NILAY SHARMA

ACADEMIC DETAILS

Year	Degree / Board	Institute	GPA / Marks(%)
---	B.Tech in Mathematics & Computing	Indian Institute of Technology Delhi	9
2022	CBSE	Navyug Convent School, New Delhi	96.8%
2020	CBSE	Delhi Public School, Gurgaon	96.5%

SCHOLASTIC ACHIEVEMENTS

- **IIT Delhi Merit Scholarship,** awarded by IIT Delhi for being in top **7%** out of **1250** students in my batch for Semester II.
- **KVPY Fellowship Holder** : Secured an All India Rank **663** out of more than 1 million students conducted by IISc, Bangalore.
- **NTSE Scholar**: Selected after a national 2-tier examination and evaluation for displaying **academic excellence** by NCERT, GoI.
- **UGEE 2022**: Secured an All India Rank **2** in UGEE organised by IIIT Hyderabad, after a two-round examination process.
- **JEE Mains 2022** : Secured an All India Rank **839** among 1,026,799 students with 99.9165773 percentile in JEE Mains.
- **Competitive Programming : Expert** on **Codeforces** having achieved rating of **1610** and participated in various contests.
- **Amazon Summer School 2024:** Selected for **Amazon Machine Learning** Summer School among more than 50,000 students.

INTERNSHIPS

- **Varun Beverages Ltd. (PepsiCo.) Haryana** | **Cloud based Optimization** [Jun'23 - Jul'23]
  - Identified opportunities for enhancing performance at Varun Beverages Ltd. by proposing **cloud-based** infrastructure.
  - This optimizes financials and reduces hardware maintenance and software update costs along with maximized productivity enhanced data security, and improved scalability, to better meet future demands and keeping a competitive edge in the industry.

PROJECTS

- **Search Engine and Dictionary** | Data Structure And Algorithms [November, 2023]
  - Implemented and conducted an evaluation of the efficiency of different dictionary structures, like **AVL trees, hashmaps, and tries**.
  - Evaluated and tested various pattern matching algorithms such as **KMP, Boyer-Moore, Suffix Trees and Finite Automata**.
  - Performed an assessment of the search engine and dictionary on a vast corpus of complete works of Mahatma Gandhi.
- **Contextual Input for LLMs** | Data Structure And Algorithms [October, 2023]
  - Retrieving **high-probability answer-containing** paragraphs from a corpus based on a query to feed to an LLM like ChatGPT.
  - Returned top-K scored paragraphs based on search queries by implementing the Term Frequency-Inverse Document Frequency (TF-IDF) algorithm to compare word frequency in the given corpus against a general corpus, stored in a **Trie based structure**.
  - Enhanced the results by implementing the **Porter Stemming Algorithm** improving matching accuracy with search query.
- **Agglomerative Hierarchical Clustering of Stocks** | Quantitative Finance | Data Structures [February, 2024]
  - Implemented hierarchical clustering for stock analysis, creating **dendrograms** to visualize relationships among stocks.
  - Utilized **tree algorithms**, including the **Lowest Common Ancestor (LCA)** method, to efficiently calculate hierarchical distance matrices and enhance the analysis of stock similarities, which can be used for further optimizing investment strategies.
- **SURA (Summer Undergraduate Research Award) Project** | Prof. Prashant Palkar [Jun'24 - Present]
  - **Parallel Computing Algorithms** for Mixed-integer Nonlinear Optimization and their implementation in MINOTAUR.
  - Implementing **Distributed Memory** parallel design of the branch and bound and the QG algorithm for MINLPs.
  - Analyze the performance of the two level parallel algorithm, where inner level shared-memory is used to solve subtrees.
- **JPMC Virtual Internship Project** | Machine Learning [June, 2024]
  - Completed virtual internship with **JPMorgan Chase**, focusing on quantitative research methods and financial data analysis .
  - Analyzed a book of loans to estimate customer's probability of default using **confusion matrix, log likelihood**, and other methods.
  - Used **dynamic programming** to convert FICO scores into categorical data to predict defaults with a high accuracy.
- **Compiler for simple language of expressions** | Data Structure And Algorithms [September, 2023]
  - Implemented a compiler to generate a stack machine compatible code for infix expressions with **Unlimited Rationals**.
  - Used parsing trees and evaluation components and implemented Symbol Table using **Binary Search** and **AVL Trees**.
  - Implemented the Unlimited Integers and Unlimited Rationals structures using **dynamic arrays** to represent high precision values.

TECHNICAL SKILLS

- **Programming Languages and Tools** : C, C++, Java, Python, MATLAB ,GNU Octave, SQL, Verilog
- **Design And Visualization and Developer Tools** : AutoCAD Inventor, Fusion, HTML, LaTeX

EXTRA CURRICULAR ACTIVITIES

- **Coordinator, Economics Club** - [July,2024 - Present]
  - Coordinator of Economics Club, specializing in **Game Theory**, involved in various **trading-based competitions and simulations**.
  - Conducted discussion sessions on game theory, and organized various competitions and events for over **1200** students.
- **Dalal Street** : Reached the finals of Dalal Street, the **Stock Market and Trading simulation** competition organised by IIT Delhi.

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

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IIT COURSE

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B.Tech in Mathematics & Computing	Indian Institute of Technology Delhi	9

QUALIFYING EXAM

• **Joint Entrance Examination (JEE) Advanced Rank:** 1850 (GE)

COURSES DONE

Linear Algebra & Diffe. Equa., Principles Of Elect. Materials, Probability & Stochastic Pro., Microeconomics, Discrete Mathematical Struc., Data Structures And Algorithms, Computing Laboratory, Macro Economics, Digital Electronics, Optimization Methods & Appl.

POSITIONS OF RESPONSIBILITY

• Knowledge Management Executive, Economics Club, CAIC