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://www.w3.org/MarkUp/Guide/)
  - [http://archive.ncsa.uiuc.edu/General/Internet/WWW/HTMLPrimer.html](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?
“Java is a simple, object-oriented, distributed, interpreted, robust, secure, architecture-neutral, portable, high performance, multi-threaded, and dynamic language.”

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

- 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.”

- Java a high-level language
- High-level languages must be translated to a computer’s native tongue, machine language
- Interpreted high-level languages are translated to an intermediate form and then converted to machine language and run

- Why?
- We’ll learn more about this later
“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?
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
“Java is a simple, object-oriented, distributed, interpreted, robust, secure, architecture-neutral, portable, high performance, multi-threaded, and dynamic language.”

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

- 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

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);
    }
}