

Course Syllabus

Week 1: Text: Part I
Overview: mathematical domains, modeling, computational tools, theory of representation, hardware and software architectures.
Overview of mathematical structures: sets, logic, algebras, numbers, groups, graphs.
Curriculum planning.
Assignment 1: Outline your knowledge of data structures and algorithms.

Week 2: Text: Part I, Ch 6.
Overview of Java
Overview of data structures: stacks, arrays, lists, trees, graphs.
Assignment 1 due.

Week 3: Text: Chs 15, 16, 17
Abstract data structures, the String, Rational Numbers. Case study: the square.
Assignment 2: Build a type hierarchy for data structures

Week 4: Text: Ch 7
Overview of algorithms: sequential and parallel processes, recursion, tractability.
Programming paradigms.
Assignment 3: Implement an ADS for Strings
Assignment 2 due

Week 5: Text: Ch 5
Algorithm analysis.
Assignment 3 due.
Assignment 4: Implement an ADS for Squares

Week 6: Text: Chs 8, 23
Sets and Sorting. Case study: the set
Assignment 4 due.

Week 7: Text: Chs 11, 19
Hashing and parsing. Search algorithms.
Strings, sequences and streams. Pattern matching. Case study: Mathematica
Assignment 5 (major): Abstract control structures

Week 8: Text: Ch 14
Graphs. Graph processing.
Case study: satisfiability of boolean forms

Week 9: Text: Ch 13
NP-completeness, algorithms for intractable problems.
Interpreted languages.
Assignment 5 due

Week 10:
Closure.