

CS-6035 Project & Technical Prerequisites

Project 1:

1. Working knowledge in C
2. Advanced abilities in GDB to debug a program
 - a. Know how to compile code and debug in GDB
 - b. Know how to move through code execution flow
 - c. Know how to access and print variables in various formats
 - d. Know how to navigate between source, assembly, and register layouts
3. Working knowledge about the Stack and Heap
 - a. Their layouts in memory
 - b. The role they play in program execution
4. Basic computer architecture
 - a. Registers, addresses in memory, and what they are used for
 - b. Memory allocation, both static and dynamic
 - c. Ability to work with hexadecimal, bits, and bytes
 - d. Basic level of reading and understanding assembly
5. Basic command-line execution in Linux
6. Basic knowledge working with Virtualbox VMs and images, cloning, and sharing files

Project 2:

1. Basic command-line execution in Linux
 - a. Knowledge of how to run python scripts
 - b. Knowledge of how to write basic shell scripts
2. Basic to intermediate understanding of working with Virtualbox VMs and images, cloning, and sharing files between them.
 - a. Understanding how we can accomplish this process via command line arguments
 - b. Understand how Virtual Machines are run when you need to run one virtual machine in another.
3. An understanding of isolated environments and honeypots for viruses to run in a safe and contained way.
 - a. Knowledge of how these systems work at a high level via a networking perspective
4. Conceptual understanding of network rules, ports, IP/CIDR addresses
 - a. Knowledge of how firewall rules are read
 - b. Knowledge of port numbers and what they do
 - c. Knowledge of how iptables and how to read them
5. Understanding of how malware can disable or enable different parts of a machine's operating system
 - a. Knowledge of bit/bytes in order to understand if a piece of malware infected a specific part of a system

Project 3:

1. Basic command execution in Linux
 - a. Familiarity with running python scripts via command line interface
2. Familiarity with python programming
 - a. Only python 3.7 and below
 - b. Functions and the self keyword
 - c. Basic Operators in Python
 - d. Loop Conditions in Python
3. Familiarity with modular arithmetic and discrete math
 - a. Working knowledge of number theory
 - b. Working knowledge of General algorithms and how they work
4. Familiarity with unit testing
 - a. Working knowledge of how Python unit tests are made and possibly how to make your own

Project 4:

1. Basic command execution in Linux
 - a. Working knowledge of how to edit files and view contents in different places.
2. Intermediate understanding and familiarity with web technologies and browser events (HTML / JavaScript / jQuery / PHP / web page inspection tools)
 - a. Working knowledge of DOM and how you can use it with javascript
 - b. Basic JavaScript syntax
3. Basic familiarity with SQL.
 - a. How basic SQL functions work
 - b. How to connect to a database and interact with it using PHP
4. Basic understanding of REST (GET/POST) and other more advanced jQuery calls.
 - a. How these calls work in programs in general and what it means for said program.
5. Basic knowledge of string manipulation and using regex to filter strings
 - a. Using with PHP to manipulate strings