Rajeev Kumar

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ACADEMIC QUALIFICATIONS

Indian Institute of Technology Kanpur

B.Tech., CSE — *CPI: 8.9/10*

2021 - Present — Kanpur, India

S.N.S. College, Gaya, Bihar

XII, BSEB — *Percentage: 89.2%*

2021 — Gaya, Bihar

R.D. Public School, Gaya, Bihar

X, CBSE — *Percentage: 95.2%*

2019 — Gaya, Bihar

SCHOLASTIC ACHIEVEMENTS

- Received **Academic Excellence Award** for exceptional academic performance in session '22-23
- Secured **All India Rank 1011** in **JEE (Advanced) 2021** among 1.5 Lakh shortlisted candidates
- Secured **All India Rank 1767** in **JEE (Mains) 2021** among 10 Lakh candidates
- Qualified **National Talent Search Examination Stage-I** conducted by Government of Bihar

COURSES

* : ongoing

Principles of Programming Languages* | Linux Kernel Programming | Programming for Performance* | Data Mining* | Compiler Design | Operating Systems | Computer Security | Computer Networks | Computer Organisation | Parallel Computing | Advanced Algorithms | Software Dev and Ops | Introduction to Machine Learning | DSA

TECHNICAL SKILLS

Programming: C, C++, Java, Python, Verilog HDL, MIPS Assembly Language

Web: Angular, Spring Boot, Django, Typescript, Javascript

Utilities & Frameworks: Numpy, Pandas, Matplotlib, Seaborn, Figma, QtSpim, Selenium, Git, Bash, LaTeX

LEADERSHIP

Tutor

ESC111/2: Fundamentals of Computing *Aug'24-Present*

- Helping administer the course for 500+ students under the instruction of Prof. Urbi Chatterjee
- Tutoring 30+ students in the course on weekly basis
- Responsible for formulating and evaluating lab exams

Student Guide

Counselling Service, IITK *Oct '22-Apr '23*

- Guided **5 freshmen** academically and emotionally
- Helped organize **7-day Orientation Programme'22**

Academic Mentor

Counselling Service, IITK *Oct '22-Apr '23*

- Conducted **institute-level lectures** for the course **ESC101: Fundamentals of Computing**

WORK EXPERIENCE

Adobe

Software Engineer Intern | Adobe Bangalore *May '24-July '24*

*Received **Pre-Placement Offer** for exceptional performance during internship*

- Developed and deployed a **relationship based access control (ReBAC) system**
- Used **OpenFGA**-open-source authorization solution for authorization checks
- Used **Angular** for frontend, **Spring Boot** for backend, and **MySQL** for database

PROJECTS

Full Fork

Course Project | CS614 | Prof. Debadatta Mishra *Jan '24-Apr '24*

- Implemented new system call in **Linux kernel** to **clone multi-threaded processes**
- Modified ***do_signal_stop*** and ***do_notify_parent_cldstop*** functions to **stop every thread except leader** when it sends **SIGSTOP** signal to any sibling thread
- Cloned the leader, hooked into ***schedule_tail***, replicated thread group by invoking ***kernel_clone*** passing parameters similar to those passed by ***pthread_create***
- Copied execution states of original threads to new threads and resumed them

Sankalak

Course Project | CS335 | Prof. Swarnendu Biswas | *Jan '24-Apr '24*

- Developed compiler for statically typed subset of **Python** targeting **x86_64** code
- Used **Flex** for lexical analysis, **Bison** for syntactic analysis, generating **AST**
- Supported basic operators, conditional, loop, function (with recursion), printing
- Supported **classes**, **multilevel inheritance**, `__init__` **constructor overloading**

gemOS

Course Project | CS330 | Prof. Debadatta Mishra | *Aug '23-Nov '23*

- Implemented **cfork**-a variant of the **fork** system call which implements **copy-on-write** policy for the address space of a process, and **CoW fault handler**
- Implemented **trace buffer**-unidirectional data channel similar to pipe, **strace**-system call tracing functionality, and **ftrace**-function call tracing functionality
- Implemented **mmap**, **munmap** and **mprotect**, and added **lazy allocation support**
- Implemented **du** and memory management function calls **memalloc** and **memfree**

Unified Portal For Hall Automation

Course Project | CS253 | Prof. Indranil Saha | *Jan '23-Apr '23*

- Developed a **web app** for **digitalizing mess, canteen, and housekeeping services**
- Documented **requirements, design, implementation, testing**, and **user manual**
- Used **Django Framework** for backend development, **Django-Test** for unit-testing, **Selenium** for integration-testing attaining over **90%** test coverage

CSE Bubble

Course Project | CS220 | Prof. Urbi Chatterjee *Mar '23-Apr '23*

- Built processor with MIPS-like ISA with **single-cycle fetch**, **decode** & **execute**
- Implemented **ALU** using a top-down approach for **R-**, **I-**, and **J-type** instructions
- Designed **finite state machine** for the **control signals** to execute the processor

Uncovering the Mask of XORRO

Course Project | CS771 | Prof. Purushottam Kar | *Jan '23-Feb '23*

- **Mathematically** derived **simple XORRO PUF** vulnerability to **linear model attacks**
- Extended the linear model to crack **16-XORROs PUF** using mathematically derived **1040-dimensional feature vector** derived from **72-bit challenge vector**
- Achieved **99.82%** train & **99.2%** test accuracy using **LinearSVC model** (**L1 penalty**)

EXTRACURRICULARS

- Finalist in Treasure Hunt 2022 hosted by Media and Cultural Council
- Secured 3rd position in trading event hosted by Finance and Analytics Club