# Ali Mahdavifar

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## Education

- **Sharif University of Technology** — Tehran, Iran
  B.Sc. in Computer Engineering; Cumulative GPA: 19.11/20 (Ranked 35$^{th}$ out of 199) — Sept 2019 - Present
- **Shahid Beheshti High School of Kashan (NODET)** — Kashan, Iran
  Diploma in Mathematics & Physics; Cumulative GPA: 19.81/20 — Sept 2016 - Sept 2019
  Under the supervision of National Organization for Development of Exceptional Talents

## Experience

- **Max Planck Institute for Informatics (D1: Algorithms and Complexity)** — Saarbrücken, Germany
  Summer Intern — Jul 2022 - Sept 2022
  - Under the supervision of Prof. A. Karrenbauer, I continued a project on the complexity of fine-tuning bias terms in specific neural networks. This summer we succeeded in improving the reductions from a geometrical problem to achieve NP-hardness proof of the problem. Currently, we are working on writing of the paper.

## Honors and Awards

- Awarded **Bronze Medal** in INOI (**Iran National Olympiad in Informatics** (Aug 2018).
  INOI is the national round of IOI, organized by Young Scholars' Club in Iran.
- **Ranked** 36$^{th}$ in **nationwide universities entrance exam** for B.Sc. programs in *Mathematics & Physics* branch, among more than 164,000 participants. (Aug 2019)
- **Ranked** 124$^{th}$ in **nationwide universities entrance exam** for B.Sc. programs in *foreign languages (English)* branch, among more than 165,000 participants. (Aug 2019)
- Acknowledged as the **youngest [honorary] member of the academic community of University of Kashan**, actively participating in basic courses of the faculty of mathematics at the age of 12. (Feb 2014) [link to the university bulletin]

## Skills Summary

- **Languages**: C/C++ (fluent), Python (fluent), Java (familiar), Verilog (familiar), R (familiar).
- **Database**: SQL databases, specially PostgreSQL.

## Notable Grades

- **General Maths (1&2)**: 19.5/20.0 & 19.0/20.0
- **Differential Equations**: 18.2/20.0
- **Numerical Computation**: 19.5/20.0
- **Computer Simulation**: 20.0/20.0
- **Advanced Programming**: 20.0/20.0
- **Data structure & Algorithms**: 20.0/20.0
- **Design of Algorithms**: 20.0/20.0
- **Linear Algebra**: 17.0/20.0

## Teaching Assistant

- **Discrete Mathematics** — Instructor: Prof. H. Zarrabi-Zadeh
  Responsible for designing some assignments and conducting TA classes and marking tests. — Spring 2021 & 2022 & 2023
- **Data Structures and Algorithms** — Instructor: Prof. Masoud Seddighin
  Responsible for designing assignments for some sessions as well as the final test. — Fall 2021
- **Design of Algorithms** — Instructor: Prof. H. Zarrabi-Zadeh
  Responsible for designing the assignment and TA class on NP-completeness. — Fall 2022

## Programming Projects

- **ChessFX**: Based on MVC architecture, I implemented a graphical chess game using JavaFX. (Jun 2020) [link to Github repo]
- **C-minus Compiler**: In this project, we implemented a simple compiler for a simplified version of the C language, called C-minus. I learned to work with DFAs, the LL parsing method, and code-generation techniques. (Feb 2022) [link to Github repo]
- **Simple Ray Tracer**: Following Peter Shirley's "Ray Tracing in One Weekend" book, I implemented my first simple ray tracer. In this project I learned about basics of ray tracing and antialiasing, implementation of reflections for several materials, depth of field, etc. (Nov 2022) [link to Github repo]