

Rahul PRAJAPAT

Software Engineer II | Uber

✉ rahulprajapat2601@gmail.com

🌐 <https://burixzura.github.io/personalWebsite/index.html>

👤 burixzura

RESEARCH INTERESTS

❖ Mechanism Design ❖ Complexity Science ❖ Game theory ❖ Social Networks ❖ Machine Learning

EDUCATION

Indian Institute of Technology Bombay

Bachelor of Technology, Computer Science and Engineering.

2019-2023

GPA = 8.87/10.0

RESEARCH EXPERIENCE

University of Sydney Australia	SKEWED MERKLE TREES <i>Prof. Willy Zwaenepoel, Dr. Baptiste Lepers</i> <ul style="list-style-type: none">➤ Analyzed 21 papers on frequency-aware skewed Merkle trees, identifying 30% performance gains through 1/x access pattern exploitation➤ Discovered fundamental limitations (state reversibility, order independence violations) preventing blockchain deployment➤ Evaluated alternative structures : Sparse Merkle trees, Verkle trees, and dynamic integrity trees <div style="display: flex; justify-content: space-between; width: 100%;">BlockchainDistributed SystemsCryptographyData Structures</div>	2022
University of Neuchâtel Switzerland	PERSISTENT KEY-VALUE STORE <i>Prof. Willy Zwaenepoel, Dr. Baptiste Lepers</i> <ul style="list-style-type: none">➤ Designed MassTree-PMEM with hierarchical two-tier locking enabling lock-free reads and concurrent writes➤ Resolved RECIPE framework atomicity issues via version-based coordination, achieving 3.159M ops/sec in PMEM➤ Developed PMEM-native optimizations : cache-line aware layouts, selective persistence, atomic pointer updates <div style="display: flex; justify-content: space-between; width: 100%;">Persistent MemoryConcurrencyB-treesCrash Consistency</div>	2021
IIT Bombay India	FILE SYSTEM METADATA SNAPSHOT <i>Prof. Rushikesh K Joshi</i> <ul style="list-style-type: none">➤ Built cross-platform data recovery for EXT4 and VFAT/FAT32 using direct block device access➤ Developed lightweight metadata-only snapshots (176 bytes/file) preserving directory hierarchy without file content➤ Implemented extent tree processing, Unicode LFN support, and shell interface with advanced filtering <div style="display: flex; justify-content: space-between; width: 100%;">File SystemsData RecoveryC ProgrammingSystems Programming</div>	2020

WORK EXPERIENCE

Uber Systems <i>Bangalore</i>	CONFIG AUTOMATION, Earners <ul style="list-style-type: none"> ➤ Partnering with Uber AI to design a multi-agent web orchestration layer that coordinates existing Uber agents to automate operations. ➤ Designed a Config Knowledge Graph in Neo4j to support complex market validations and configuration impact analysis. ➤ Enabled the Knowledge Graph as a secondary config store via Kafka-based ingestion and domain-wise segregation. ➤ Prototyped an AI assistant using LangGraph and explainability APIs to automate root-cause analysis of access issues. 	JAN 2025 - PRESENT
	CONFIG MANAGEMENT AND RELIABILITY, Earners <ul style="list-style-type: none"> ➤ Led adoption of workflow-driven config management, bringing code-like rigor to market-facing configuration changes. ➤ Designed a unified validation and testing platform, enabling safe and reliable rollouts via pre-deployment gates. ➤ Collaborated with ops teams and managed incidents, reducing investigation time and improving system reliability. 	JUNE 2023 - PRESENT
	PLACES CREATION, Uber Maps <ul style="list-style-type: none"> ➤ Automated freshness status detection for business places using trip data and internal metadata. ➤ Built ML prototypes and recommended production pipelines using engineered features and model scoring heuristics. 	MAY-JULY 2022

KEY PROJECTS

RED PLAG	<i>Prof. Amitabh Sanyal Course Project : Software Systems Lab</i> <ul style="list-style-type: none"> ➤ Developed a comprehensive plagiarism detector via representing source files as fingerprints, by using Winnowing strategy, and calculated intersection of sets to establish pairwise co-variance measures. ➤ Applied Running Karp Rabin Greedy String Tiling to remove stub code from the source files. ➤ Created a web frontend which incorporates user authentication and surface plots for visualization. ➤ Used Django REST for managing files and integrating logic, while ExpressJS for authentication. 	AUTUMN 2020 IIT Bombay
ROBUST VIDEO DENOISING	<i>Prof. Ajit Rajwade Course Project : Advanced Image Processing</i> <ul style="list-style-type: none"> ➤ Modelled denoising as a Matrix Completion Problem by marking off-threshold pixels as absent. ➤ Employed Adaptive Median Filter for detecting and marking impulse noise in the first phase. ➤ Used Three-Step-Cross Search Algorithm for grouping temporally and spatially similar patches. ➤ Utilized Fixed Point Iterative Algorithm to minimize the Nuclear Norm of the Patch Matrix. 	SPRING 2021 IIT Bombay
16 BIT MULTICYCLE PROCESSOR	<i>Prof. Virendra Singh Course Project : Digital Logic Design</i> <ul style="list-style-type: none"> ➤ Designed and simulated a 16-bit Multicycle Processor based on the IIT-B RISC Instruction Set. ➤ Applied behavioral VHDL principles to implement RAM, ALU, Register File, and, Test Bench units. 	SPRING 2021 IIT Bombay
COMPUTER ARCHITECTURE	<i>Prof. Biswa Panda Course Project : Computer Architecture</i> <ul style="list-style-type: none"> ➤ Analyzed the instructions per cycle as a performance metric for different SPEC-2017 CPU traces using Champsim. ➤ Compared the performance of different cache replacement policies like LRU, SHiP++ and Hawkeye combine with PACMan and Instruction Pointer Classifier-based Hardware Prefetcher(IPCP) at L1 and L2 Cache 	AUTUMN 2022 IIT Bombay
COMPILER FOR C-LIKE LANGUAGE	<i>Prof. Uday Khedkar Course Project : Implementation of Programming Languages</i> <ul style="list-style-type: none"> ➤ Developed a compiler and evaluator for subset of C supporting functions, scope levels and control sequences. ➤ Implemented a parser driven frontend using Lex & Yacc for generating TAC, RTL and Assembly code. 	SPRING 2022 IIT Bombay

