Jacob Shin

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Education

Temple University   Expected: May 2024

- BS in Computer Science • Honors Program • President's Scholar: Full-Tuition
- Courses: Introduction to Academic Computer Science, Math Concepts in Computing I (Discrete Mathematics)

Experience

Princeton Plasma Physics Laboratory (PPPL) Intern   October 2019 - December 2019

- Designed circuitry for a Langmuir probe, a device used to measure properties of plasmas like density and temperature.

Projects

MITRE Embedded Security Challenge   (C, AES, AVR)

- Designed a custom bootloader for an Atmega microcontroller with AES-CBC encryption and HMAC verification
- Attacked bootloaders from other teams by dumping flash via JTAG after finding out that fuse bits were incorrectly setup.

TI-Authenticator: 2-Factor Authentication With a Calculator   (C, HMAC, SHA1, OTP)

- Provided rolling passcodes similar to Google Authenticator and Duo except on a TI-84+ CE graphing calculator.
- Implemented One-Time Password (OTP) algorithms based on RFC 4226 (HOTP) and RFC 6238 (TOTP) specifications based on a custom implementation of the HMAC algorithm (for learning purposes).

Personal Blog and Capture the Flag (CTF) Security Challenge Writeups

- Described the process of reversing using Ghidra (reverse engineering tool), bypassing exploitation mitigation techniques like NX (Non-executable stack) & ASLR (Address space layout randomization), and leveraging Return Oriented Programming (ROP) to exploit a binary.
- Wrote a writeup on utilizing a tape-drive, emoji based assembly language to implement subtraction and xor from scratch with bitwise operators.

Revere Engineering Malware

- Learned reverse engineering techniques for reversing malware using Malware Unicorn's free, online reverse engineering workshops (Triage Analysis, Static Analysis, and Dynamic Analysis)

Skills

Programming Languages: C, C++, Python, Javascript, x86 ASM
Other: Linux, Git/Github, Tmux, (Neo)vim, Ghidra, GDB (GNU Debugger), Binary Exploitation, Basic Reverse Engineering

Awards/Activities

CTF (Capture the Flag Computer Security Competitions):

- 1st at castorsCTF20 (out of 500) • 2nd at OwlHacks RSM CTF • 4th at MetaCTF 2020 (out of 1017) • 4th at RACTF 2020 (out of 1047)
- 25th at PicoCTF 2019 (out of 11722) • 35th at TJCTF 2019 (out of 483) • 13th at MITRECTF 2019 (out of 262)

Member: Temple Hack-a-Hardware / Computer Security Club
Member: Pwn Intended CTF Team (Top 100 Globally)