



## EDUCATION

Year	Degree/Exam	Institute	CGPA/Marks
2024	B.TECH	IIT Kharagpur	9.01 / 10
2020	Higher Secondary School Examination	Bharatmata Higher Secondary School, Shahdol	94.00%
2018	All India Secondary School Examination	Jawahar Navodaya Vidyalaya, Shahdol	96.60%

## AWARDS AND ACHIEVEMENTS

- Achieved a peak rating of **1681 (Expert)** on **Codeforces** by actively participating in competitive programming contests (*user: abhay\_k47*)
- Secured **AIR 773** in JEE (Advanced) 2020 out of **250,000** eligible applicants and **AIR 987** in JEE (Main) 2020 out of **1.2 million** candidates
- Awarded the **KVPY Fellowship** for securing an **All India Rank of 751** in KVPY Exam (SX 2019-20) conducted by Indian Institute of Science
- Offered the **MMVY Scholarship** for meritorious academic performance by Ministry of Technical Education, Govt. of Madhya Pradesh
- Qualified for the **Indian National Chemistry Olympiad 2020** for being among the **top 800** out of **50,000** candidates in **NSEC Examination**

## INTERNSHIPS

### Software Engineering Intern | Jaguar Land Rover India | Received Pre-Placement Offer [May '23 - Jul '23]

- Developed a C++ based **JSON parser** utility to retrieve critical **metadata** for performing **software updates** in automotive systems
- Ensured **cross-platform** compatibility leveraging **CMake** build framework by implementing tailored **adaptations** for **Linux** and **QNX OS**
- Utilized **ARXML** to create a sample **Adaptive AUTOSAR** application that serves as interface for **inter-module IPC** via **SOME/IP** protocol
- Revised scripts for **QNX build** with **backward compatibility** for **Linux** build to streamline transition between development environments
- Adapted the entire team project from CMake on Linux/QNX to the **Ultron build framework** ensuring compatibility with **CI-build** pipelines

## PROJECTS

### Custom Linux Shell | Operating Systems | Prof. Mainack Mondal [Jan '23 - Feb '23]

- Developed a C++ based command-line interface featuring input/output **redirection**, **background execution**, and **process interruption**
- Utilized **process groups** and **signal handlers** to support the simultaneous foreground and background execution of **piped commands**
- Enhanced system safety with commands for **file lock** and **heuristic-based fork bomb detection**, including identification of potential root
- Provided support for **wildcards**, command **history navigation**, and **command-line editing** to improve user experience and productivity

### PingNetInfo | Computer Networks | Prof. Arobinda Gupta [Mar '23 - Apr '23]

- Developed a network diagnostic tool employing a **raw socket interface** for **ICMP** packet analysis to provide valuable performance insights
- Designed a **path discovery** mechanism akin to **traceroute**, to progressively identify intermediate nodes and enhance troubleshooting
- Estimated **latency** and **bandwidth** for **each** intermediate network link, leveraging **RTT** measurements and diverse **probing** techniques

### Hospital Management System | Database Management Systems | Prof. Pabitra Mitra [Feb '23 - Mar '23]

- Developed a scalable **web-based** application with **ReactJS**, **NodeJS**, and **MySQL** to optimize operational efficiency and patient care
- Incorporated a **calendar-based scheduling** system for both **routine** and **emergency** appointments facilitating **email** notifications
- Implemented **role-based login** to ensure **data security** and **access control** and integrated a **file storage system** for medical records

### KGP-miniRISC Processor | Computer Organization & Architecture | Prof. D. Mukhopadhyay [Oct '22 - Nov '22]

- Designed a modular and extensible **single-cycle** execution unit for **32-bit** Instruction Set Architecture rooted in **RISC** principles
- Developed an **encoding format** for a total of **23** distinct data **transfer**, data **manipulation**, program **sequencing**, and **control** instructions
- Engineered a **Von Neumann Architecture** for **ALU**, **Data Path**, and pure combinational **Control Unit** for the ISA, shaping its functionality
- Implemented the design on **Xilinx ISE** and then programmed the **Nexys A7 FPGA** with the generated **bitstream** for testing and validation

## COMPETITION/CONFERENCE

- Obtained a global rank of **629** in the Educational Round 153 (Division 2) on **Codeforces** among **33,000** participants
- Attained global ranks **10** and **111** in **Codechef** May Long Two 2022 and Starters 42 among **2700** participants (handle: **abhay\_k47**)
- Participated in **Meta Hacker Cup 2022** and achieved a global rank of **1086** and Country Rank **193** in **Round 2** out of **27,600** participants
- Finalist**, among **15 teams**, at **OverNite**, an ACM-certified team programming event organised by Kshitij (Technology Fest), IIT Kharagpur

## COURSEWORK INFORMATION

**Theory and Lab:** Programming and Data Structures | Algorithms | Software Engineering | Systems Programming | Switching Circuits and Logic Design | Operating Systems | Computer Networks | Database Management Systems | Computer Organization and Architecture  
**Theory:** Theory and Applications of Blockchain | Object Oriented Systems | Probability and Statistics | Discrete Mathematics

## SKILLS AND EXPERTISE

**Programming Languages:** C++ | C | Java | Python | Bash | SQL | JavaScript | CSS | HTML | Verilog (HDL)  
**Tools and Frameworks:** C++ STL | Pthreads | Java Swing | Node.js | React.js | Git | CMake | LaTeX  
**Skills:** Object Oriented Design | Systems Programming | Socket Programming | Concurrent Programming | Data Structures and Algorithms

## POSITIONS OF RESPONSIBILITY

**Student Mentor | Students' Welfare Group, IIT Kharagpur [Nov '22 - Present]**  
Mentored **3** freshmen of the 2022 batch, conducted monthly meet-ups, and guided them in exploring diverse academic and career domains