# CS 475: Formal Models of Computation

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# Instructional Staff

- Instructor: Mahesh Viswanathan (vmahesh)
- Teaching Assistant: Robert Andrews (rgandre2)
- Office Hours: See course website. Also by appointment.
- Contacting Staff: Use "private note" in Piazza.

# Electronic Bulletin Boards

- Webpage: General information, course policies, lecture notes
  `courses.engr.illinois.edu/cs475/fa2017`
- Piazza: Announcements, online questions and discussion, contacting course staff. Sign up at `piazza.com/illinois/fall2017/cs475`.
- Moodle: Everything related to quizzes, grades, and announcements
  `https://learn.illinois.edu/course/view.php?id=24671`
- Gradescope: Homework submissions and grading
  `gradescope.com`

# Resources for class material

- Prerequisites: All material in CS 173, and CS 374
- Textbook: Theory of Computation by Dexter Kozen.
  (Secondary) Automata and Computability by Dexter Kozen.
  Both available online through the university library.
- Lecture Notes: Available on course web-page
- Video Recording of Lectures: See course website for link.

# Grading Policy: Overview

Total Grade and Weight

- Homeworks: 20%
- Quizzes: 10%
- Midterms: 40% ($2 \times 20$)
- Finals: 30%

# Homeworks

- One homework every two week: Due on Thursday at midnight on Gradescope. Assigned two weeks in advance on Thursday.
- No late homeworks. Lowest homework score will be dropped.
- Homeworks may be solved in groups of size at most 3 and each group submits one written solution on Moodle.
- Homework schedule on course webpage.

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- Homework schedule on course webpage.
- Read Homework Guidelines and Academic integrity policies on course website.

# Quizzes

- Once every week on Moodle, except the week before exams and the Thanksgiving break.
- Released on Thursday night, and will be due the following Monday at midnight.
- Quizzes aren't timed. Multiple attempts allowed, with the last attempt being graded
- There are about 11 quizzes in total. We will drop 2 quizzes.
- Quiz schedule on course webpage.

# Examinations

- First Midterm: Tuesday October 3, 7pm to 9pm
- Second Midterm: Wednesday November 1, 7pm to 9pm
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- Midterms will only test material since the previous exam
- Final Exam will test all the course material

