HIMANSHU **MUNDHRA**

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EDUCATION

Degree	Institute / Board	Year	CGPA(ACGPA) / %
B. Tech in Computer Science and Engineering	IIT Kharagpur	2016 - 2020	**9.53(10) / 10** - IR8
All India Senior School Certificate Examination	Birla High School - CBSE	March, 2016	**95.2 %** - Rank4
All India Secondary School Examination	Birla High School - CBSE	March, 2014	**10 / 10** - Rank2

INDUSTRIAL EXPERIENCE

Member of Technical Staff Intern | Rubrik, Inc. **Summer'19**

- Designed from scratch a **High-Throughput Data Streaming Library** with minimal overhead above TCP to support smooth and fast flow of large amounts of data in **LVM Snappables**.
- Provided support for **pipelining of data transfer** to increase throughput which was essentially required in **High Latency Replication and CDP Links** where data transfer was occurring in a serialised manner using Apache Thrift.
- Used a **Thread-per-connection Concurrency Control** Mechanism and provided support for both **rewindable and non-rewindable** producers and consumers on a **secured duplex** channel.

TEACHING EXPERIENCE

Teaching Assistant | Algorithms-I CS20003, IIT Kharagpur **Jul'19 - Nov'19**

- Organise tutorials for the students, set practice problems and solve them in the class of 120 along with doubt clearing.

Lecturer | Competitive Programming Workshop, IIT Kharagpur **Jan'19 - May'20**

- Designed and Lectured an Intermediate Competitive Programming Workshop for the students of IIT Kharagpur.

RESEARCH EXPERIENCE

Student Researcher | CNERG Lab, IIT Kharagpur **Autumn'19**

- Working on **assigning stance to textual data** by a user catering to a particular target using **Knowledge Graphs**.
- Aiming to analyze the **effect of external knowledge from KG** about target and entities in tweet in predicting stance.

MAJOR PROJECTS

Live Modifiable Server **Prof. Sandip Chakraborty | Spr'20**

- Working on a **live modifiable server**, where changes in server code are immediately reflected in the executable.
- Uses **Signals and I/O Multiplexing** to communicate events and **Pipes** for data transfer within the process group.
- A **Wrapper Server** acts as the **Control Channel** for GET and PUT and maintains a dummy connection to the Client.
- The functional **Connection Channel** of the Server is **restarted as a separate process** from the previous breakpoint.
- Deployed and tested the system on **MiniNAM** by switching between relay replication nodes by pausing a PUT transfer.

Memory-Resident Unix-Like File System **Prof. Indranil Sengupta | Spr'19**

- Created a **Multi-Level Directory Tree like File System** which supports all Linux-type file commands.
- **Linked List Implementation** where the Free Blocks are a Bit Vector and Data Blocks are maintained in a FAT.
- **iNode Implementation** where the Free Blocks are a Linked List and the File Blocks are maintained in iNodes.

AWARDS and ACHIEVEMENTS

- Holding **InstituteRank 8** among the B.Tech students of the Indian Institute of Technology, Kharagpur **Dec'19**
- Holding **DepartmentRank 4** among the B.Tech students of the Department of Computer Science & Engineering **Dec'19**
- **Peak Rating 2082** on CodeChef, **1726** on Codeforces and **Level 7** on InterviewBit **Dec'19**
- Acquired a **Rank of 189 (Round G)** and a **Rank of 121 (Round H)** in **Google Kick Start 2019** **Nov'19**
- Qualified for **Google Code Jam - Round 2** and **Facebook Hacker Cup - Round 2** **May'19**
- Acquired a **Rank of 45** in ACM-ICPC Amritapuri-Coimbatore Regionals Onsite Finals **Dec'18**
- **Awarded** by the Department of Computer Science & Engineering for performance par excellence in 2017 **Apr'18**
- **Awarded** the Batch of 1985 Scholarship by the Institute for excellent academic performances in 2016-17 **Mar'18**
- **Changed Department** to Computer Science & Engineering by acquiring an **InstituteRank 9** in the first year **Jul'17**
- Acquired a **top 1.22%** rank in JEE Advanced-2016 and **top 0.32%** rank in JEE Mains-2016. **Jun'16**

TERM PROJECTS

Loadable Kernel Module **Prof. Sandip Chakraborty | Aut'19**

- Created a world-readable and writable user-space interface to the LKM as a file in the **/proc** folder.
- The LKM **stores data in a BST** and reads data node by node in each read call in user determined order of tree traversal.
- The LKM **handles concurrency and mutual exclusion of data** from **multiple user-space programs**.

