System Security
Constructor University
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Module: MCSSE-CYB-02
Date: 2026-05-01
Due: 2026-05-08

Problem Sheet #8

Problem 8.1: *malware code in different languages* (2+2+2+4 = 10 points)

The goal of this exercise is to study malicious machine code written in different high-level programming languages. For each of the following functions, provide implementations in three different compiled high-level programming languages (e.g., C/C++, Rust, Go, Haskell).

For some related research, see "Coding Malware in Fancy Programming Languages for Fun and Profit" (https://doi.org/10.48550/arXiv.2503.19058).

a) Write a function creating a reverse shell. The function should receive an IP address and a port number, establish a stream connection, and then hand over the connection to a shell.

b) Write a function appending a line to a file if the line is not yet present in the file. Ensure that the access and modification time of the file does not change.

c) Write a function encrypting a file. Make sure that the original file can be restored, including its metadata.

d) Analyze the machine code using malware analysis tools such as radare2. How similar is the generated machine code? Are there common patterns?