Part I

# Course Overview

# Overview

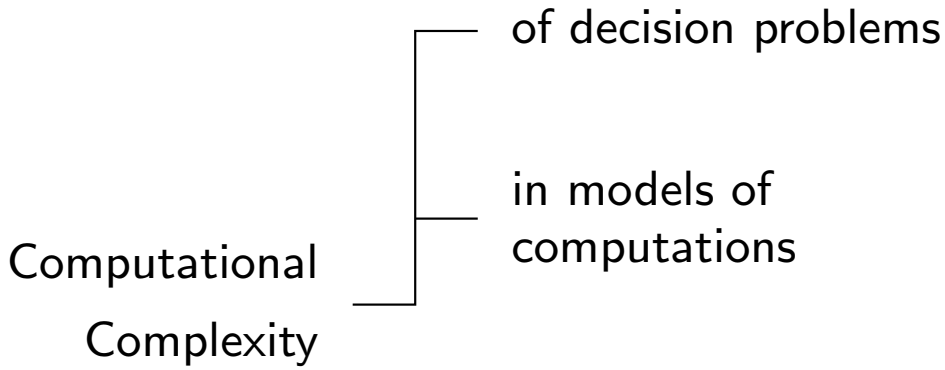
Computational

Complexity

# Overview

Computational Complexity of decision problems

# Overview


Computational
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