Pallav Agarwal

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Education

2014 – 2018 **Indian Institute of Technology, Kanpur**,
Bachelor of Technology, Computer Science and Engineering.

- Maintained a CGPA of 9.94/10 after 8 semesters.
- Received 19 A* grades over 4 years (awarded for outstanding performance in corresponding courses).

Awards and Achievements

2014 **All India Rank 188**, *Joint Entrance Examination (JEE) Advanced*.

2014 **All India Rank 475**, *Joint Entrance Examination (JEE) Mains*.

2013 **All India Rank 255**, *Kishore Vaigyanik Protsahan Yojana (KVPY)*.

2010 **Scholarship Awardee**, *National Talent Search Examination (NTSE)*.

Work Experience

July 2018 – Current **Software Engineer**, ***Google India***, Manager: Nannan Ramachandran.

- Worked on the development, as well as significant performance improvements of "Search for Apps" relevancy-search stack (Search for GSuite/Workspace Apps - Gmail, Drive, Calendar, Chat).
- Tech lead for Pendulum, an internal debugging tool for Apps Search team.
- Added debugging support (internally: Sherlog) to the full Gmail C++ search stack.
- Contributed to KUnit, a new open source kernel unit test framework, outside of my primary project.

Dec 2017 – April 2018 **Tech Lead**, ***JEE (Advanced) 2018***, Supervisor: Prof. Shalabh.

- Primary point of contact for tech during conduction of JEE (Advanced) 2018 - the first time it was organized completely online across India.
- Wrote code for all back end systems, including, but not limited to, candidate eligibility checking, admit card generation, centre allotment, scoring of answer sheets, and rank generation.
- Wrote the code for the online results declaration portal, *reducing CPU usage and the corresponding cost by 98 percent* compared to previous years, with zero downtime during peak traffic.

May 2017 – July 2017 **Software Engineering Intern**, ***Google NYC***, Supervisor: Julio Merino, Philipp Wollermann.

- Built SandboxFS: A userspace fs to mount files and dirs in form of a nested tree under a mount point.
- Supported mounting with read-only mappings and read-write mappings, needed to isolate the build actions of Bazel (http://bazel.build), the build tool used across Google.
- Supported "on the fly reconfiguration" of the mounted filesystem, for fast sandbox recreation, as unmount-remount cycle is usually too slow. Open sourced: `github.com/bazelbuild/sandboxfs`.

Apr 2016 – Sep 2016 **Google Summer of Code**, ***Gentoo Organization***, Supervisor: Sébastien Fabbro, Nitin Agarwal.

- Created Orca, a continuous stabilization and build system to automatically build and test packages with respect to the Gentoo Operating System.
- Used Docker, Kubernetes to build a parallel and scalable server for the management of build jobs as well as computation of build requirements on the basis of dependency trees.
- Built a job management server for an "opt-in" service for resource heavy jobs which could be used by volunteers to devote computing time for stabilization jobs.

Nov 2015 – July 2016 **Software Intern**, ***Joint Seat Allocation Authority***, Supervisor: Prof. Surender Baswana.

- Created the software to perform allotment of students to respective institutes (IITs, NITs, IIITs, GFTIs).
- Improved over previous year's algorithm to reduce the run time of the algorithm by 85 percent.
- Spent a month at National Informatics Centre Delhi, during the Joint Seat Allocation, where our software was used to allocate seats to 1.2 million students who had written the JEE 2016 exam.

Projects

Aug 2017 – Nov 2017 **NDFS: Kernel file system spanning multiple disks/partitions**, Course Project: IIT Kanpur, Supervisor: Prof. Debadatta Mishra .

- Created a fully functional file system for the Linux Kernel that supports spanning multiple physical disks.
- Introduced 'ndfs_ladder', a way to order the disks based on underlying device properties to enable the NDFS file system to optimize data organization based on them.
- Showed proof of concept of optimizations based on properties like different read/write speeds of disks.

Jan 2017 – Apr 2017 **Tipsy: Tool to provide tips and corrections for MOOC submissions**, Undergraduate Project: IIT Kanpur, Supervisor: Prof. Amey Karkare.

- Created a tool in Scala to parse, analyze and classify C programs from large programming courses, to help provide suggestions and tips to weak students.
- Reduced C programs to a high level representation, to find shortest distance between 2 programs.
- Classified programs to provide suggestions to students based on programs similar to their submission.

Jan 2017 – Apr 2017 **Amigo: x64 Compiler for Golang**, Course Project: IIT Kanpur, Supervisor: Prof. Amey Karkare.

- Implemented a compiler for a fully functional subset of the Go language (pointers, multiple return values, deeply nested arrays, structs, among other features), in C++ and Python.

Sep 2016 – Nov 2016 **YourHonour: A Kubernetes based decentralized judge for programming competitions**, Course Project: IIT Kanpur, Supervisor: Prof. Piyush P. Kurur.

- Inspired due to lack of FOSS programming contest judges which are easy and intuitive to deploy.
- Created a fully functional judge which can be deployed instantly on a kubernetes cluster with support for 6 default programming languages, while adding more is as easy as using a docker image.
- Implemented a fully functional GUI, and protection against malicious user given codes.

May 2015 – 2016 **Cimulator: Interactive system to teach ESC101 (Fundamentals of Computing)**, Summer Project, IIT Kanpur, Supervisor: Prof. Amey Karkare.

- Wrote an interpreter for C in python to cover the topics taught in first year programming course.
- Simulate a user's C program visually to help him understand core concepts.
- Help students avoid common errors by using familiar visual cues (similar to those shown in class slides).

Oct 2014 – Mar 2015 **Badminton playing robots**, ABU Robocon, Supervisor: Prof. Bhaskar Dasgupta.

- Developed robots to play doubles badminton on a real court against the opponent.
- Involved in programming the robot to predict the trajectory of shuttlecock using computer-vision.
- Used live video feed from Microsoft Kinect to track the shuttlecock.

Publication(s)

Apr 2018 **TipsC: Tips and Corrections for Programming MOOCs**, Co-Author, Poster Paper.

- Presented at the 19^{th} International Conference on *Artificial Intelligence in Education'18, London*.

Technical Strengths

Languages C++, Go, Python, NodeJS

Tools Git, LaTeX, Vim, Docker, Kubernetes

Relevant Coursework

A^*	Data Structures	A^*	Algorithms	A^*	Compiler Design
A^*	Theory of Computation	A	Computer Architecture	A^*	Computer Systems Security
A	Computer Organization	A	Computer Networks	A	Operating Systems
A^*	Introduction to Programming	A^*	Abstract Algebra	A^*	Discrete Mathematics
A^*	Linux Kernel Programming	A	Advanced Compiler Optimizations	A	Topics in Distributed Systems

A^* - *Awarded for outstanding performance*

Extra Curricular Activities

2016 – 2017 **Coordinator, Programming Club**, IIT Kanpur.

- Conducted workshops and lectures on various topics, including those on python, linux, and open source. Set problems for, and organized programming contests for students on campus.