Asish Kumar Mandoi

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Homepage
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Education

2019 – 2023 **Bachelor of Technology in Electrical Engineering**, *Minor in* **Physics**, *CPI: 7.5/10.0*
Indian Institute of Technology Kanpur, India

2019 **Grade XII (CBSE Board)**, *Cumulative Percentage: 93.8%*
MBS Public School, Bhubaneswar, India

2017 **Grade X (CBSE Board)**, *CGPA: 10.0/10.0*
DAV Public School, Bhubaneswar, India

Interests

Quantum Technology, Quantum Computing, Quantum Error Correction, Optimization, Software Development, Open-Source Software, Quantum Physics, Relativity

Achievements & Honours

Programming Achievements

2021 **IBM Quantum Challenge, Fall 2021**
Badge **Among 677 worldwide** to complete the 10 day challenge by solving problems in areas of finance, natural sciences, machine learning and optimization using **Quantum Computing**

2020, 2021 **Google Kickstart**
Globally ranked 1636 in Round E 2021, **1055** in Round D 2021, and **976** in Round H 2020

2020, 2021 **Facebook Hacker Cup**
Globally ranked 1967 in Round-1 2021 and **2769** in Round-1 2020

Scholastic Achievements

2019 **All India Rank 3592**, in **JEE-Advanced** out of 220,000+ shortlisted candidates

2019 **All India Rank 7480**, in **JEE-Main** out of 0.9 million+ candidates

2019 **National Top 300**, to be selected for **Indian National Chemistry Olympiad**, HBCSE

2017 **All India Rank 322**, in **KVPY** out of 50,000+ candidates and selected for **KVPY Fellowship** by Govt. of India, and IISc Bangalore

Experiences

Oct '21 – Jan '22 **Quantum Computing Mentorship Program**
QOSF *Quantum Open Source Foundation, Mentor: Dr. Vesselin G. Gueorguiev*
GitHub
- Among ~**40 out of 1000+** to be selected for the program and recognized for developing **one of the best solutions** to an assessment task by implementing **Quantum Search on Unstructured Data** using quantum input loading and **Grover's algorithm**

GitHub
- Implemented new solvers based on clustering and non-clustering approaches for the **Travelling Salesman Problem** (TSP) and the **Vehicle Routing Problem** (VRP) using **Quantum Annealing**
- Worked on **improving applicability** of quantum annealing-based solvers for TSP and VRP by optimizing our algorithms to use **minimal number of qubits**
- Compared the runtimes and accuracies of various solvers run on **D-Wave Quantum Annealers**

Dec '21 – Present **Optimizing Logistics using Quantum Algorithms**
QWorld *QResearch Project, Leader: Paweł Gora, QWorld*
- Consolidated results from experiments run on D-Wave quantum annealers and described the implementations of our solvers
- **Contributed to a comprehensive report** summarizing research on practical implementations of various techniques including hybrid neural networks, graph coarsening, quantum annealing and gate-based approaches to solve the Vehicle Routing Problem

Presentations

Dec '21 — *Presentation*

Presented my work on "*Clustering and non-clustering based approaches to solve the Vehicle Routing Problem*" as part of my project at **Quantum Open Source Foundation** to guests like **Paweł Gora** in Quantum Computing Meets hosted by Dr. Vesselin G. Gueorguiev

Selected Projects

May '21 – Jul '21 — *GitHub*

IITK-Coin

Backend of a pseudo-currency system to be used in the IITK campus | Programming Club, IIT Kanpur

- **Developed the backend** from the ground up using **Golang** and **SQLite**
- **Secured** the endpoints by incorporating user authorization using **JWT**s
- Built an **additional layer of protection against hacks** by employing the **Bcrypt** algorithm to **hash and salt passwords**
- Added a **transaction tracking** functionality for administrators and implemented an **OTP based confirmation system**
- **Increased server efficiency** by handling up to **300 concurrent transactions per second** by utilizing the **Write-Ahead Logging** mode in SQLite and **Redis** for caching

DockerHub

- Containerized the application using **Docker** and made it **publicly accessible** on DockerHub

Jan '21 – Feb '21 — *CWoD*

Crio Winter of Doing

Externship program for developers | Crio.Do

- Acquired familiarity in **HTTP, REST API, AWS, Linux, Git, HTML, CSS, JavaScript** by implementing related concepts
- **Launched an instance of Amazon EC2**, deployed the backend server of the QEats (dummy) android app, and connected the app to its backend server
- Sorted cities based on the popularity of the QEats android app by **analyzing 10k+ logs** using **Linux shell techniques**
- Deployed the frontend and the backend of my **Personal Portfolio** web application
- Integrated my **GitHub** account with this application enabling it to fetch repository descriptions in **real-time**
- Among the **final 1200 out of 10,000+** total applicants to clear the coding round and reach **Stage-2B**

Apr '21 – Jun '21

Algorithms based on Maths

Stamatics, IIT Kanpur

- Implemented and applied algorithms like prime factorization, factorial calculation, and **polynomial hashing** in C++
- Improved proficiency in **developing optimal approaches** to solve **mathematical programming** problems by actively participating in **competitive-programming contests**

May '20 – Jul '20 — *Final Report*

String Theory for Beginners

Science Coffee House IITK, Mentor: Gurmeet Singh, Ph.D. student at IIT Kanpur

- Acquired a qualitative understanding of early modern physics and **String Theory** by doing a thorough study of the book - *String Theory for Dummies* by Andrew Z. Jones
- Performed detailed study on exciting scientific topics like **blackhole kinematics**
- **Contributed to the final report** for the project concisely describing String Theory

Technical Skills

Languages	C, C++, Python, Go, MATLAB, JavaScript
Web	Node.js, Express, Next.js, HTML, CSS, PHP, MySQL, SQLite, Redis
SDKs	Qiskit, Ocean
Utilities	Linux shell utilities, Git, Docker, LaTeX

Relevant Coursework

Computer Science	Quantum Computing[i], Data Structures and Algorithms[o], Fundamentals of Computing, Intro to Machine Learning[i]
Electrical Core	Digital Control, Digital Electronics, Microelectronics, Principles of Communications, Convex Optimization in SP-COM[o]
Maths & Physics	Quantum Physics[o], Probability and Statistics, Complex Analysis

[i]: informal, [o]: ongoing, [hyperlinked at appropriate places]