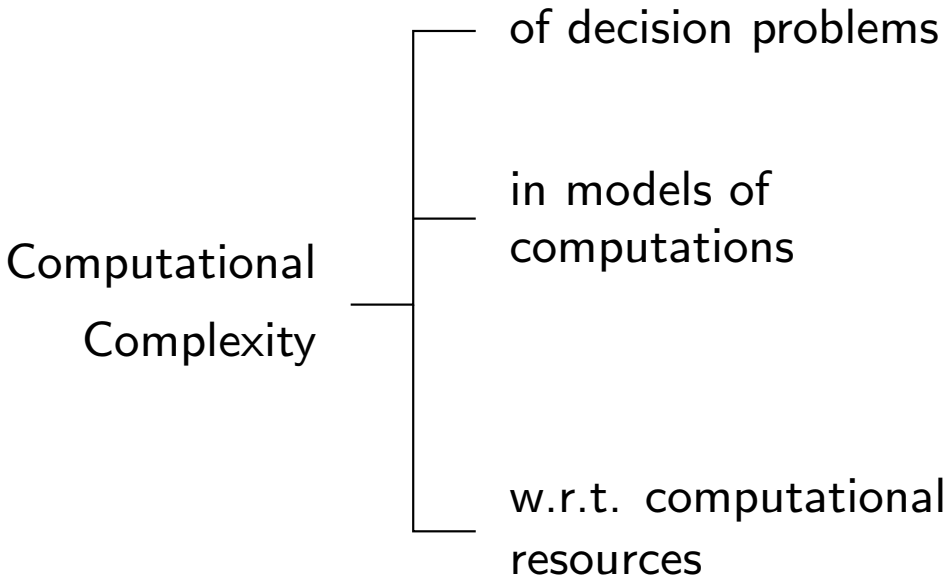
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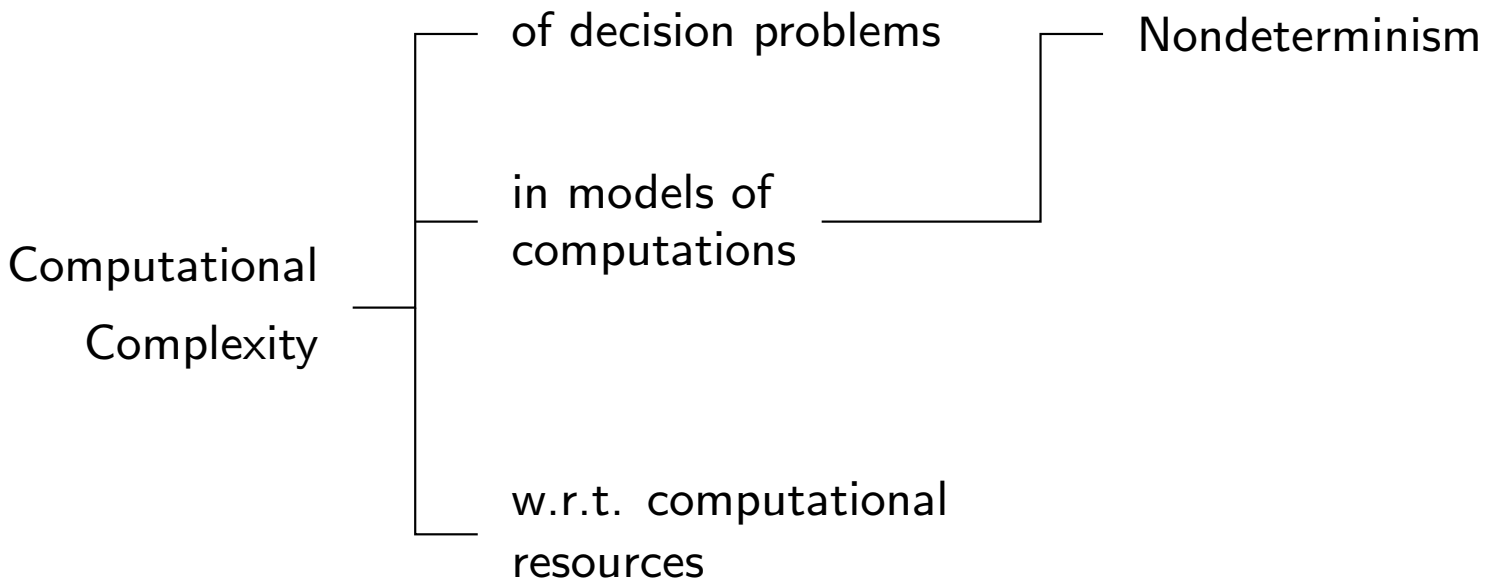
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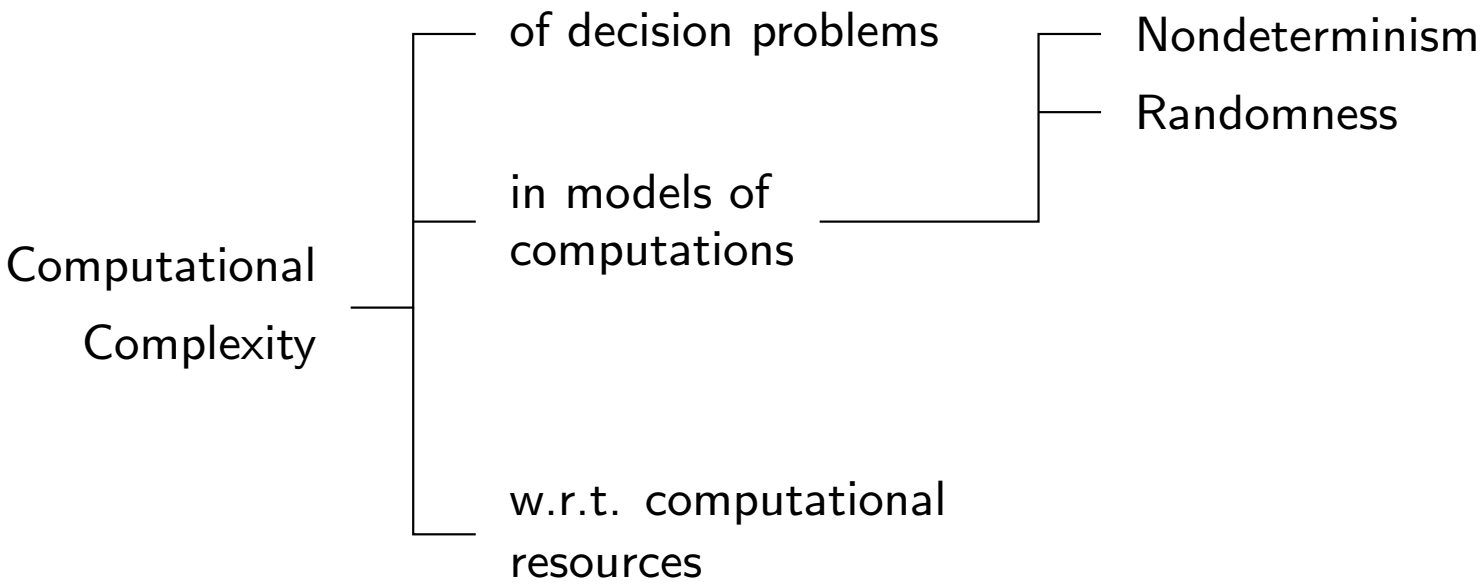
