

Fundamentals of Theory of Computation I

1: Introduction

Organization

Lecture: Wednesday 8:15 - 9:45, room 2.502

Practice class:

Wednesday 12:15 - 13:45, Chemistry building, room 115,
Monday 14:15 - 15:45, room 1.819

Web page: <http://people.inf.elte.hu/lukovszki/Courses/24FOTOC1>

For successful completion:

1. Active participation and work in solving and discussing exercises in practice classes
2. Successful exams (grade is computed as average of 2 exams).

Important dates:

- midterm test/exam (written): 2024-10-16
- final test/exam (written): 2024-11-27
- repeat exam (second trial exam in case of unsuccessful exam): 2024-12-04

Content

- Introduction
- Basic concepts and notations.
- Grammars, Chomsky hierarchy.
- Finite automata, regular expressions, regular languages
- Push-down automata, context-free languages
- Algorithmic problems of regular languages and context-free languages (membership, emptiness, equality), closure properties
- Context-sensitive grammars, noncontracting grammars
- Phrase structured grammars
- Lexical analysis, parsing. LL(k) grammars
- Turing machines

Literature

- M. Sipser, Introduction to the Theory of Computation, 3rd edition, Cengage, 2012.
- J. E. Savage, Models of Computation: Exploring the Power of Computing, Brown University, 1998.
<https://cs.brown.edu/people/jsavage/book/pdfs/ModelsOfComputation.pdf>

Further books:

- J.E. Hopcroft, R. Motwani, J.D. Ullman: Introduction to Automata Theory, Languages, and Computation, 3rd ed. Pearson Education Ltd., 2014.
- A. Salomaa, G. Rozenberg (eds.): The Handbook of Formal Languages I., II., Springer Publishing Company, 1997.
- Arto Salomaa: Formal Languages, Academic Press, 1973.