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CSC 1052 – Algorithms & Data Structures II:

Exam Review

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Exam Format

- Short answer questions
  - A few words to a sentence answers
  - Testing basic concepts and terminology
- Long answer
  - A few sentences to a paragraph
  - Testing deeper concepts
- Thought exercise
  - Possibly multiple subsections
  - Requires you to assemble multiple concepts into a complete solution

Java Organization

- Classes and objects
- Exception handling
  - Define
  - Throw
  - Catch
- Inheritance
  - Single inheritance only!
  - Inheritance-based polymorphism

Question!

- Name the four Java visibility modifiers. What does each mean?

- What is the difference between a Java Exception and a RuntimeException?

Computer Organization

- Memory structure
- Direct vs indirect addressing
- Parameter passing
  - Java uses call-by-???
- Implementation dependent and independent data structures

Question!

- Draw the memory layout for the following code segment.

- Trace the code in exercise 1.34

Algorithmic Analysis

- Operation counting
- Order of growth
  - How does the operation count grow with the input size?
- Common orders of growth
- Simple OOG analysis
  - Biggest order of growth dominates

Question!

- Compare these orders of growth

Java Abstraction

- Abstraction hides the complication to simplify the use of modular components
- Java abstraction: the interface
- Java generic collections
  - One implementation for any type of object stored in the container

Question!

- Can you define a constructor for an interface?
- Can you declare a variable as an interface type?
- Can you instantiate a variable with an interface type?

Stacks

- Last In First Out Collection
- Operations
  - Push
  - Pop
  - Top
  - isEmpty, isFull helpers
- Good for
  - Saving state
  - Nested information
  - Backtracking

Question!

- Trace the stack calls in 2.14b

- How could we add a size() method to the ArrayBoundedStack class?

Linked List

- Elements stored in random memory locations
- Each node tracks one data element and the next node
- Good:
  - Memory management
- Bad:
  - Random access

Question!

- Why is pushing onto a Linked List stack *slightly* slower than pushing onto an array?

- What happens if you delete all pointers to a node?

Next Time...

- Exam!
- NO electronic devices
- Peer Tutors
  - http://www.csc.villanova.edu/help/