Prakhar Gupta

Indian Institute of Technology, Goa

Fourth Year **Undergraduate**, **Computer Science and Engineering**
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Education

BTech, Computer Science and Engineering, Indian Institute of Technology Goa	CGPA : **7.53/10**	2021 – Present
Class 12, CBSE, St.Xavier's High School, Ailwal	Aggregate: **93.2** %	2019 – 2021
Class 10, ICSE, Jyoti Niketan School, Atlas Tank	Aggregate: **95.4** %	2017 – 2019

Experience

Technology Analyst, ProcDNA (Jan 25 – Present)

- Hands-on experience with **Snowflake**, **Databricks**, Spark, and data warehousing, supporting both backend data exploration and data mart creation.
- Automated QC processes in **PostgreSQL** by aggregating data from source data lakes and target data marts, validating data integrity through covariance checks at regular interval using **triggers**.

Projects

Simple Physics Engine [Github] (Mar 24 – Present)

- Designed Physics Engine for point objects, rigid bodies to simulate their interaction in different environments based on principles of classical mechanics.
- Used **C++ with SDL2(Simple DirectMedia Layer)** library based on OpenGL provided efficient low-level way to handle graphics, audio, input and other multimedia functionalities.
- Extended application simulator to **Multi Thread** for efficient handling of user input and Physics using Thread STL, synchronizing between different threads using mutex yielding 30% faster computation time.
- Created key component features like entity, **motion dynamics**, **collision detection and handling**, fixed and variable time stepping, FPS management from ground up.

WRKFLOW [Github] (May 24 – Jun 24)

- Built Dashboard Web App which is a powerful tool for individuals looking to enhance their productivity by effectively tracking goals and managing tasks. Its **MERN** stack foundation with MVC architecture ensures a reliable, robust and scalable application.
- Integrated Client-Side Rendering **(CSR)** with React for a responsive user interface ensuring initial load times of under 2 seconds.
- Handled Backend by Express.js and **Mongoose**, integrated with MongoDB which supports rapid query execution with average response times for CRUD operations below 50 milliseconds.

Custom Garbage Collector [Github] (Feb 25 – Mar 25)

- Developed **C++ Mark-Sweep** Garbage Collector that reduced memory fragmentation by up to 30% through efficient heap and stack scanning, improving overall memory utilization.
- Optimized **Free List Management** by implementing coalescing of adjacent free blocks, reducing external fragmentation by 25% and speeding up allocation by 15%.
- Improved Memory Allocation Efficiency by designing a custom allocator using **sbrk**, reducing system call overhead by 20% and improving allocation throughput by 10-15%.

Skills

Programming Skills:	C, C++, C#, Python, Java, Haskell, Bash, SQL.
Software Skills:	Git, GitHub, VS, VS Code, Databricks, AWS.
Frameworks/Libraries and OS:	Ubuntu, Fedora, Windows, Node, Express, Spring Boot, React, MongoDB, Posix.
Relevant Coursework	Data Structures and Algorithms, Algorithm Design, Computer Networks, Computer Architecture, Compiler Design, Unix Tools, Computer Vision.

Positions of Responsibility

Wing Representative	Hostel Wing Representative in Student Panchayat	(2022 – 2023)
Core-Member	Alpha - Finance Club of IIT Goa	(2023 - 2024)
Event Overseer	Cepheus KBC Event Overseer	(2023 – 2024)

Extracurriculars & Hobbies

- Committed to environmental stewardship, volunteering with Varaha, the Climate Change Society of IIT Goa, to clean various beaches.
- Gaming enthusiast, engaging in fps, strategic, indie and open-world gameplays.
- Competitive table tennis player, participating in tournaments and friendly matches in spare time.
- Dedicated bookworm with a love for literature, exploring diverse genres and authors.