PRINCE

B.Tech in Engineering Physics
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Education

Year	Degree/Certificate	Institute	CGPA/Percentage
2026	B.Tech Engineering Physics	Indian Institute of Technology Delhi	7.03
2021	CBSE(XII)	Navyug Senior Secondary School	84%
2019	CBSE(X)	Sheetla Public School	91.6%

Projects

- **Command-Line Spreadsheet Application** | *Systems Programming* | *Prof. Abhilash Jindal* ***Jan 2025 - Mar 2025***
  – Developed a **C-based CLI spreadsheet** supporting over **18M+ cells** with various core formulas, functions, and commands
  – Designed a **DAG-based recalculation engine** for dependency tracking and a modular input parser to handle user commands
  – Managed robust **error handling** for invalid cell references, division-by-zero, and **cycle detection** with status reporting
  – Identified memory leaks using **Valgrind** and **GDB/LLDB**, and performed unit testing on core modules to ensure code stability
- **Spreadsheet System -Sparse Optimization** | *Systems Programming* | *Prof. Abhilash Jindal* ***Mar 2025 - May 2025***
  – Reimplemented the spreadsheet system in **Rust** using **sparse data representation**, significantly reducing total memory usage
  – Engineered a high-performance **DAG-based recalculation engine**, improving dependency updates for very large spreadsheets
  – Implemented basic **undo/redo functionality** and extended support to floating-point computations with robust error handling
  – Achieved drastic performance improvements, reducing spreadsheet recalculation time from **2-3 minutes** to a mere **few seconds**
  – Compiled to **WebAssembly** and deployed the app as a static site on both **GitHub Pages** and **AWS S3** static website hosting
- **SimpleRISC CLI Interpreter** | *Computer Architecture* | *Self Project* ***Jul 2024 - Aug 2024***
  – Developed a **C program** that reads and executes **SimpleRISC v21 assembly** language programs to generate desired outputs
  – Implemented **error detection**, register support, and core **3-address formats** ensuring robust execution of assembly programs
  – Added custom macros for register output and instruction encoding; designed as a neat **single-file**, easy-to-build CLI tool
  – Deployed behind a lightweight HTTP API on an **AWS EC2** instance, using an **IAM role** for scoped **S3** access to program I/O
- **Taylor-Line Microswimmers in Confinement** | *Computational Physics* | *Prof. Sujin B. Babu* ***Jan 2026 - May 2026***
  – Built a custom **2D molecular-dynamics simulator** in C++ modeling Taylor-line microswimmers under shrinking confinement
  – Hand-implemented a **Velocity-Verlet integrator** and an **Andersen thermostat** for accurate active-matter swimmer dynamics
  – Designed a resumable parameter-sweep pipeline across **70+ configurations**, deployed on IIT Delhi's **Baadal** academic cloud
  – Replaced the naive **O(N^2)** pairwise collision check with a **spatial-hashing** scheme, achieving a measured ∼**61x** speedup
- **Corpus Q&A Tool** | *Data Structure & Algorithms* | *Prof. Subodh Sharma, Prof. Rahul Garg* ***Jan 2024 - Feb 2024***
  – Implemented a **query ranking system** and utilized **KMP algorithm** with **Trie** and **heaps** for efficient text pattern matching
  – Integrated **ChatGPT** and **Hugging Face LLMs**, optimizing answer generation by managing context within hard token limits
  – Ranked paragraphs via **TF-IDF** weighted scoring scheme, applying the **KMP algorithm** for **O(n+m)** pattern matching overall
- **Advanced expression evaluator** | *DSA* | *Prof. Subodh Sharma, Prof. Rahul Garg* ***Oct 2023 - Dec 2023***
  – Implemented an **Unlimited class** to accurately perform math arithmetic operations on rational numbers with infinite length
  – Engineered specialized data types, **InfiniteInt** and **InfiniteRational**, for effectively managing huge numbers of any magnitude
  – Evaluated E++ expressions using a **Parser Tree** and a **BST-based Symbol Table** for storing all node variable values safely
- **Rollerball Al Bot using Adversarial Search** | *Algorithmic Game Development* | *Prof. Mausam* ***Mar 2024 - Apr 2024***
  – Engineered a Rollerball AI bot using **minimax algorithm** with **alpha-beta pruning**, optimized for 1-2 second game moves
  – Designed a **heuristic function** for AI decisions evaluating board material advantage, checkmate threats, and promotions
  – Developed an **autonomous agent** balancing search depth and accuracy to successfully compete in a real timed AI tournament

Technical Skills

- **Systems, Debug & Cloud Tools**: GDB, LLDB, Valgrind, Bash, basic Linux commands, Makefile, Git/GitHub, AWS (EC2, S3, IAM), Baadal (OpenStack)
- **Programming Languages**: C, C++, Rust, Python, Java, Swift, Assembly, Shell Scripting
- **Other Tools**: MySQL, GNUplot, LaTeX, Vim, Xcode, Figma, AutoCAD, Blender, Final Cut Pro, Adobe After Effects

Key courses taken

- **Relevant Coursework**: Introduction to Computer Science, Data Structures and Algorithms, Design Practices, Digital Electronics, Signals and Systems, Computational Physics

Positions of Responsibility

- **Activity Head**, RendezvousX (Under the Board for Recreational and Cultural Activities, BRCA) ***Jun 2023 - May 2024***
  – Led a **4-member team** to draft over **20+ sponsorship proposals**, securing top partners and raising **10+ lakhs** in total funding
  – Managed **4 key sponsors** by coordinating customized brand events, overseeing agreements, and ensuring timely deliverables

Miscellaneous

- **Joint Entrance Examination (JEE Advanced)**, Qualified JEE Main and JEE Advanced; ranked in the **top 0.7%** in JEE *2022*
- **Competitive Programming**, Earned **Specialist ranking** with **1450+ rating** on Codeforces, handle: prince__evans__ *2025*