OTHER PROJECTS

MASTERMIND

Prof. Ashutosh K. Gupta | Course Assignment : Logic for CS

SPRING 2021

IIT Bombay

- Encoded moves of Mastermind game into a SAT problem with the help of the z3py library in Python.
- Implemented a solver based on Conflict Driven Clause Learning which is robust to an unreliable player.

OPTIMIZED PERMUTATION

AUTUMN 2020

IIT Bombay

Prof. Ajit Diwan | Course Assignment : DSA

- Implemented an abstract data type called permutation via an encapsulated class with efficient functionality and operations using a cyclic representation of permutations and modulo space properties.
- Employed Extended Euclidean Algorithms in conjunction with the Extended Chinese Remainder Theorem to implement logarithms, and find square roots for permutations in linear time.

QUAD TREE

AUTUMN 2020

IIT Bombay

Prof. Ajit Diwan | Course Assignment : DSA

- Designed a hierarchical spatial data structure for representing binary image to optimize on space.
- Associated efficient image manipulation and refinement methods using binary operations recursively.

BASH AND FEATURES OF XV6

AUTUMN 2022

IIT Bombay

Prof. Mythili Vutukuru | Course Assignment : Operating Systems

- Built a shell capable of serial, parallel & background execution of simple Linux commands and signal handling.
- Examined xv6 source code and implemented process scheduling algorithms like round robin & priority based.
- Implemented memory management techniques like lazy page allocation, copy on write and applications of pthreads.

SOCKET PROGRAMMING

SPRING 2021

IIT Bombay

Prof. Vinay Ribeiro | Course Assignment : Computer Networks

- Used Socket Programming libraries in C++ to study different TCP variants in terms of throughput, using server and client systems.
- Used Wireshark to capture packets on the loopback interface and study TCP window variations w.r.t. time.
- Modelled and Simulated The Hidden Terminal Problem using ns3 library in c++, to study the relation between Throughput and offered load.

ACADEMIC ACHIEVEMENTS

- Achieved All India Rank 302 in JEE Advanced amongst 245,000 eligible candidates.
- Secured All India Rank 360 in JEE Main out of a total of 1.2 million candidates.
- Achieved International Rank 5 in National Science Olympiad (NSO) conducted by SOF.
- Secured All India Rank 50 in JEE Main 2 (B Arch.) amongst 145,000 candidates.
- Ranked amongst National Top 1% in National Standard Exam in Chemistry (NSEC).
- Recipient of the prestigious Kishore Vaigyanik Protsahan Yojana (KVPY) Fellowship.

2019

2019

2019

2019

2019

2019

TEACHING ASSISTANT

Computer Programming and Utilization (CS101)

AUTUMN 2020

IIT Bombay

Course Instructors : Prof. Kameswari Chebrolu, Prof. Bhaskaran Raman

Operating Systems Lab (CS347)

AUTUMN 2022

IIT Bombay

Course Instructors : Prof. Purushottam Kulkarni, Prof. Umesh Bellur

TECHNICAL SKILLS

Languages Go, TypeScript, C/C++, Python, SQL, Bash, MATLAB, Java, VHDL

Frameworks / Tools React, GraphQL, Protobuf, gRPC, Cadence, Docker, Git, LangChain, LangGraph, Jupyter, GDB, Sed, Awk, Make, Lex, Yacc, NS-3, ChampSim, L^TE_X

Infra / Datastores Neo4j, Postgres, Redis, MySQL, Kafka

RELEVANT COURSEWORK

Game Theory and Mechanism Design	Advanced Image Processing	AI and Machine Learning
Database and Info. Systems	Logic for Computer Science	Automata Theory
Operating Systems	Data Structures and Algorithms	Computer Architecture
Implementation of Prog. Languages	Computer Networks	Digital Logic Design

EXTRACURRICULAR

- Stood runner up in the **AI hackathon** at Uber. 2025
- Associated with **National Service Scheme (NSS)**, IIT Bombay, to promote sustainability. 2019-20
- Worked under Sustainable Social Dev. (NSS) to ideate a **Rainwater Harvesting model**. 2019-20
- Designed a basic RC plane for a competition held by Aeromodelling Club, IIT Bombay. 2019
- Participated in box cricket at Fun2shh organised by hostel 2, IIT Bombay. 2020
- Participated in a 10 Km cyclothon organized virtually by L&T Cyling Group. 2021

HOBBIES

 Reading		 Anime		 Cooking		 Diary Writing		 Drawing		 Pool
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