

Algorithms and Data Structures

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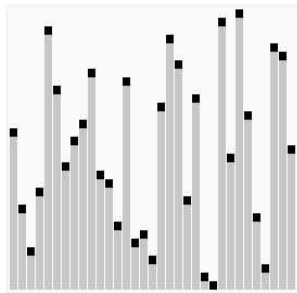


CENTER FOR RESEARCH ON EMBEDDED SYSTEMS
School of Information Science, Computer and Electrical Engineering

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Motivation

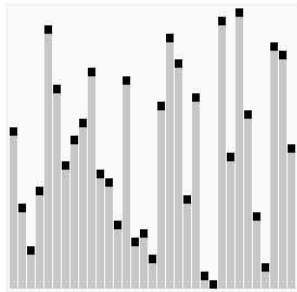
When developing software you will often have to solve **well known problems!** Many of these well known problems have **very well known solutions that are very well implemented.**



In many cases you will have to come up with **new solutions to new problems.** You should then be prepared to think in particular ways. For instance, is the problem suitable to be solved recursively? Or, does the recursive solution become so inefficient that it is useless? How can I transform it into a more efficient solution? How efficient is the result?

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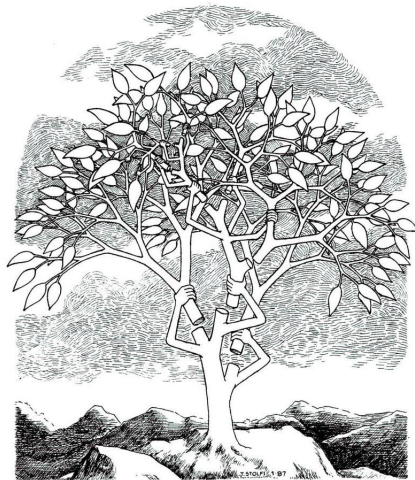
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Goals

Become familiar with

- **algorithm complexity,**
- **algorithm design** and
- **classical data structures.**

Also to improve programming abilities in a modern programming language, (at the moment Java)

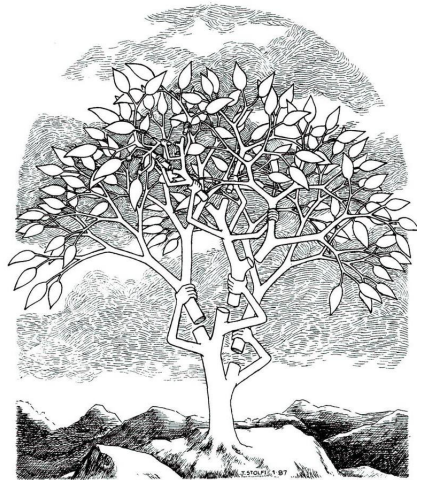


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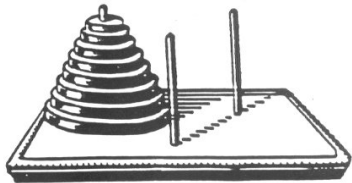
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Contents

- An introduction to Java with emphasis on inheritance and polymorphism as a way of organizing reusable programming libraries.
- Abstract data types, stacks, queues, lists, hash tables, graphs.
- Algorithm analysis and design. Asymptotic execution time. Recursion, dynamic programming, divide and conquer.



Organization

- Very low intensity, quarter 1 & 2!
- Lectures (8 or more).
- Computer based exercises (8 or more) with supervision.
- Three labs (project work) with supervision.
- Written exam.