Virtual Memory using Demand Paging **Prof. Indranil Sengupta | Spr'19**

- Created **different modules** such as Master, Scheduler, Processes and the Memory Management Unit (MMU).
- Implemented message passing between modules through **Blocking Synchronous IPC Message Queues**.
- Accessed **Shared Memory** synchronously using **signals & messages** to indicate safe and mutually exclusive access.

Reliable User Datagram Protocol **Prof. Arobinda Gupta | Spr'19**

- Created a **Static Library** with all required functions for our protocol - socket(), send(), recv(), close().
- Created a **Concurrent Thread** which managed the Receiving of Messages and placed them into the Receive Buffer.
- This Thread also managed the **Acknowledgements and the Re-transmissions** to ensure reliability.

Auditorium and Room Booking System (HOVA) **Prof. Shamik Sural | Spr'19**

- Developed a **Web Application** on Java NetBeans using **JSP and MySQL** to automate room booking in IIT Kharagpur.
- Included dynamic features like submitting/accepting booking request at both the Applicant and Verification Side.

Restaurant Automation System (RAS) **Prof. Sudip Misra | Spr'18**

- Developed a **Desktop Application** on Java NetBeans using **Swing and MySQL** to automate all activities in a restaurant.
- Tested the software using **JUnit Testing technique** with a **well-rounded test suite** to debug the errors.
- Employed industrial software development techniques including preparing **SRS**, **DFD** and **UML Diagrams**.

Parallel Programming **Aut'19 - Ongoing**

- Implemented Block Reduction, Convolution Kernel, Optimised Parallel Reduction, and used Shared Memory in **CUDA**.
- Implemented an Image Processor, Parallel Merge Sort, and Time-Analysed a manual Broadcast Tree using **MPI**.
- Implemented a Point-Rotation Matrix about a given Axis and a Sparse-Matrix Multiplication program analysing change in execution time with threads, chunks size assigned to each thread and scheduling algorithms in **OpenMP**.

Systems Programming **Spr'19 - Ongoing**

- Implemented a rudimentary **Command-Line Interpreter** for Linux on C++ using **forks and pipes**.
- Developed a **Process/Thread Scheduler** which implements the common Process Scheduling Algorithms.
- Simulated a **Multi-threaded mutually exclusive deadlock free** Producer-Consumer problem implementation.

Socket Programming **Spr'19 - Ongoing**

- Developed an **iterative FTP Server and FTP Client** following a subset of the File Transfer Protocols.
- Developed a simplistic implementation of a **Peer-to-Peer Live Chat Relay Server**.
- Developed a version of the Linux-Command **$traceroute** using **Raw Sockets** and the **TTL Field** in the IP Header.

OTHER PROJECTS

Web Crawlers - Developed workable web crawlers for CodeChef, InterviewBit and CreateDebate using **BS4** and **Requests**
tinyC Compiler - Wrote a Lexical Analyser in **Flex**, Semantic Parser in **Bison** and Machine Independent Code Generator
Machine Learning - Developed a **Regression** Tool, **Decision Tree** Classifier and an Agglomerative Hierarchical **Clusterer**

SKILLS and EXPERTISE

Languages/ OS : C, C++, Python, Haskell, Scheme, UML, MySQL, Java, JSP, LaTeX, MIPS, Windows, Ubuntu
Tools : Git, Netbeans, MiniNAM, Swing, VSCode, Sublime Text, Arcanist/Phabrigator, Vim
Libraries : C++ STL, NumPy, Pandas, Matplotlib, Scikit, CUDA, OpenMP, MPI, BeautifulSoup, Requests

POSITIONS of RESPONSIBILITY

Tech Lead at CodeClub, IIT Kharagpur **Oct'17 - Present**

- Organised an **HSBC powered Hackathon** in campus for the students of IIT Kharagpur.
- Organised **up.AI**, a one of a kind flagship event solely dedicated to the use of AI for Social Good.
- Organized **Code.Fun.Do**, a Microsoft sponsored hackathon which involved the participation from various institutes.
- **Head - Technical Blogs** on Programming at https://medium.com/@codeclub.iitkgp.

Student Mentor at Student Welfare Group, IIT Kharagpur **Aug'18 - July'20**

- **Mentor** to 5 students of the junior batch, act as the first stop for all their academic and personal doubts .

Volunteer at National Service Scheme, IIT Kharagpur **July'16 - Apr'18**

- **Taught** the students of a primary school for an hour each weekend in a village in the Porapara District of West Bengal.
- **Conducted Surveys** in a village in the Porapara District of West Bengal to learn about their grievances and act on them.