Mohammad Hossein Ebtehaj

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INTERESTS

– Quantum complexity and computation
– Complexity theory
– Theoretical computer science

EDUCATION

Master's in Computer Science   2021–Current
University of Waterloo   Waterloo, Canada

– GPA: **98/100** (Current)

B.Sc. in Computer Science   2016–2021
Sharif University of Technology   Tehran, Iran

– GPA: **98/100**
– Minor degree: **Mathematics and Applications**
– rank in year group (Math department): **1$^{\text{st}}$**

EXPERIENCE

Research assistant under supervision of *Dr. Shalev Ben-David*   2021–Current
Faux deterministic algorithms in black-box model and their implications.   University of Waterloo

– We define faux deterministic algorithms to be a relaxation of pseudo-deterministic algorithms: algorithms that may use randomness, but are hard to be distinguished from deterministic algorithms for any adversary running in polynomial time. We have shown that in black-box model, all verifiable search problems that have an efficient randomized algorithm have an efficient faux deterministic algorithms. Currently, we are researching on relations between black-box faux deterministic algorithms, meta-complexity, and white-box models of computation.

B.Sc. project under supervision of *Dr. Amir Daneshgar*   2020–2021
Computation from the viewpoint of homogeneous, discrete and local dynamical systems Sharif University of Tech.
In this project

– In this project, we gave an equivalent definition of *computers* and *enumerators* as closures of local relations and proved several theorems regarding equivalence of computers as well as normalization of *deciders* and *acceptors* in standard forms. This project is going to be the part of the graduate book "Theory of Computation" by *Dr. Amir Daneshgar* (unpublished).

SELECTED COURSES

– Adv. Topics: Graduate Complexity Theory (100/100)   University of Waterloo

– Adv. Topics: Quantum Communication and Query Complexity (96/100)   University of Waterloo

– Adv. Topics: Eigenvalues and Polymomials (97/100)   University of Waterloo

– Quantum Information Processing (99/100)   University of Waterloo

– Adv. Logic [Gödel's Incompleteness Theorems] (20/20)   Sharif University of Tech.

– Foundations of Mathematics (20/20)   Sharif University of Tech.

Course Projects

– A Survey on Impossibility results in the key agreement problem(CS 867)   University of Waterloo

– A survey on Dinur's proof of PCP theorem(CS 860)   University of Waterloo

Teaching

- TA of Algorithms Design and Analysis, *Dr. Therese Biedl*   Fall 2022
- TA of Logic, *Dr. Mohammad Ardeshir*.   Spring 2020, Fall 2020
- TA of Foundations of Theory of Computation (Graduate), *Dr. Amir Daneshgar*.   Spring 2020
- Head TA of Foundations of Mathematics, *Dr. Mohammad Safdari*.   Spring 2020
- Head TA of Linear Programming, *Dr. Kasra Alishahi*.   Fall 2019
- TA of Automata and Formal Languages, *Dr. Javad B. Ebrahimi*.   Fall 2019

Tenchincal Skills

- **JAVA**, upper intermediate expertise; implemented several projects in basic and advanced programming courses.

- **Python**, intermediate expertise; implemented projects in various courses, such as Cryptography, Analysis of Algorithms, Data Structures, Operating Systems, and Computer Networking.

- **SageMath**, implemented a few projects in Discrete Mathematics.

- **MATLAB**, implemented several small projects in Numerical Analysis.

- **Solidity**, implemented several projects in Blockchain course.

- **Racket**, TAed Racket programming course at University of Waterloo

- **LATEX**, upper intermediate expertise; wrote project reports, lecture notes, exercises.

Languages

- **Persian:** Native fluency
- **English:** Proficient fluency (TOEFL iBT: 113/120.)

Personal Skills

- **Sharif Music Club**
    – Elected central board member (specifically in charge of club's properties and archives).   2019-2020
    – Taught classical piano at Sharif University of Technology.   2019-Pandemic

- **Music**
    – Classical piano   2012–Current
    – *Tom'bak* (Persian percussion instrument).   2006-2010
    – 2nd-best performance in the classical section of "Sharif Festival of Music", and 3rd place for music composition in "Sharif Festival of Art".
    – Attended Chetham's summer school of piano   2018