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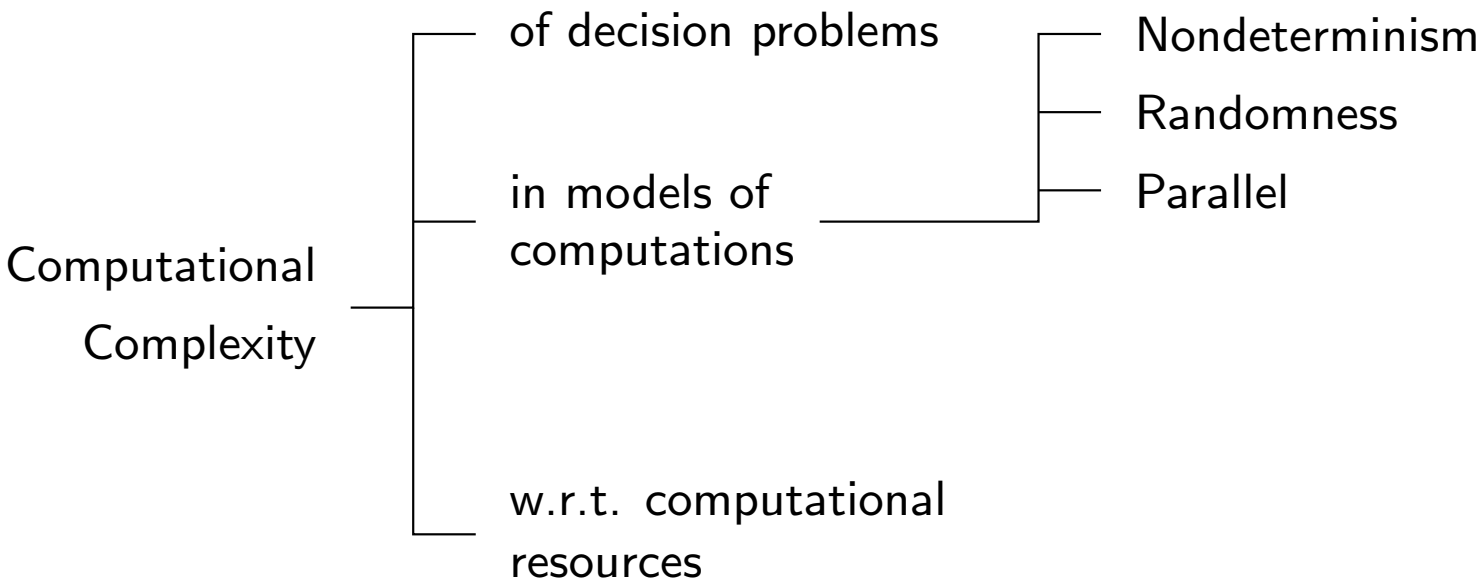
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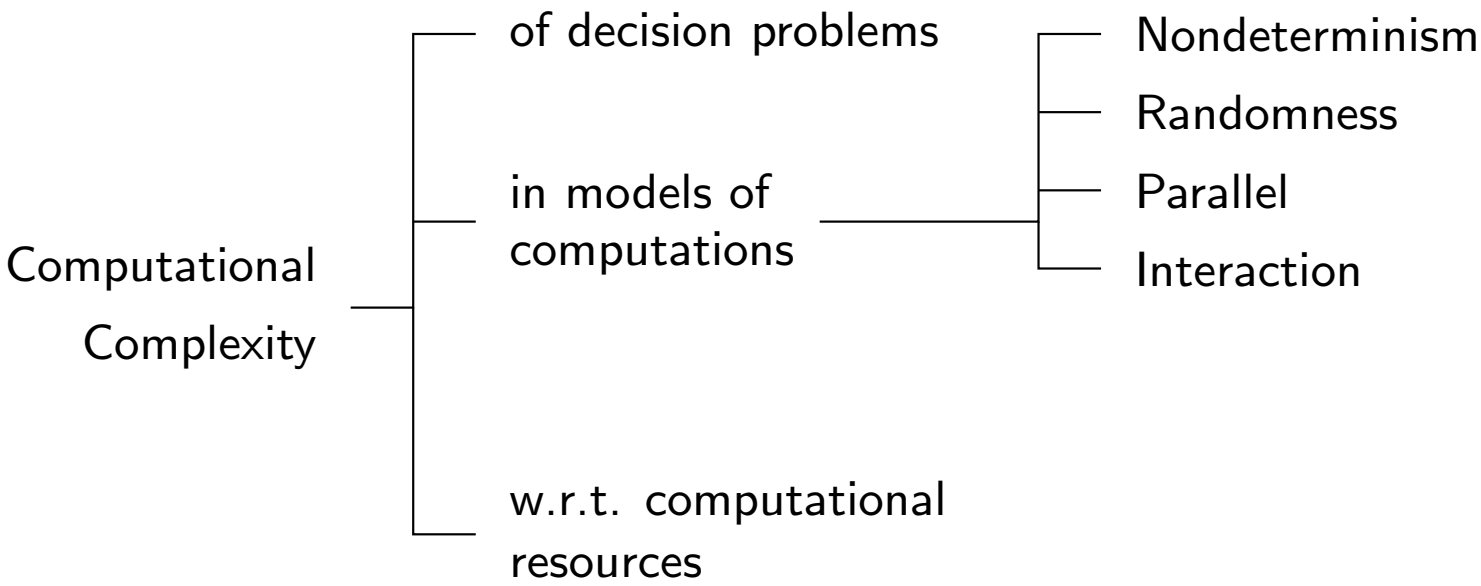
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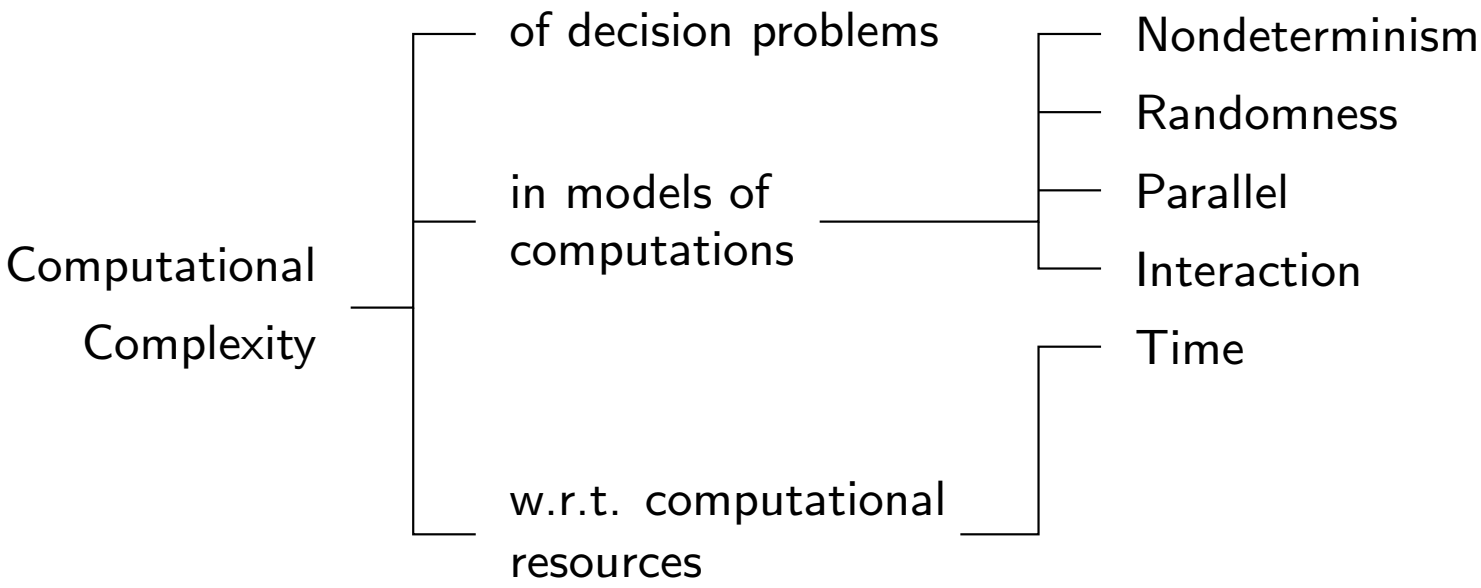
