Lecture 42: Summary

CSCI 62
Spring, 2012
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Topics

• Object-oriented Programming in Java
  • Encapsulation, information hiding for flexibility!
• Proofs by induction for correctness & complexity (more in Discrete Math)
• Big-O complexity – performance
  • Sorting & searching: selection, insertion, merge, quicksort, heapsort, binary search, tree & graph search
• Java graphics, GUI programming

More Topics

• Basic Data Structures including alternate implementations:
  • Lists
  • Stacks
  • Queues
  • Trees – including (balanced) binary search trees
  • Maps & Dictionaries (including hash tables)
  • Graphs, including sophisticated algorithms
  • Understand trade-offs in selection of data structures

More Topics

• Parallelism & Concurrency
• C++ Programming
  • Differences between Java & C++
  • Explicit pointers & manual memory management!
Place of CS 62

- Last course with focus on teaching to program.
  - Though will learn other languages.
  - Further courses focus on core topics & applications
- Assume comfortable in creating medium sized programs
  - There are courses, e.g. CS 121 Software Design & CS 181 Big Data, that focus on designing large programs

Goals from Syllabus

- Good understanding of the object-oriented design, coding, and debugging of programs in Java and C++
- Good understanding of how one might analyze programs for correctness and efficiency
- Understand the trade-offs involved in selections of different data structures and algorithms to solve computational problems.

Choice of Language

- What is important?
  - Programmer time: Use high-level garbage-collected language like Java, Python, ML, Scheme, Haskell, Scala, etc.
  - Execution time (and need access to low-level details): Systems language like C or C++.
- Students taking 105 (Systems) and graphics will need to be sure C/C++ is solid.

Final Exam

- About 7 questions in 3 hours
  - Next Friday at 9 a.m., in regular room (here).
- Comprehensive, but most focus on material since midterm.
- Mix of programming, understanding, and analysis.
Questions?

Teaching evaluations

- Answer questions about course structure/value only once!
  - Answer questions about instructor for each.
- Kim Bruce
  - Answer all questions
- Kevin Coogan
  - Omit all questions from section A, 6-8, 10 from B, & 2 from C.