CS310 Automata Theory – 2016-2017

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Lecture 31: End of Module III, Module IV: Effective computation
April 03, 2017

Summary of Module III

Introduction to Turing machines

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Equivalent models

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- multi-tape TM,
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- $A_{TM} = \{(M, w) \mid M \text{ accepts } w\}$,
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Rice's theorem

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Notion of reduction (Tutorial 9)

At the end of last class

Undecidability of the following languages:

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Note that undecidability of REG_{TM} and E_{TM} can be proved using Rice's theorem.

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Turing machines with resource constraints.

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- Why bound resorces?
  - Viewing TM as algorithms.
  - TM to help in computation of important problems.
  - Finer study of decidable languages.
- How should we bound the resources?
  - Many different ways exist. . . .

Time complexity and complexity classes

Let $t : \mathbb{N} \to \mathbb{N}$.

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Definition

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$$EXP = \bigcup_k \mathrm{TIME}(2^{n^k})$$

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