

Final Review

The final is comprehensive. It will be similar to the midterms, but with more of a ‘big-picture’ focus. This review focuses on newer concepts and the Java language, but Python is fair game, so review that language.

Ways to study:

1. Practice answering midterm questions without notes.
2. Practice answering questions on old and new worksheets
3. Practice coding from scratch
4. Look over code samples on-line and handed-out in class.
5. Come in and discuss problems with Wolber
6. Study with classmates.

Newer Concepts

Object-oriented methods and data access

Built-in Java arrays

Building an ArrayList-like library class using arrays and class object.

Iterating with for loops and iterators

Class object and inheritance

Information hiding

Static methods and variables

Parsing and Lexical Analysis

Web Development

On-going Concepts

Programming terminology

Tracing

Comparing Python and Java

Study Questions

Information Hiding

Why does Java provide information hiding? What does 'private' mean? Can you write code that will cause a visibility error? Why are data members, by convention, not defined as 'public'? Give an example of an appropriate private method from your projects.

Static methods and data

How do you access a static method/data? Give an example of an appropriate static data member from your projects?

Dynamic Web Pages

What is a dynamic web page? Draw a diagram showing the steps between a user entering a url and the system responding with a dynamic web page. What is the purpose of CSS?

What is lexical analysis? What is the job of a parser? Can you write code to identify various patterns of text?

Anatomy of a program:

Be able to define and identify terms:

data member
field
local variable
global variable
formal parameter
actual parameter
function signature
method
instance variable
static
constructor
subclass
parent
descendent
ancestor

Can you explain the main method header that was so weird looking when we began?

Strings

How is Java's String class different than other classes? What special things can you do to one?

How is accessing the characters of a string different in Python and Java?

Lists and Iteration

What list constructs does Python provide? What about Java?

What is an iterator?

How does a 'for loop' work?

What are the steps in creating a built-in array of objects, such as Cars?

How does the library class ArrayList make use of the library class Object?

What is the difference between the built-in Java array and Java ArrayList? How is ArrayList implemented? What is the advantage of using ArrayList?

What is the class 'Object' in Java? How is it useful for code reuse? Why does Wolber call it the 'grand pupa'? If a formal parameter is of type Object, what must the actual parameter be?

How is a Matrix represented in Python? What would a class Matrix look like?

Sometimes loops are not just 1..10 or walking through a list, but instead end based on an arbitrary expression. What are some examples of this from your projects?

Types

What is a type? What is a strongly-typed language?

What are the advantages of a strongly typed language?

In Java, there is a clear distinction between scalar types and objects. How does this complicate things in terms of using class ArrayList?

Object-Oriented Programming

What is a class? What is an object? What is an object reference?

What are the components of a class?

What are the typical bookkeeping methods in a class?

How is Python different than Java in terms of how object-oriented programming works?

What is a constructor? When is it called?

Tracing Programs

What is the heap?

What occurs in a trace for the following:

- a. object creation statement
- b. method call

For the following types of actual parameters, what is actually sent to a method and put in the 'box' of the formal parameter:

- a. scalar
- b. list in Python
- c. Java array
- d. Java Object

What is a variable?

What is the value of a variable that is of an object type?

Beneath the Hood-- Bits and Bytes

What is a byte? What is a bit?

How big is an integer?

How big is a character?

How big is an object reference?

Convert a stream of bits into an integer, and vice-a-versa.

How big an integer can be stored in n bits?

How much memory can a program use?