

# Borna Tavasoli

✉ borna.tavassoli@gmail.com | 🌐 borna-tl | 🏠 borna-tl.github.io

## EDUCATION

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### College of Electrical and Computer Engineering, University of Tehran

Tehran, Iran

B.Sc. in Computer Engineering ◊ 18.75/20

09/2019 – Present

- **1<sup>st</sup>** rank ◊ 2021 Spring Semester ◊ 19.59/20
  - **3<sup>rd</sup>** rank ◊ 2022 Academic Year ◊ 19.38/20
  - **Relevant coursework:** Discrete Mathematics\*, Introduction to Computing Systems and Programming\*, Data Structures and Algorithms\*, Design and Analysis of Algorithms\*, Advanced Algorithms\*<sup>†</sup>, Strategic Games, Formal Languages and Automata Theory, Advanced Programming\*, Artificial Intelligence
- † Graduate Course    ★ Full Mark

## RESEARCH EXPERIENCE

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### Shanghai University of Finance and Economics

Shanghai, China

Internship | Supervisor: [B. Laekhanukit](#)

07/2023 – 10/2023

- Came up with an extension of the detour problem in bounded-genus graphs after the recent paper of [Meike et al. \(2023\)](#). Our main goal was to use the same method on a more general class of graphs. For starters, we focused on solving the detour problem on a torus.
- The project has shown to be challenging. We have also considered solving the detour problem on noisy graphs. More specifically, we try to solve for a planar graph with planted (minors of)  $k_{3,3}$ s.

### Max-Planck-Institut für Informatik

Saarbrücken, Germany

Internship | Supervisor: [A. Polak](#)

03/2023 – Present

- Focused on the paper of [Hanauer et al. \(2020\)](#), and examined practical results of using predictions when answering the Partial Dynamic Transitive Closure of graphs.
- Implemented all of the experiments of the mentioned paper on our own and presented a competitive ratio for using predictions instead of the previous methods. Code repository can be found [here](#).

### The University of Hong Kong

Hong Kong

Internship (Online) | Supervisor: [Z. Huang](#)

07/2022 – 12/2022

- Worked with optimal stopping problems, more specifically, the prophet inequality problem. We came up with an extension of the problem that considers picking prizes in a range of  $k$  variables and tried to present a 2-approx algorithm that solves it.
- Tried to solve the problem using economic views inspired by the paper of [B. Lucier \(2017\)](#).

### Université Clermont Auvergne

Clermont-Ferrand, France

Remote Collaboration | Supervisor: [F. Foucaud](#)

09/2021 – 01/2022

- Worked on the metric dimension problem on planar graphs. We tried to see whether the problem remains NP-C in a more restricted class such as bipartite planar graphs with a maximum degree of 3. Our work and gadgets were inspired by [J. Diaz et al. \(2016\)](#).

## PUBLICATIONS

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### Discrete Mathematics Persian | [GitHub](#)

I collaborated on an open-source Persian book focused on providing free and complete resources of discrete mathematics for students. This project is under the supervision of [S. Mohammadi](#). My main contribution was to the *mathematical induction* chapter which consisted of introducing the concept with sufficient details, solving the more classical problems in the field, and designing new homework exercises.

## AWARDS & ACHIEVEMENTS

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**Top Honors Degree:** Awarded to top 3 bachelors with the highest GPA in an academic year. ('21-22)

**HKU CS Research Internship Programme Certificate:** Awarded to the students who had a satisfactory presentation at the end of the internship. It can be found [here](#). (Summer 2022)

**National University Admission Exam:** Participated in three different categories and secured the following results (07/2019):

- Ranked 121st in Mathematical Sciences (out of 164,278 entrants).
- Ranked 38th in Foreign Languages (out of 165,533 entrants).
- Ranked 206th in Arts (out of 103,665 entrants).

