Today’s topics

Java
Review
Just a bunch of headings meant to trigger questions
A contraction of previous notes

Upcoming
Midterm Exam

Reading
Great Ideas, Chapters 1-4

Review Topics

- HyperText Markup Language (HTML)
  - Linked Property Makes WWW What it is Today
  - HTML Structures
  - Tags (Note: The tags are case insensitive)
  - Ordered Lists; Unordered Lists
  - Tables
  - Links (Anchors)
  - Text Formatting
  - Carriage Returns
  - Images

- An Introduction to Programming: Coding Decision Trees
  - Object Oriented Programming
    - Treats everything as an Object
    - Object has Data and Functions (Methods)
    - Class Describes an Object in Java
  - Two Ways of Using Java
    - Stand Alone (like most traditional programs)
    - Using Web with an Applet (for this class)
  - Example: "Hello World", Things to Note:
    - Program is a class
    - Class contains data and methods
    - Method init() always started for applets
    - add statements (layout)
    - Applet invoked through HTML file
    - Program tested with Web Browser or appletviewer

- Demonstrate Use of Buttons; Important Pieces:
  - actionPerformed method
  - events, cause
    - if statements
  - String Variables
  - Reading Data Into Your Program: Input
    - The TextField Class
      - Example: Read In and Duplicate Demo .getText
  - if Statements, if - else Statements
    - Logical Expression
  - Assignment Statement
  - Method Invocation
  - Using Decisions to Solve Problems
  - Example: A Number Guessing Game
    - Binary Search
Review Topics

- Decision Trees
- Example: Text Selection Problem: Decision Tree
  - Review Code Noting myLocation Variable
- Using Primitive Data Types: Integers
- Example: Doing Multiple Tallies
- Strings and String Manipulation
  - The String Class
    - Declaration: String message;
    - String Constant: "Good Morning World!"
    - String Assignment: message = "It's Friday";
    - String Class Has Many Methods for Manipulation
      - int length()
      - int indexOf(String st)
      - String substring(int start, int end)

Review Topics

- More About Syntax
  1. <name> -> any string of alphanumeric symbols that begins with a letter
  2. <statement> -> <name> = <expression> ;
  3. <statement> -> <name> = new <class>(<arguments>) ;
  4. <statement> -> <name>.<method>(<arguments>)
    <method>(<arguments>);
  5. <arguments> -> possibly empty list of <expression>s separated by commas
  6. <expression> -> <string-expression> | <int-expression> | <oth-expression>
  7. <string-expression> -> <string-expression> + <string-expression>
  8. <string-expression> -> <string>
  9. <string> -> " any sequence of characters "
  10. <string> -> <name>

Review Topics

- Numerical Computation & Study of Functions
  - New Classes for Numbers
    - public IntField(int size);
    - public void setInt(int number);
    - public int getInt();
    - public DoubleField(int size);
    - public void setDouble(double num);
    - public double getDouble();
  - Iteration by Button Pushing
  - The while Loop
  - Example: Redesign of Diamond Program
  - Arrays
    - Have Multiple Elements or Cells
    - Use Subscript or Index to Identify Element
      - Subscripts are usually integers in brackets

Review Topics

- Often Use Arrays in a Loop
- Setting Up an Array
  - double weights[];
  - weights = new double[50];
  - double weights[] = new double[50];
- Subscript Range Errors
- Example: Simple Statistics Program Design
  - Get Data Into Array
  - Display Data
  - Compute
  - Display
- Algorithms for Extrema
- Algorithm for Mean
Review Topics

- Top-Down Programming, Subroutines, and a Database Application
  - Functions using Functions
  - Getting Information In and Out of Functions
  - Class Data: known within class.
  - Formal Parameters/Arguments
  - Syntax: Using a Function
  - Functions that Return Values
  - Syntax: Defining a Function
  - Larger Problems: How to Deal with the Complexity
    - Divide and Conquer
  - "Parallel" Arrays or "Corresponding" Arrays
    - Model Phone Book Capability
    - Typical Access by Name
    - Access by other Fields (other arrays)

Review Topics

- Extend Idea to Database
  - Basic Data Base Functions
  - Wild Card Retrieval
  - Used Car Database
  - Relational Data Bases
- Recursion
  - Dictionary example
  - Base/Halting case
  - Clone model
  - Factorial (N!)
    - Iterative Approach for Factorial
  - Exponentiation (X^n)
- Church-Markov-Turing Thesis
  - This part of Java lets you solve all kinds of algorithms