HARICHARAN B

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EDUCATION AND SCHOLASTIC ACHIEVEMENTS

Degree	Institution	%/CGPA	Year of Completion
B. Tech. (Hons.) in Engineering Physics	Indian Institute of Technology Madras	9.43	2025
XII Std	Modern Senior Sec. School, Chennai	98.4 %	2021
X Std	Modern Senior Sec. School, Chennai	96.8 %	2019

- **Department Rank 1** in Engineering Physics with highest CGPA

COMPETITIVE PROGRAMMING

- **Candidate Master** in Codeforces (Max. rating: 1913)
- Uploaded solutions for over 600 problems, templates, and code snippets in public GitHub repository

Round	Rank	Participants
Codeforces round #886 (Div. 4)	Global rank #59	25000 participants
Codeforces round #860 (Div. 2)	Global rank #174	27000 participants
Codeforces round #855 (Div. 3)	Global rank #174	30000 participants
Codeforces round #829 (Div. 2)	Global rank #181	21000 participants

RELEVANT COURSES AND TECHNICAL SKILLS

- Probability and Statistics
- Applied Linear Algebra
- Mathematical Physics
- Quantum Computing
- Multirate Signal Processing
- Convex Optimization
- Approximation Algorithms
- Principles of Economics
- Digital Systems & Lab

- Programming Languages and Softwares: C, C++, Python, MATLAB, LaTeX, Haskell
- Algorithms: Fast-fourier transform, Computational Geometry, Randomized algorithms

RESEARCH EXPERIENCE

Lattice Filters under Prof. C. S. Ramalingam Aug 2023 - Present
Dept. of Electrical Engineering, IITM

- Performed brute-force calculation on MATLAB to determine oddness or evenness of lattice coefficients
- Worked on discovering conditions on lattice coefficients which lead to many-one lattice filters

iLQR Control System under Prof. Sourav Rakshit Nov 2022 - Jan 2023
Gait And Motion Analysis (GAMA) Lab, Machine Design Section, IITM

- Worked on trajectory tracking using advanced control systems including Linear-Quadratic Regulator (LQR), iterative LQR (iLQR), and Soft Actor Critic (SAC) for gait training of paralyzed patients with 75% accuracy
- Contributed to Open Source Repository in implementing LQR to achieve multiple-motor position control

PROJECTS

TMOTOR CAN Communication Library
Open Source Contribution

- Created and published open-source Python library for integration of motor with CAN communication
- Used Standard CAN and BUSMASTER libraries to interface laptop with motor using Kvaser Leaf Light v2
- Implemented position control and velocity control in TMOTOR AK80-64 using Torque-based PID control

POSITIONS OF RESPONSIBILITY

Head and Co-Founder Nov 2022 - Present
Mathematics Club, Centre for Innovation (**CFI**), IITM

- Founder and Head of Mathematics Club, Centre for Innovation, IITM with a reach of 1000+ students
- Conducted sessions and workshops on number theory, cryptography, quintic insolvability and dynamic games
- Devising and heading projects on Probability and Stochastics, Nonlinear dynamics and Group Theory

Strategist Apr 2023 - Present
Programming Club, Centre for Innovation (**CFI**), IITM

- Conducting sessions for students on Competitive Programming topics like Graphs and Dynamic Programming
- Made video editorials on Youtube for Codeforces Rounds #844, #860, #877, #878, #879 with over 5000 views
- Curated questions for Freshie programming contest and Summer programming contest using Polygon platform

Core Team Member Feb 2023 - Nov 2023
Cybersecurity Club, Centre for Innovation (**CFI**), IITM

- Conducted exploratory session on file forensics, web exploitation and reverse engineering for over 100 people
- Conducted workshop on cryptographic algorithms such as RSA encryption and Diffie-Hellman key exchange
- Hosted and prepared questions for 24-hour Capture the Flag event (CTF-0) with 60 participating teams

Mathematical Modelling of Physical Systems Apr 2022 - Mar 2023
Horizon: Physics and Astronomy Club, Centre for Innovation (**CFI**), IITM

- Researched on multi-agent Lotka-Volterra Model and SIR model for population dynamics
- Analyzed COVID-19 by developing differential equations to study infection using time-dependent analysis
- Simulated epidemics by using Manim Python library to observe spread of infection in urban areas

Visualizer Library Apr 2022 - Mar 2023
Programming Club, Centre for Innovation (**CFI**), IITM

- Created visualizing tools for common graph theory algorithms using Python (NetworkX) package
- Researched on BFS, DFS to develop greedy algorithm for Maze solver, Snake Game, and Stable Matching
- Used Dinic's maximum flow algorithm to develop 20% faster algorithm for Split-Wise App Emulator

HONORS AND AWARDS

- Presented achievements of Mathematics club at **G20 Summit** held at IIT Madras to international delegates
- 7th in **Shaastra CTF** among 162 teams across India, by solving innovative problems in cybersecurity
- 3rd in **Shaastra Embedded Programming Challenge** by developing motion sensors, using ESP32 microcontroller