Today’s topics

Basic HTML
What is Java
• Upcoming
  ➞ Java programming
  ➞ Decision trees

The Web

• Lots of computers connected together in a collection of networks
• HyperText Markup Language (HTML) is a common formatting language for the web
  ➞ Hypertext is text with a link or reference
  ➞ Tags are unprinted formatting markers
    • Identified by angle brackets (i.e. <TAG> )
    • Example: <TITLE>The Human Tornado</TITLE>
    • Come in delimiting pairs
  ➞ Other examples
    • <i>italics</i>, <em>italics</em> both mean *italics*
    • <b>BOLD</b>, <strong>BOLD</strong> mean **BOLD**

Delimiting with tags

• First tag says, “Begin mode”
• Second tag says, “End mode”
• So <TITLE>The Human Tornado</TITLE> means
  1. Begin title mode
  2. The text “The Human Tornado” is in title mode
  3. End title
• Using this construct, we can nest several different modes and have interesting behavior
• Good tutorials on HTML
  http://www.w3.org/MarkUp/Guide/
  http://archive.ncsa.uiuc.edu/General/Internet/WWW/HTMLPrimer.html
• In lab, you will create a webpage

HTML

• Hypertext (from the Webopedia)
  ➞ A special type of database system, invented by Ted Nelson in the 1960s, in which objects (text, pictures, music, programs, and so on) can be creatively linked to each other.
  ➞ An anchored link:
    <A HREF=http://www.duke.edu> The Duke Web Page </A>
• More useful HTML
  ➞ Bulleted lists <UL> … </UL>
  ➞ Ordered lists <OL> … </OL>
  ➞ Tags are not case sensitive
  ➞ “White space” generally does not matter
• Most people don’t code in raw HTML
  ➞ Save as HTML in Microsoft Word
  ➞ Netscape Composer
Java!

- Java is a buzzword-enabled language
- From Sun (the developers of Java), "Java is a simple, object-oriented, distributed, interpreted, robust, secure, architecture-neutral, portable, high performance, multi-threaded, and dynamic language."

- What do all of those terms mean?

A programming language

- A vocabulary and set of syntactical (grammatical) rules for instructing a computer to perform specific tasks
- You can do most anything in any programming language
- A particular language encourages one to do things in a certain way

A Question for the course: Is this a fair characterization?

"Java is a simple, object-oriented, distributed, interpreted, robust, secure, architecture-neutral, portable, high performance, multi-threaded, and dynamic language."

- Based on popular languages called C and C++
- C: old, pretty bare bones language
- C++: newer, more complicated language
- Start from C and add some of C++'s more useful features
  - From Gosling, the creator, "Java omits many rarely used, poorly understood, confusing features of C++ that in our experience bring more grief than benefits."

- Question: Is Java really all that simple?

"Java is a simple, object-oriented, distributed, interpreted, robust, secure, architecture-neutral, portable, high performance, multi-threaded, and dynamic language."

- The object-oriented paradigm
  - Problems and their solutions are packaged in terms of classes
  - The information in a class is the data
  - The functionality in a class is the method
  - A class provides the framework for building objects

- Object-oriented programming (OOP) allows pieces of programs to be used in other contexts more easily
A distributed system is one where multiple separate computer systems are involved
- Electronic card catalogs
- The web

Java was designed for the web
Question: What are examples of a distributed task in your lives?

"Java is a simple, object-oriented, distributed, interpreted, robust, secure, architecture-neutral, portable, high performance, multi-threaded, and dynamic language."

- Programs will have errors, but a good program degrades reasonably
- A robust program may not do exactly what it is supposed to do, but it should not bring down other unrelated programs down with it

Question: Give me an example of a non-robust program you have seen?

"Java is a simple, object-oriented, distributed, interpreted, robust, secure, architecture-neutral, portable, high performance, multi-threaded, and dynamic language."

- Security: techniques that ensure that data stored on a computer cannot be read or compromised
- A program is running on your computer. What is to stop it from erasing all of your data, accidentally or otherwise?

Question: Is Java really all that simple?
“Java is a simple, object-oriented, distributed, interpreted, robust, secure, architecture-neutral, portable, high performance, multi-threaded, and dynamic language.”

- A language is architecture-neutral if it does not prefer a particular type of computer architectures
- E.g. The Macintosh processor family (PowerPC) and the PC (x86-Pentium) family have their own respective strengths and weaknesses. It is not too hard to construct a program that will run faster on one than an other.

- A particular program is never entirely architecture neutral though
- Question: When is being architecturally neutral a bad thing?

“Java is a simple, object-oriented, distributed, interpreted, robust, secure, architecture-neutral, portable, high performance, multi-threaded, and dynamic language.”

- A program is portable if it will work the same (roughly) on many different computer systems
- HTML is also platform-independent or portable
- A whole lot of effort is currently spent porting non-portable code

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- Performance: speed in completing some task
- Performance is everything to most computer and software manufacturers.

- Story:
  - If the transportation industry kept up with the computer industry, one would be able to now buy a Roll Royce that could drive across country in 5 minutes for $35.
- Rebuttal:
  - It would crash once a week, killing everyone on board.

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- A thread is a part of the program that can operate independently of its other parts
- Multi-threaded programs can do multiple things at once
  - e.g. download a file from the web while still looking at other web pages
- Question: What is the problem with multiple agents working at the same time?
  - Synchronization
“Java is a simple, object-oriented, distributed, interpreted, robust, secure, architecture-neutral, portable, high performance, multi-threaded, and dynamic language.”

- Dynamic refers to actions that take place at the moment they are needed rather than in advance
  ➤ Antonym: static
- A dynamic program can
  ➤ Ask for more or less resources as it runs
  ➤ Use the most recent version of some code that is available

- Question: Why is being dynamic a good thing?

A Java Program

```java
import java.awt.*;

public class HelloWorld extends java.applet.Applet
{
    TextField m1;
    public void init()
    {
        m1 = new TextField(60);
        m1.SetText("Hello World");
        add(m1);
    }
}
```