Yashwant Singh Rana

Software Engineer | C++ Systems and Python Backend
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GitHub | LinkedIn | Portfolio | LeetCode

Experience

IBM ISL Jul 2025 - Sep 2026
Software Engineer *Bengaluru, Karnataka*

- Resolved **8+ production compiler defects** on IBM Z through root-cause analysis, fixes, and regression testing.
- Optimized constant bit-field initialization by replacing an NI/OI pair with a single MVI, reducing the affected sequence from **two instructions to one**; verified generated assembly and check-in tests.
- Fixed missing initialization of register-passed parameters in nested PL/X procedures; validated nested/non-nested, by-value/by-address, and save-area variants.
- Built a **Python/Shell testcase reducer** to remove unreachable states while preserving defect reproducibility.
- Developed a **Python MCP service** for AI-assisted retrieval of compiler diagnostics and development artifacts.

IBM ISL Jan 2025 - Jul 2025
Software Engineer Intern *Bengaluru, Karnataka*

- Fixed C/C++ compiler frontend and backend defects in parsing, AST processing, and code generation; added defensive checks and assertions.
- Built Zowe automation scripts and contributed backend features to an AI-assisted developer platform.

Projects

Qualcomm ELD – Open Source | C++, LLVM **5 merged PRs**

- Fixed GNU option compatibility and linker-script header-layout crashes; validated the crash fix with **164 passing focused test runs across six targets**. #2011, #2065.
- Preserved native-object generation for **ARM/AArch64 LTO** when saving intermediate files, avoiding an unintended external-assembler path; added full LTO and ThinLTO regressions. #2129.
- Restored missing linker-script assignments in YAML maps and added source-line locations to redeclaration warnings, with targeted regression tests. #2336, #2207.

Legal Lens 2.0 | Python, FastAPI, MiniLM GitHub

- Implemented **token-aware BM25/MiniLM hybrid retrieval** over a **1,871-page document corpus**, eliminating measured encoder truncation.
- Added **cache-invalidation and fallback checks** within a **46-test offline regression suite**, validating retrieval reliability and backend behavior.

Real Estate Aggregator | PHP, Slim, MySQL GitHub

- Developed a **PHP/Slim property-marketplace backend** with MySQL-backed listing creation, editing, and filtering, plus PDF contract generation.
- Implemented registration and login workflows with **password hashing**, PHP sessions, email OTP verification, and password reset.

Technical Skills

Languages: C++, C, Python, JavaScript, SQL, PHP
Systems: Compiler development, LLVM, GDB, Linux, multithreading, CMake
Backend and AI: FastAPI, REST APIs, MySQL, Slim, MCP, retrieval-augmented generation (RAG)
Testing and Tools: Regression testing, root-cause analysis, Git, CI/CD, Docker, shell scripting

Education

Indraprastha Institute of Information Technology Delhi Jul 2023 - Jun 2025
M.Tech in Computer Science and Engineering; CGPA: 8.37/10 *Delhi*

Graphic Era Hill University Aug 2019 - May 2023
B.Tech in Computer Science and Engineering; CGPA: 8.27/10 *Uttarakhand*

Recognition and Leadership

- Received the **IBM Monthly Star Performer Award** for contributions to compiler engineering.
- Served as a **Teaching Assistant at IIIT Delhi** for **OOP, DSA, OS, and Theory of Computation**; qualified **GATE 2023 (CS)**.
- Represented at the **national level in football**.