116 32 97 32 100 97 114 107 32 ...

ASCII character encoding

ASCII, pronounced AS-key, stands for American Standard Code for Information Interchange.

<table>
<thead>
<tr>
<th>Character</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0100 0001</td>
</tr>
<tr>
<td>B</td>
<td>0100 0010</td>
</tr>
<tr>
<td>C</td>
<td>0100 0011</td>
</tr>
</tbody>
</table>
Bits and Bytes

- It's customary to name the two possible patterns of a bit 1 and 0, but we could use any names to represent the 2 distinct patterns.
- Sequences of 8 bits create a byte.
- Two patterns in sequences of 8 ... \( m = 2, n = 8, 2^8 = 256 \) possibilities from 0000 0000 to 1111 1111.
- The two pattern options (1 or 0) naturally fall to the term binary for this representation.

### Names for Patterns

<table>
<thead>
<tr>
<th>Present</th>
<th>Absent</th>
</tr>
</thead>
<tbody>
<tr>
<td>On</td>
<td>Off</td>
</tr>
<tr>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>True</td>
<td>False</td>
</tr>
<tr>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Black</td>
<td>White</td>
</tr>
<tr>
<td>For</td>
<td>Against</td>
</tr>
<tr>
<td>Yin</td>
<td>Yang</td>
</tr>
</tbody>
</table>

Storing Text

- Information is often stored by charge or magnetic field.

Schematic diagram of magnetic spots, like on a disk.

- The presence or absence of the magnetic charge can be detected, which leads to a natural association with 1 and 0 to charged/neutral states.

Text is stored as a sequence of keyboard characters.

Character codes

- The ASCII character codes represent the identity of the characters, e.g., A vs. B.
- Upper and lower case, e.g., A vs. a.
- But they don't represent the size of the characters.
- Their detailed shape (font).
- Whether they're bold or italic.

To represent these additional properties, additional character codes can be added, sometimes called tags.

73 116 32 97 32 100 97 114 107 32 ...
For Wednesday

- Read Chapters 5 and 6 of the FIT course pack

- Remember: no labs Wednesday and Thursday
  - However, lab 4 will be posted for you to review

- Assignment 1 will be posted to the Labs/assignments page today
  - To be done by next Monday/Tuesday Lab

- Project 1 will be introduced on Wednesday