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# Independent Study Complexity Theory

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## Table of Contents

1	Introduction & Preface .....	3
2	Review .....	4
3	Polynomial Hierarchy, Alternating TMs .....	5
4	Boolean Circuits .....	6
5	Randomization .....	7
6	Interactive Proofs .....	8
7	Quantum Computation .....	9
8	PCP Theorem .....	10
9	Decision Trees .....	11
10	Communication Complexity .....	12
11	Algebraic Computation Models .....	13
12	Counting Complexity .....	14
13	Average-Case Complexity .....	15
14	Hardness Amplification .....	16
15	Derandomization .....	17
16	Expanders/Extractors .....	18
17	PCP and Fourier Transform .....	19
18	Parameterized Complexity .....	20

## 1 Introduction & Preface

Welcome to this series of lecture notes! The main book that the material comes from is Arora and Barak's *Computational Complexity* book [AB09]. Some material that is assumed from the reader (and is referenced in Section 2) is from Sipser's *Introduction to the Theory of Computation* book [Sip12]. We assume that the reader has a reasonable understanding of the following material:

- {Regular, Context-free, Turing-decidable, Turing-recognizable} languages, and their automata counterparts
- (Un)decidability
- Reducibility
- Recursion theorem
- Time complexity:  $\mathcal{P}$ ,  $\mathcal{NP}$ ,  $\mathcal{EXPTIME}$ , and the -complete versions
- Space complexity:  $\mathcal{PSPACE}$ ,  $\mathcal{EXPSPACE}$ ,  $\mathcal{L}$ ,  $\mathcal{NL}$ , and the -complete versions

4 Independent Study – Complexity Theory

## **2 Review**

### 3 Polynomial Hierarchy, Alternating TMs

6 Independent Study – Complexity Theory

## 4 Boolean Circuits

## 5 Randomization

8 Independent Study – Complexity Theory

## **6 Interactive Proofs**



## 7 Quantum Computation

10      Independent Study – Complexity Theory

## **8   PCP Theorem**

## 9 Decision Trees

12 Independent Study – Complexity Theory

**10 Communication Complexity**

## 11 Algebraic Computation Models

14 Independent Study – Complexity Theory

## **12 Counting Complexity**

## 13 Average-Case Complexity

16 Independent Study – Complexity Theory

## 14 Hardness Amplification



## 15 Derandomization

18    Independent Study – Complexity Theory

## **16    Expanders/Extractors**

## **17 PCP and Fourier Transform**

20 Independent Study – Complexity Theory

## 18 Parameterized Complexity

## References

- [AB09] Sanjeev Arora and Boaz Barak. *Computational Complexity: A Modern Approach*. Cambridge University Press, 2009.
- [Sip12] Michael Sipser. *Introduction to the Theory of Computation*. Course Technology, 2012.