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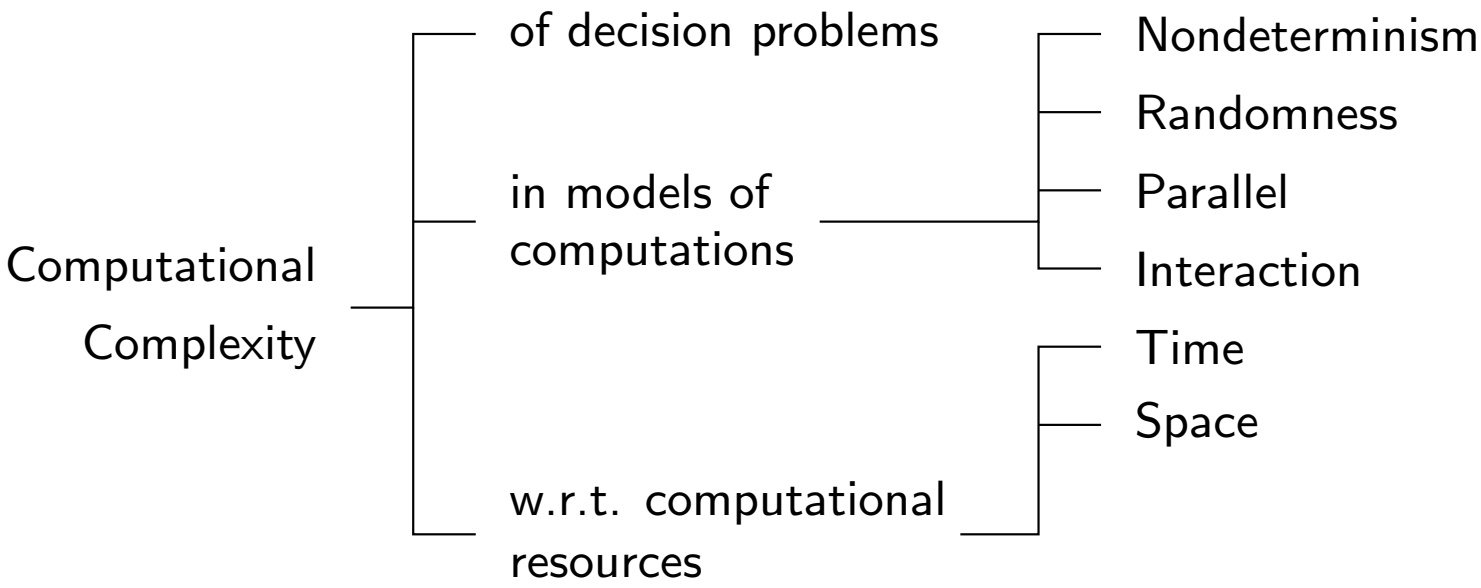
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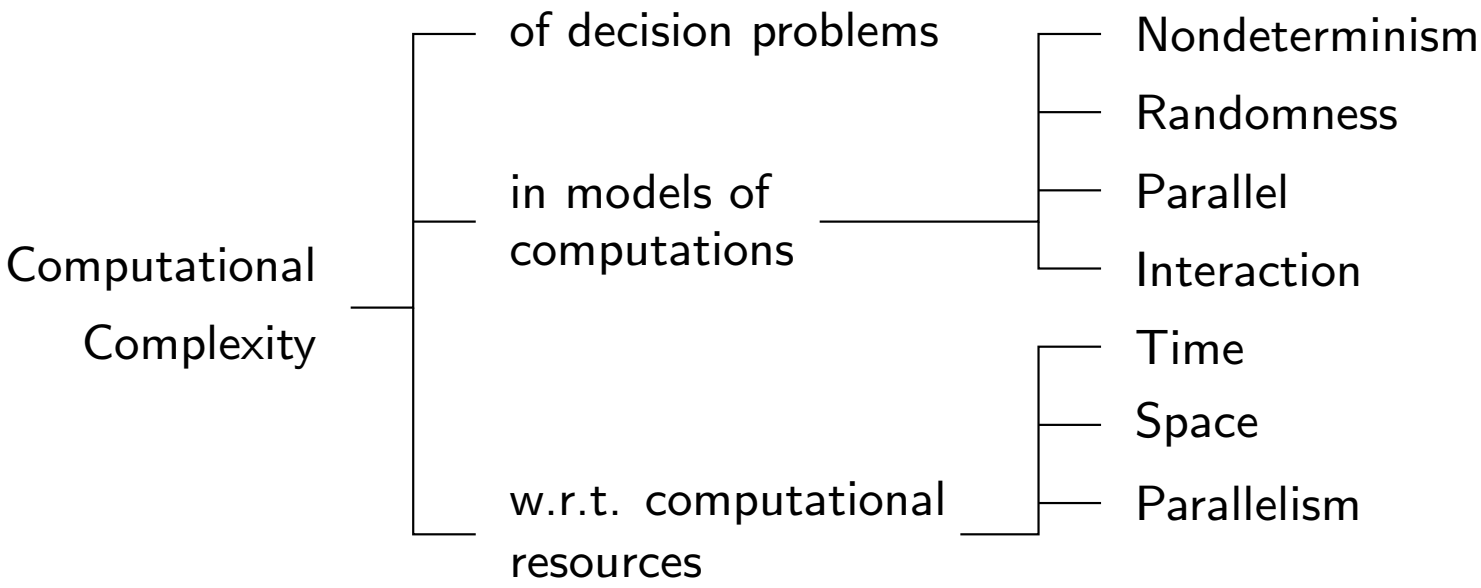
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Randomness
