

SACHAL ABDULLAH

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SUMMARY	I am an early-career mathematician with original research experience in graph theory and combinatorics. I have taught mathematics across secondary and university levels. Currently continuing research on open problems in uniquely Hamiltonian graphs with the goal of publication. Seeking position as a PhD candidate where this research can be developed further. Additionally open to Mathematics Researcher or a Teaching Assistant role.	
EDUCATION	Department of Mathematics and Physics, Charles University <i>Bachelor of Science in Computer Science</i>	Prague, Czechia 2022 – 2024
	• Research area: Graph Theory and Combinatorics • Conducted primary thesis research on Sheehan's Conjecture and uniquely Hamiltonian graphs; ongoing research towards publication	
	Department of Computer Science, Forman Christian College <i>Bachelor of Science (Honors) in Computer Science</i>	Lahore, Pakistan 2013 – 2018
	• Research area: Game Theory and Artificial Intelligence	
EXPERIENCE	Substitute Teacher International School of Prague	2025
	• Served as mathematics and science substitute teacher for middle school students, covering full lessons independently. • Occasionally responsible for theatre classes, demonstrating adaptability across subjects.	
	Guest Lecturer Czech MENSA Summer Camp, Czechia	2024
	• Designed and delivered lectures introducing graph theory and mathematical problem-solving to approximately 40 gifted students aged 6–18.	
	Private Tutor Mathematics	2018 – present
	• Over 6 years of continuous private tutoring in mathematics, working with 10+ students primarily at secondary school and undergraduate computer science level.	
	Teaching Assistant FAST-NUCES, Lahore	2018 – 2019
	• Supported approximately 30 students per semester in an undergraduate Artificial Intelligence course; held office hours, graded assignments, and delivered the mathematical components of lectures.	
	Research Assistant ITU, Lahore	2018 – 2019
	• Surveyed research literature on uniquely Hamiltonian graphs and the Hadwiger–Debrunner (p, q)-problem in preparation for original research.	
	Volunteer Teacher MAKEISTAN (ITU), Lahore	2017 – 2019
	• Delivered mathematics and STEM presentations and assisted with organising educational activities for community outreach programmes.	

RESEARCH
AND PROJECTS

Thesis: Uniquely Hamiltonian Graphs

Explored Sheehan's Conjecture on the non-existence of uniquely Hamiltonian regular graphs. Analysed the limitations of Fleischner's construction via the Blanuša snark, applied the Lovász Local Lemma to extremal cases, and proposed open questions for further investigation.

Thesis: Traffic Regulation Using Game Theory

Proposed an intelligent traffic light system combining Game Theory, Markov Models, and Reinforcement Learning to dynamically optimise signal timings based on real-time traffic data, with application to high-congestion urban environments.

Tiny Java Compiler

Developed a compiler for a subset of Java as part of the Compiler Construction course, covering lexical analysis, parsing, and code generation.

Convolutional Neural Networks — Computer Vision

Implemented vehicle detection using Gaussian mixture models and Python image-processing libraries as part of a Computer Vision course.

SKILLS

Mathematics: Graph Theory, Combinatorics, Game Theory, Analysis, Probability

Teaching: Secondary & Undergraduate Mathematics

Programming: Python, L^AT_EX, Java

Languages: English (fluent), Urdu (native)

ACADEMIC
AND OTHER
ACTIVITIES

- **EuroComb 2021** — Participant, International Conference on Graph Theory and Combinatorics, Barcelona
- **Volunteer Teaching:** Mathematics, Computer Science, and STEM outreach (2017–2019)
- **Creative Writing:** Critique and proofreading