Kartik Agarwala

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Education

BML Munjal University, Gurgaon **Sep 2021 – Sep 2025**
Bachelor of Technology in Computer Science And Engineering *Current CGPA: 8.51/10*

Relevant Coursework

- Compiler Design
- Data Structure
- Computer Architecture
- Database Management
- OOP using C++
- Artificial Intelligence
- Comuter Networks
- Operating System

Experience

Bitcoinfuzz - Summer of Bitcoin **May 2024 – August 2024**
Software Development Intern *Remote*

- Developed tooling in **C++, Rust, and Go** to enhance the security and reliability of various Bitcoin implementations.
- Increased the fuzzer's coverage by adding new targets, **enhancing** its capability to identify vulnerabilities.
- Implemented **instrumentation support** for Rust and Go code, expanding the PC-Table size by **300%**, which enabled the fuzzer to explore a greater number of potential code paths.
- Leveraged **GitHub CI to automate** the build process, ensuring compatibility of tooling on different platforms.
- Responsibly disclosed over **10+ bugs**, including a **critical security vulnerability** that enabled **denial-of-service** attacks against a Rust-based full node, which was assigned **CVE-2024-44073** by MITRE.

ScummVM - Google Summer of Code **May 2023 – August 2023**
Software Development Mentee *Remote*

- Redesigned a game engine(CRAB) to integrate with ScummVM, enabling it to run on modern platforms and increasing the number of platforms supported by **500%**.
- Utilized static analysis tools, including Coverity, to identify and **resolve various memory leaks and bugs** in the codebase, successfully reducing the defect density from 2.0 to 0.0.
- Improved functionality of ScummVM's custom **C++ Standard Library implementation.**
- Achieved a **150% performance improvement** by optimizing blitting routines through vectorization techniques.

Projects

Wumiibo | *C++, C, Python, ARM-Assembly, JavaScript, HTML, CSS* **Github**

- Created a **multi-threaded module in C++ and C** for the Nintendo 3DS, enabling the **emulation** of amiibo figurines by reading files from SD-card to enhance gaming experiences.
- **Reverse-engineered** the stock NFC module to analyze the **IPC mechanism**, leading to a comprehensive reimplementation of an optimized module for improved functionality and efficiency.
- Enhanced user experience by developing a web portal using **JS, HTML and CSS** to easily generate required files.
- The module has been **downloaded over 400,000 times**, and the GitHub repository has garnered more than **400 stars**, reflecting strong community engagement and interest.

Battleships | *Python, Arcade, Sockets* **Github**

- Spearheaded the development of a multiplayer Battleship game using **Python and the Arcade library**, enhancing gameplay through engaging graphics and interactive features.
- Added support for local multiplayer functionality by enabling two players to connect via a **P2P** architecture using **socket programming** for seamless gameplay.

Technical Skills

Languages: C++, C, Python, ARM Assembly, Java, HTML5/CSS3, JavaScript, Embedded C
Tools: VS Code, Excel, Android Studio, Intelli-J, CMake, Autotools, Meson, Hyper-V, Git, VMWare, Valgrind, Coverity
Others: Github, Gitlab, IDA-Pro, Matplotlib, Bokeh, Seaborn, Numpy, Pandas, Flutter, OOPS, Design Patterns, SQL, MongoDB, AFL++, Hongfuzz, Libfuzzer, Linux Kernel and Drivers

Achievements

- Selected in **several prestigious** open-source programs such as Google Summer of Code, LFX and Summer of Bitcoin.
- Awarded **first prize in Titanhacks 2020** for Transport Display project under the hardware category.
- Secured **first position worldwide in Google Code in 2019** and won a cash price of INR 200K+.