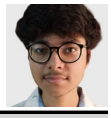
# SHANKH GUPTA



## ACADEMIC DETAILS

| Year | Degree / Board | Institute | GPA / Marks(%) |
|---|---|---|---|
| --- | B.Tech and M.Tech in Computer Science & Engineering | Indian Institute of Technology Delhi | 7.98 |
| 2021 | Central Board of Secondary Education | Sanskar Public School, Gwalior | 93.2% |
| 2019 | Central Board of Secondary Education | St. Paul's School, Gwalior | 95.2% |

## SCHOLASTIC ACHIEVEMENTS

- **Joint Entrance Examination:** Achieved **All India Rank 650** in JEE Advanced 2021 and **All India Rank 717** in JEE Mains 2021.
- **KVPY (Kishore Vaigyanik Protsahan Yojna) Fellowship Award:** Secured an **All India Rank of 273** under the SA stream.
- **NTSE (National Talent Search Examination) Scholar:** Accomplished excellence in National Talent Search Examination-2019.
- **CBSE Merit Certificate Class X:** For being among the **top 0.1%** of successful candidates in **Mathematics** and **Science**.

## INTERNSHIPS

- **Research Intern, IISc Bangalore** | *Prof. Arpita Patra* [May, 2024 - July, 2024]
  - Worked on the theoretical and applied aspects of **Secure Multi-Party Computation** with a focus on optimizing efficiency.
  - Analyzed the **round complexity** of secure multi-party computation under various security settings and threshold assumptions.
  - Worked on optimizing the **Secure-Shuffle** protocol to enhance efficiency in **Secure Graph Analysis** applications.

## PROJECTS

- **LENET-5 with GPU Acceleration** | *Prof. Rijhurekha Sen* | Parallel & Distributed Programming (C++, CUDA)
  - Implemented a small image processing library to **recognize MNIST digits** and adding GPU acceleration using **CUDA framework**.
  - Created CUDA **kernels** for various sub-tasks like Sub-Sampling, Convolution and Activation functions like ReLU, sigmoid, softmax etc.
  - Integrated the kernel implementations using LENET-5 architecture and used **CUDA Streams** to parallelize the computation.
- **Copy-On-Write with Demand Paging** | *Prof. Abhilash Jindal* | Operating Systems (C, xv6, x86 architecture)
  - Extended xv6 operating system with **Copy-On-Write (COW)** mechanism to **improve memory utilization** during fork system calls.
  - Implemented shared memory pages, enabling processes to share pages and perform **on-demand copying** upon write operations.
  - Developed reverse mapping and **swap space integration** for efficient memory management ensuring proper page table updates.
- **Chess Bot using Convolutional Neural Network** | *Prof. Mausam* | Intro to AI (CNNs, Chess Programming)
  - Developed a bot to play RollerBall Chess (a chess variant) utilizing the **Monte Carlo Tree Search (MCTS)** algorithm.
  - Added heuristics, opening/endgame databases, transposition tables, and trained it against **self-play** using a **CNN**.
- **Reliable Data Transfer with congestion control** | *Prof. Aaditeshwar* |Computer Networks (Network Protocols)
  - Developed a **Transport Layer protocol** for fast and reliable data transfer, **dynamically adjusting** to network congestion.
  - The protocol fetched data from a server which emulated **real-time network conditions** like packet drops and rate fluctuations.
  - The protocol could learn **on-the-fly** to adapt to the server's variable bandwidth and fluctuations in the network conditions.
- **Toy Interpreter in SML** | *Prof. S. Arun Kumar* | Programming Languages (SML, ML-Lex, ML-Yacc)
  - Designed an interpreter for a toy programming language of Rational numbers in SML using **ML Lex** and **ML Yacc** packages.
  - Handles **arbitrarily sized rational numbers** with while loops, function calls, static scoping, type checking, and recursion.
  - Created a **stack-based push-down automaton** to process the **Abstract Syntax Tree(AST)** generated by the parser.
- **Full stack E-commerce website** | *Prof. Abhilash Jindal* | Design Practices (Flask, Rest APIs, MySql, OOPs)
  - Created a full stack web application with **user authentication** using **Flask** for backend and **MySql** for the database.
  - The website featured buy and sell options, User feedback, Language translation, Wishlist, along with a **chat application**.
- **MIPS Pipelined processor simulator** | *Prof. Rijurekha Sen* | Computer Architecture (C++, OOPs)
  - Designed MIPS processors with **5stage** and **7stage** pipeline designs along with bypassing for processing MIPS instructions.
  - Used stalling to avoid data hazards during pipeline operations and modified it to implement **bypassing** to improve cycle count.
  - Also implemented a **branch predictor** for predicting branching instructions for improving efficiency using **state counters**.

## TECHNICAL SKILLS

- **Programming Languages** : C, C++, Python, MATLAB, JavaScript, SML, VHDL, Prolog, SQL
- **Libraries and Tools** : NumPy, Pandas, Flask, CUDA, Open MPI, React, Git, GitHub, Latex, Figma

## POSITIONS OF RESPONSIBILITY

- **Coordinator, Entrepreneurship Development Club (eDC)** [June, 2023 - May, 2024]
- **Core Team Member, BECon 2024** | *Creative and Media Team Lead* [June, 2023 - May, 2024]

## EXTRA CURRICULAR ACTIVITIES

- **Academic Mentor**, **BSW**(Board for Student Welfare) [Nov, 2022 - Feb, 2023]
- **Create 2022**, 1st Runner-up, Design Club : Annual Design Thinking Marathon [Apr. 2022]

***Disclaimer: All the information on this page is entered by student.***

# SHANKH GUPTA

## IIT COURSE

| Degree | Institute | CGPA |
|---|---|---|
| B.Tech and M.Tech in Computer Science & Engineering | Indian Institute of Technology Delhi | 7.98 |

## QUALIFYING EXAM

- **Joint Entrance Examination (JEE) Advanced Rank:** 55 (EW)

## COURSES DONE

Intro. To Computer Science, Discrete Mathematical Structur, Data Structures And Algorithms, Digital Logic & System Design, Design Practices, Computer Architecture, Programming Languages, Analysis & Design Of Algorithms, Computer Networks, Principles Of Artificial Int., Cryptography & Computer Sec., Operating Systems, Intro To Automata & Th. Of Co., Intro. To Parallel & Dis. Pro., Spl. Topics In Cryptography

## EXTRA CURRICULAR ACTIVITIES

- First Runner-Up, Design Club Trophy (July, 2021 - May, 2022)
- First Runner-Up, Gazettale (July, 2021 - May, 2022)
- Gazettale '22 First Runner-up, Gazettale'22 (July, 2021 - May, 2022)
- BSP Trophy '22 Winner, BSP Trophy (July, 2021 - May, 2022)
- Winner, BRCA Trophy (July, 2021 - May, 2022)
- Gazettale '23 Second Position, Gazettale'23 (June, 2022 - May, 2023)
- BSP Trophy'23 Winners, BSP Trophy'23 (June, 2022 - May, 2023)
- Winner, BSP Trophy (June, 2022 - May, 2023)
- Participation, Interhostel Wall Painting (July, 2021 - May, 2022)