Aswin C

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Education

- **Amrita Vishwa Vidyapeetham** — Kollam, India
  Bachelor of Technology in Computer Science and Engineering; GPA: 9.1/10 — *July 2019 - June 2023*
- **Ben-Gurion University of the Negev** — Be'er Sheva, Israel
  Summer school in Data Mining and Business Intelligence for Cyber Security Applications — *July 2022 - August 2022*

Work and research experience

- **Google Code-In** — Remote
  Student developer — *July 2018 - Sept 2018*
  - Completed Google Code-In and received the certificate of participation. Got a gist of what open source software development is and how it works in Ubuntu and OpenSUSE.
- **teambi0s** — Kollam
  Member & mentor — *July 2019 - Present*
  - Helped in coordinating InCTF Nationals and InCTF Internationals—both Capture The Flag tournaments—by mentoring students and creating puzzles in the area of reverse engineering.
  - Developed a custom hardware badge for InCTF 2019, a device to enable students learn about IoT security.
- **Adam Engineering** — Remote
  Freelancer — *November 2020 - January 2021*
  - Worked on reverse engineering an ECU firmware of a automotive vehicle of a popular motor corporation to research about its CRC algorithm.
- **Google Summer of Code—Rizin Organization** — Remote
  Student developer — *May 2021 - Sep 2021*
  - **Support for CPU and Platform Profiles**: Added support for editable CPU and platform profiles, which added flexibility in maintaining platform-specific data about MMIO and IO ports of development boards.
  - **Developed rz-uefi**: Ported and improved a tool for analyzing UEFI modules with the Rizin reverse-engineering framework.
  - **Developed rz-svd**: A tool which can parse SVD descriptor files and add the relevant information as comments and labels in the Rizin reverse engineering framework.
- **Schneider Electric** — Remote
  Freelancer — *April 2022 - June 2022*
  - Developed Capture The Flag tournament challenges (puzzles) for the categories: firmware reversing and Linux kernel programming.

Open Source experience

- **radare2 Organization** — Remote
  Contributor — *June 2020 - Dec 2020*
  - Developed a pseudo-disassembler plugin for RISC-V architecture—a tool which displays the raw assembly instructions in a pythonic syntax—making reverse engineering programs written for the RISC-V architecture easier.
  - Refactored the implementation many existing commands which supported the JSON output mode to use dedicated APIs.
- **Rizin Organization** — Remote
  Member of the organization and developer — *March 2021 - Present*
  - Implemented RzArch—a single module to house all architecture related APIs and data structures.
  - Implemented a tree-sitter based command parser for better performance in parsing user commands.
  - Contributed to the Rizin book—Rizin's usage manual: wrote articles, added examples, helping tips and documentation for the APIs. Ported Rizin's documentation book from the mdBook framework to the Quarto publishing framework.
- **Arch Linux** — Remote
  Community member — *March 2022 - Present*
  - Contributed to asknot-ng—a web app that helps beginners navigate through what they can do for the Arch Linux community depending on their area of interest.

Projects

- **Adversarial attacks on Speaker Recognition models**: Implemented a Fast Gradient Fourier Transform and Projected Gradient Descent attack on the DeepSpeech2 speaker recognition model—under Prof Asaf Shabtai and Shoham Hanina of the Ben-Gurion University of the Negev, Israel.
- **Firmware security analysis of Internet appliance devices from SonicWall**: Employed a full-stack penetration test on the devices which involved testing the on-chip implementation of chip-level protocols such as UART and JTAG, and of the software-level protocols such as HTTP and FTP.
- **FuzzRTOS**: A fuzzing framework to find vulnerabilities in FreeRTOS applications (Ongoing)—mentored by Prof. Aravind Machiry from Purdue University
- **DataSketch**: a web-app to easily plot graphs and visualize data with just a few clicks—aimed at people who are inexperienced with code.
- **kin-ecdote**: Created an audio-streaming platform for the elderly to share their stories and wisdom. Worked on engineering the audio streaming backend and UI design.
- **kalyani**: a simple tool to control the screen brightness for Linux machines that can make the screen look like a Kindle for better reading experience in dark environments.

Skills Summary

- **Languages**: **Proficient:** C, Python, Java, Bash
  , **Intermediate:** Rust, Haskell, C++, R, x86 assembly
- **Soft Skills**: Public speaking, event management, writing

Capture The Flag tournaments and other competitions

Hardware Security CTF at Nullcon Security Conference, Goa: Won the Hardware Security CTF with teambi0s at the Nullcon security conference in Panaji, Goa. Interacted with experts of automotive security and Software Defined Radio.

CSAW Embedded Security Challenges finalist: Completed the initial set of puzzles and qualified for the finals of CSAW ESC 2020 and 2021- a CTF aimed at embedded devices' security hosted by NYU and CSAW. The puzzles were about reverse engineering firmware written for the RISC-V architecture, and Side Channel and Fault Injection attacks.

IEEE National RFID Challenge 2021 runner up: Implemented a COVID-19 vaccine verification system using RFID-based secure authentication for the IEEE National RFID Challenge 2021 using a MFRC 522 for reading the RFID, MLX 90614 for measuring temperature and ReactJS for interacting with CoWIN-API.

MITRE Collegiate eCTF: Worked on designing and securing a radio technology protocol based on Secure Common Embedded Wireless Link (SCEWL) protocol. The competition involved securing the SCEWL Bus Controller from replay attacks, and counter packet injection.

Hac'KP Hackathon: Researched and proposed a GPS-free geo-location tool by implementing low-power LoRaWAN technology for law enforcement to track inmates.