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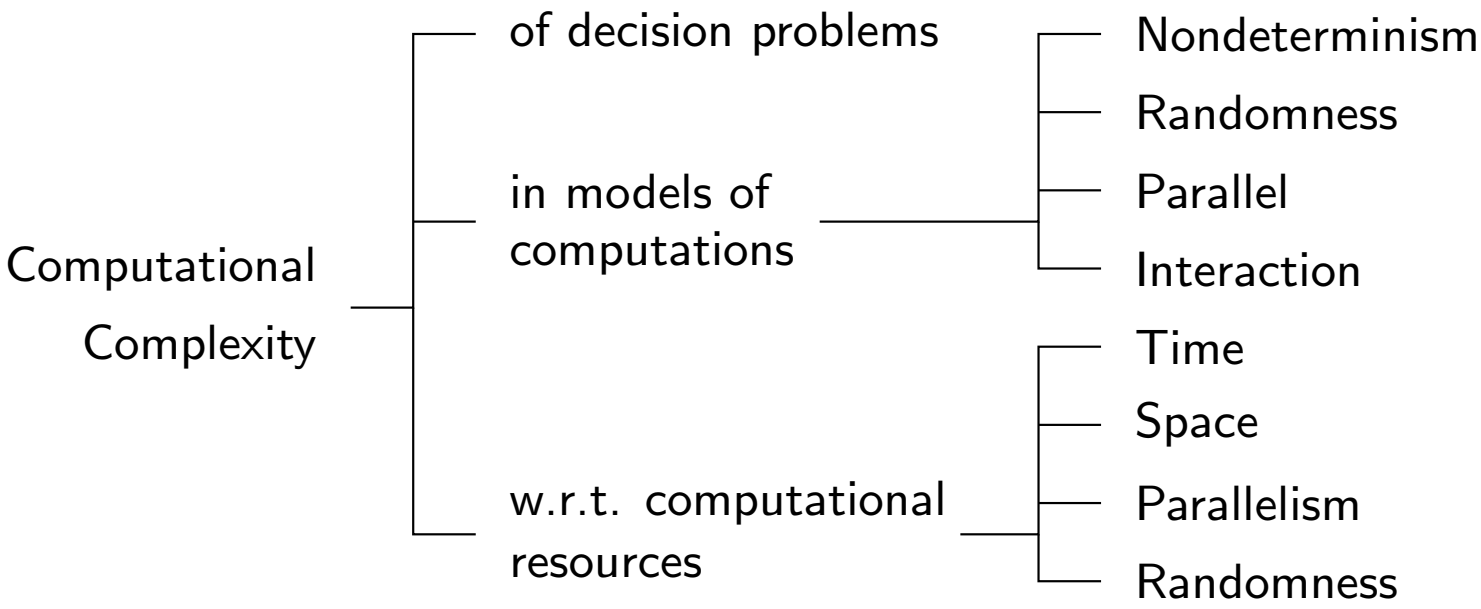
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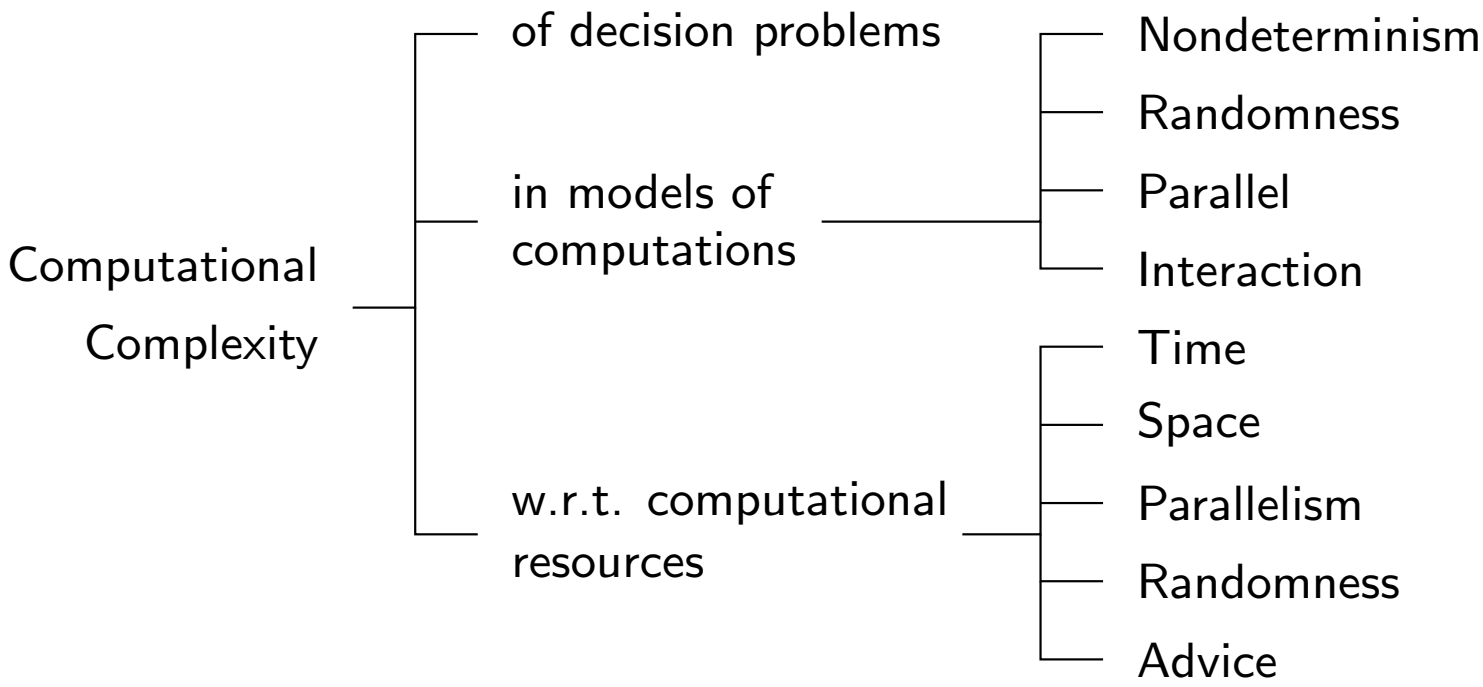
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Interaction
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Space
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Advice

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- Is finding proofs as easy as checking their correctness?
- Is every efficient sequential algorithm parallelizable?
- Can every (time) efficient algorithm be converted into one that uses a small amount of space?
- Can every efficient randomized algorithm be converted into an (efficient) deterministic one?