

Finite Automata Theory and Formal Languages

TMV027/DIT321

Context-Free Grammars

Exercise 5

In these exercises, book sections, exercise numbers and pages refer to those in the third edition of the course book.

Basic exercises

1. Do exercises 5.1.1 a and b), and 5.1.3.
2. Do exercises 5.1.2 and 5.2.1.
3. Do exercise 5.1.7.
4. Do exercises 5.4.1, 5.4.3 and 5.4.5.

Additional exercises

1. Do exercises 5.1.4, 5.1.5 and 5.1.6.
2. Consider the grammar in exercise 5.1.8. Prove that all the words generated by the grammar have an equal number of a 's than b 's.
3. Do exercises 5.2.2, 5.2.3 and 5.2.4.
Note for exercises 5.2.2 and 5.2.3: What we called “node” in the lecture the book calls “internal node”. By nodes the book means either an internal node or a leaf.
4. Do exercises 5.3.1 and 5.3.2.
5. Do exercises 5.4.2, 5.4.6 and 5.4.7.

Programming Exercises

1. Design a good data structure for grammars.
2. Program all the different steps involved in the simplification of a grammar.
3. Program the conversion of a (simplified) grammar into a grammar in CNF.