**World Mathematics Team Championship:** Won gold medal in the national selection exam. (2016)

**World Mathematics Invitational:** Won gold medal in the national selection exam. (2015)

## TEACHING ASSISTANTSHIPS

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### Algorithm Design | Instructor: [M. J. Dousti](#)

University of Tehran

*Chief TA*

09/2022 – Present

The Chief TA is in charge of all matters related to the course. Under the supervision of Dr. Dousti, I help design course material, organize the teaching staff, manage students' activities, hold TA sessions, etc.

*Teaching Assistant*

09/2021 – 09/2022

I helped with both designing and grading aspects of the course's weekly assignments.

### Discrete Mathematics | Instructor: [S. Mohammadi](#)

University of Tehran

*Supervisor TA*

09/2022 – Present

As a course supervisor, I mentor new teaching assistants and oversee course assignments.

*Teaching Assistant*

09/2020 – 09/2022

I helped with the course outline, problem setting (for both class quizzes and homework), and grading student assignments.

### Advanced Algorithm (*Graduate Level*) | Instructor: [H. Faili](#)

University of Tehran

*Teaching Assistant*

09/2022 – Present

I help with designing homework, quizzes, and TA classes. I also grade student projects and exams.

### Computer Aided Design | Instructor: [M. E. Salehi](#), [M. Modarressi](#)

University of Tehran

*Teaching Assistant*

01/2022 – Present

I designed, graded, and evaluated students' computer assignments in this course.

### Introduction to Programming | Instructor: [M. R. Hashemi](#), [H. Moradi](#)

University of Tehran

*Teaching Assistant*

09/2020 – 01/2022

I graded some of the projects and weekly homework.

## EXTRACURRICULAR ACTIVITIES

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### Event Director

University of Tehran, ACM Student Chapter

Programming Contests, Problem Solving competitions, etc.

11/2021 – 11/2022

I joined our student chapter as an event director and helped manage different events for the students. Some of the bigger events I directed had a staff of up to 50 people.

### Course Mentor

University of Tehran, ACM Student Chapter

Algorithms

Summer 2021

I helped organize the algorithm course in ACM's Summer of Code. In this course, participants will get familiar with some of the more practical algorithms for problem-solving in computer science and use them in various projects to strengthen their creative thinking skills.

## Course Mentor

Multimedia

University of Tehran, ACM Student Chapter

Summer 2021

I helped organize the multimedia course in ACM's Summer of Code. In this course, participants will learn to work with different editing applications (i.e. Adobe Premiere Pro, Adobe After Effects, etc.) and will build their own projects at the end.

## PROJECTS

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A comprehensive list of my university projects along with their descriptions can be found on my [Github](#) page.

### Artificial Intelligence Course Project

Python

- **Search Project:** Used BFS, IDS, and different versions of A\* algorithms to solve a specific search problem.
- **HandsOn Project:** Used minimax and genetics algorithm for two separate projects.
- **NaïveBayes Project:** Wrote naïve bayes classifier that helps group different advertisements into their right categories.
- **DecisionTree Project:** Used Scikit-Learn library to predict labels and optimize them based on Decision Tree and Random Forest models.
- **NeuralNetwork Project:** Implemented a Feed Forward Neural Network from scratch in the first phase. In the second phase, I used TensorFlow library and Keras high-level interface to train a neural network that classifies different types of animals.

### Advanced Programming Course Project

C++, HTML, CSS

- **Game Project:** An event-driven, graphical implementation of Fieldrunners using the [RSDL](#) library.
- **Final Project:** An online hotel reservation website operating with [APHTTP](#) (A simple web-app framework) with emphasis on OO Design. Implemented in three phases.

## WORK EXPERIENCE

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### Back-end Data Engineer

Tehran, Iran

[Karafs Team](#), App that helps you count your daily calories.

05/2021 – 08/2021

I did data analysis (Elasticsearch, Kibana, etc.) to gather information on users' interaction with the suggestion box of the app and handle their requests.