Alan Cao *https://codemuch.tech*

Student and Systems Engineer

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Summary

Student and systems engineer with passions in secure and distributed systems, cryptography, and programming languages. Proficient in low-level systems programming languages such as C/C++ and Rust, full-stack web development, penetration testing, and Linux systems administration. Looking to harness leadership capabilities and problem-solving skills to write impactful, research-oriented and open-sourced code for a more technically-capable future.

Education

Francis Lewis High School — Fresh Meadows, NY
GPA: 4.0 / 4.0 (96.5) — *September 2015 – June 2019*
> **Coursework:** AP Global History, AP English Language and Composition, AP Biology, AP U.S History, Honors Physics, Honors Chemistry, Precalculus, Science Research, Virtual Enterprise, Junior Reserves Officer Training Corp

Farmingdale State College — Farmingdale, NY
Finance and Economics — *September 2017 – June 2018*
> Under guidance of Christopher Power, received college credit for economics and finance-related courses at a high school level. **Coursework:** Advertising Practice and Application, Graphic Design for Non-Majors, Principles of Economics (Macro)

The Cooper Union — New York, NY
Electrical Engineering — *July 2017 – August 2017*
> Under guidance of Professor Yashodhan C. Risbud, took one semester equivalent of Digital Logic and Design course. Implemented 4-bit computer as final research project.

Experience

NYU Secure Systems Lab — New York, NY
Research Intern — *May '18 – present*
> Under guidance of Professor Justin Cappos, The NYU Secure Systems Lab conducts research in discovering security solutions for threats in modern-day software systems. Collaborated with PhD candidate on building crash replay system using Python and C. Independently worked on distributed password management protocol research project.

turingmachines — New York, NY
Founder & Research Associate — *Dec '17 – present*
> turingmachines is a not-for-profit student-led research collective focused on systems and computation. Led development on several research projects, including a full-scale Linux-based operating system. Independently published academia for research projects.

Nuapps — Francis Lewis High School, NY
Software Developer — *September '17 – present*
> Nuapps is a student-led Virtual Enterprise app development firm. Led development on several cutting-edge apps Introduced team to working with industry-level technologies, including version control and unit testing. Collaborated on building hardware arcade machine for tradeshow marketing.

Virtual Enterprise International — Remote
VR Developer *(contract)* — *April '18 – May '18*
> Virtual Enterprise International is a nonprofit organization dedicated to supporting student-led Virtual Enterprise firms. Collaborated on Virtual Reality Experience for tradeshow marketing using the Metaverse platform and JavaScript.

Francis Lewis High School — Fresh Meadows, NY
I.T Intern — *July '16 – June '18*
> Provided software and hardware technical support for 5,000+ population school. Troubleshooted and diagnosed Windows 7 / macOS issues. Gained knowledge of server administration and the TCP/IP network stack. Assisted Patriot Battalion with website administration.

Extracurriculars

lewHacks()

Co-Founder and Director of Technology *July '17 – present*

lewHacks() is a student-led high school hackathon for Francis Lewis High School. Led development of hackathon tech stack, including front-end and project management platform (JavaScript). Provided guidance to participants. Managed non-tech logistics for events, including sponsorship interaction and reward distribution.

JROTC Academic Leadership Team
Fresh Meadows, NY

Team Captain *October '17 – present*

The Francis Lewis High School JROTC Academic Leadership Team is a nationally-acclaimed academic team with a focus on studying academic and leadership materials and competing in local, state and national-wide competitions. Won local, state, and national-wide competitions as a freshman, sophomore and junior. Led team as captain for competition for 2018 national-level competition.

Accolades

- JROTC Leadership and Academic Bowl - Second Place 2018 - *won Second Place national award out of thousands of JROTC Academic teams*

- National Piano Guild High School Diploma - *received diploma for completion of audition for high-school level piano repertoire*

- JROTC Leadership and Academic Bowl - First Place 2017 - *won First Place national award out of thousands of JROTC Academic teams*

- defHacks() Best Cybersecurity Hack 2016 - *won award for building dedsploit penetration testing framework*

- National Piano Guild Sonatina Award 2014 - *won award for auditioning classical Sonatina repertoire*

Notable Projects

- Ghostpass - *Dead simple two-round password management cryptographic protocol that focuses on security and portability.*

- CrashSimulator - *Crash-based record-replay system that enables debugging through anomaly injection (in conjunction with the NYU Secure Systems Lab).*

- dedsploit - *Penetration testing framework built for attacking network protocols.*

Publications

Lagrange: design of a low-level mathematical library for polynomial interpolation over Galois finite fields

Skills

Technical expertise: Software design and implementation, with(in) a team. Version control, unit testing, (basic) design patterns, technical writing. C/C++, Rust and Intel x86 ASM for low-level and embedded systems and binary exploitation. Python, Ruby and Go for full-stack web and general development. HTML/CSS/JS (including NodeJS) for full-stack web development. Flirts with theoretical computer science, functional programming (OCaml), digital logic, computer architecture, machine learning. Linux skills include: Bash, (Ubuntu) server administration and deployment, penetration testing with Kali Linux, troubleshooting. Flirts with virtualization/containerization (Docker, VMware, VirtualBox) and databases (SQLite and MySQL).

Others: Languages: English *(full professional proficiency)*, Chinese Mandarin *(intermediate speaking proficiency)*, Spanish *(elementary proficiency.)* Miscellaneous: Piano (Classical, Romantic and Contemporary Advanced Level)

Interest Buzzwords: Decentralization, quantitative finance, startups, functional programming, computer vision, machine learning, blockchain, networking, compilers, applied mathematics, computer architecture, privacy