Announcements

• New deadlines because of snow
  • Today by 5pm: Labs 4 and 5
  • Tomorrow by 11pm: Project 1A
  • A week from tomorrow by 11pm: Project 1B
    • Thursday, February 7

Announcements

• Quiz 2
  • Each quiz was different
  • Your TA will tell you if your

Announcements

• Quiz 3
  • Thursday and Friday
  • Chapters 7 and 8 of Fluency
  • Review
    • Questions at end of chapters
    • Answers at back of book
    • Lectures

Announcements

• Chapter 10 for today
• Chapter 18 for Friday

Basic HTML and Nesting

```html
<html>
  <head>
    <title>Basic HTML</title>
  </head>
  <body>
  </body>
</html>
```
Basic HTML and Nesting

```html
<html>
  <head>
    <title>Basic HTML</title>
  </head>
  <body>
    <p>Content on the Web page goes here</p>
  </body>
</html>
```

HTML DOCTYPE

```xml
<?xml version="1.0" encoding="utf-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"" http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
  <head>
    <meta http-equiv="content-type" content="text/html;charset=utf-8" />
    <meta http-equiv="Content-Style-Type" content="text/css" />
    <title>An XHTML 1.0 transitional template</title>
  </head>
  <body>
</body>
</html>
```

DOCTYPE and Validator

• DOCTYPE helps the Web Browser display your file properly on the Web
• Validator looks for the DOCTYPE
  • Many versions of HTML
    • From 1.0 to 4.01
  • Now we’re moving to XHTML
    • Compliant with XML
    • We’ll look at XML later in course
XHTML 1.0 Rules

- Delete any blank lines or tabs or spaces at top of file.
- Change all tags to lower case.
- Put quotes around all attributes in tags.
- Fix deprecated, or obsolete, tags:
  - Change `<b>` to `<strong>`
  - Change `<i>` to `<em>`
  - Change `<u>` to `<em>`

XHTML 1.0 Rules

- Fix these three special tags so they self-close:
  - Change `<br>` to `<br/>`
  - Change `<hr>` to `<hr/>`
  - Change `<img ... >` to `<img ... />`

XHTML 1.0 Rules

- Nesting issues:
  - Tags must be "nested" properly:
    - RIGHT
      `<p>`Book Title`<em> by Author`<p>`
    - WRONG
      `<em>`Book Title`<em> by Author`<p>`
  - Right or wrong?
    - `<strong>`Book Title`<strong>` by Author

XHTML 1.0 Rules

- Nesting issues:
  - Don't nest a list within `<p>` tags.
  - Always put `<br/>` within `<p>` or `<div>` or `<a>` tags.
  - An `<a>` tag can be within a `<p>` tag but a `<p>` cannot be inside an `<a>` tag.

Validating XHTML 1.0

- Fix one error, save, upload, refresh, revalidate; many errors will fall away.
- The Validator will read the DOCTYPE and know which version of HTML or XHTML you are using.
- DOCTYPE helps the Web browser display the page correctly.

What's The Plan?

Algorithmic Thinking

Step-by-step directions for whatever someone, or the computer, needs to do

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Algorithm

• A precise, systematic method for producing a specified result
• In real life we do this all the time:

Five Essential Properties of Algorithms

1. Input specified
   • Data to be transformed during the computation to produce the output
   • Must specify type, amount, and form of data
2. Output specified
   • Data resulting from the computation—intended result
   • It is possible to have no output

Language in Algorithms

• Natural language
  • For people, we use a natural language like English
  • Ambiguity is common in natural language

• Programming Language
  • Formal languages designed to express algorithms
  • Precisely defined; no ambiguity

Five Essential Properties (cont'd)

3. Definiteness
   • Specify the sequence of events
   • Details of each step, including how to handle errors
4. Effectiveness
   • The operations are doable
5. Finiteness
   • Must eventually stop

Context Matters

• Program can fulfill five properties of an algorithm, be unambiguous, and still not work right because it is executed in the wrong context
  • e.g., last name in Western countries means family name; in Asian countries it may mean given name
• Context matters: Driving instructions
  • “From the Limmat River go to Bahnhof Strasse and turn right.”
  • Assumes you are traveling in a specific direction. If you are not, the directions will fail.
Program vs. Algorithm

- A program is an algorithm that has been customized to
  - solve a specific task
    - under a specific set of circumstances
    - using a specific language
- Algorithm is a general method; program is a specific method

An Algorithm: Alphabetize CDs

- Imagine CDs in a slotted rack, not organized
- You want to alphabetize by name of group, performing musician, or composer
- How do you solve this problem?

Analyzing Alphabetize CDs Algorithm

- Illustrates the five basic properties of algorithms
  - Inputs and Outputs were listed
  - Each instruction was defined precisely (definiteness)
  - Operations are effective because they are simple and mechanically doable
  - Alphabetizing is mechanical, so our algorithm is effective
  - Finiteness is satisfied because there are only a finite number of slots that can be paired, so instructions 4, 5, and 6 cannot be repeated indefinitely

A Deeper Analysis

- Structural features
  - Two instructions, 5 and 6, in which the agent is directed to go back and repeat instructions. This is called a loop.
  - Loops and Tests
    - A loop must include a test to determine whether the instructions should be repeated one more time
- Assumptions
  - We assume that
    - The CD rack is full (instructions do not handle the case of an empty slot)
    - The word “following” means a slot further from the start point
Exchange Sort Algorithm

- The Alphabetize CDs example illustrates the standard Exchange Sort algorithm
  - The idea of comparing pairs of items chosen in a particular way, exchanging them if they are out of order, and continuing to sweep through the items
  - We could use the same algorithm to sort on a different principle

Announcements

- Chapter 18 for Friday