Exam of Algorithms and Data Structures. Pettorossi. December 2002
Programs to hand-in: one from set 1 and one from set 2.

1.1 String pattern matcher as a finite automaton.
1.2 Cocke-Younger-Kasami parser for context-free grammars.
1.3 Construction of finite automata equivalent to regular expressions.
1.4 Parser for regular languages given as regular grammars.

2.1 Transformation from n-ary trees to binary trees.
2.2 Dijkstra's single source shortest path algorithm.
2.3 Elimination of useless symbols from context-free grammars.
2.4 Elimination of left-recursion from context-free grammars.

Exam questions

 1. Computable and non-computable functions.
 2. Arrays and lists. Adjacency matrices and adjacency lists for graphs.
 3. Trees. Minimal spanning trees of undirected graphs.
 4. Matrix multiplication and transitive closures of relations.
 5. Reachability and Shortest paths in graphs.
 6. Stacks and queues. Depth-first and breadth-first visit of trees.
 7. Equivalence of finite automata, regular expressions, and regular grammars.
 8. Deterministic and nondeterministic finite automata: powerset algorithm.
 9. Parsing of regular languages.
10. Backtracking and algorithm for computing dispositions.
11. Chomsky normal form and Cocke-Younger-Kasami parser.
12. Avoiding epsilon productions, unit productions, and left-recursion.
13. Pushdown Automata. Chop-Expand parser.
14. Binary Insertion. Binary Selection sort. Topological sort.
15. Mergesort. Quicksort and its complexity analysis.
16. Treesort. Heapsort and its complexity analysis.
17. Unification algorithm.
18. Theorem Prover for Propositional Calculus.