CS 44500 Computer Security

Lab 1: Lab Environment Setup

Due on January 18, 2023, Wednesday, 11:59pm

The goal of this lab assignment is to let you set up SEED lab environment and review C programming and GDB.

1) **VirtualBox and SEED Ubuntu 20.04 VM**.
   Please following the instructions in the following link to install VirtualBox (e.g., version 6.1.16) and Pre-built Virtual Machine Images (Ubuntu 20.04 VM) to your computer:

   https://seedsecuritylabs.org/labsetup.html

   under the Section of "Ubuntu 20.04 VM", "Approach 1: Use a pre-built SEED VM".

   Note that the steps to use VirtualBox to run SEED Ubuntu 20.04 VM are in the document "Run SEED VM on VirtualBox":

   https://github.com/seed-labs/seed-labs/blob/master/manuals/vm/seedvm-manual.md

   Pay attention to the information such as the passwords for user *seed*.

   In your lab report, please include a screenshot of your SEED Ubuntu 20.04 into your lab report (i.e., lab1.docx), like
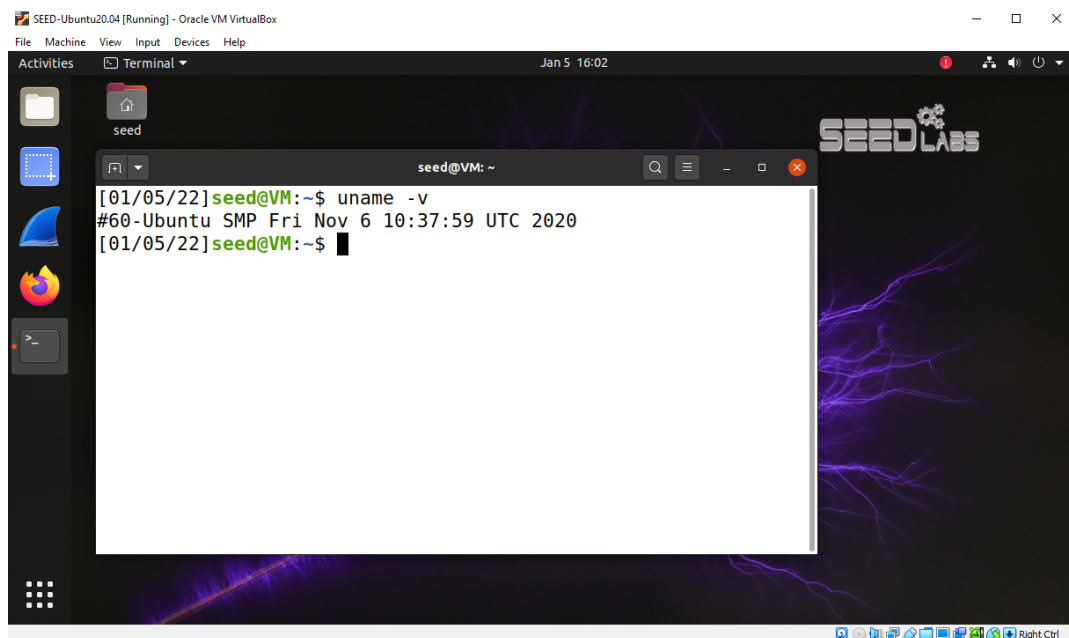
Note that if you do not have your own computer, please use the computer in ET-109 or ET-111 to use VirtualBox to install SEED Ubuntu 20.04 VM. Another option is to run the SEED Ubuntu 20.04 VM from the Cloud (such as Amazon AWS or Google Cloud). Please refer to the following document:

https://github.com/seed-labs/seed-labs/blob/master/manuals/cloud/seedvm-cloud.md

Important Note. Please only use the **shared folder** to copy files between the VM and the host machine, and never use it as your working folder. Working from the shared folder has caused many problems, especially on the permissions of the files created inside the shared folder. For example, if we unzip the Labsetup.zip file inside the shared folder, the permissions of the unzipped files will be different from those on the original files. Some labs and containers are very sensitive to those permissions.

2) **C program**. In Ubuntu 20.04 VM, use "vim" or "Text Editor" to write a C program that prints out all the environment variables of the process of this C program. The program also prints out the value and the memory address of the "SHELL" environment variable. (Hint: use getenv() function call). An example running output is like:

$ gcc -o lab1 lab1.c -Wall
$ ./lab1
SHELL=/bin/bash
SESSION_MANAGER=local/VM:@/tmp/.ICE-unix/1876,unix/VM:/tmp/.ICE-unix/1876
QT_ACCESSIBILITY=1
COLORTERM=truecolor
……
SHELL's value: /bin/bash
SHELL's address: 0x7fff1c2a6460

Please put your code and running output in your lab report (i.e., lab1.docx). Note that you can find some review materials on C programming language in Brightspace.

3) **GDB**. File "prob3" is an executable program and compiled with "-g" flag. Please use gdb to find the "secret" string (i.e., variable name is "secret") inside the "keep_secret" function in the program. Moreover, put all gdb commands into ".gdbinit" file and then auto-run all those commands when running "gdb prob3". Please put gdb commands and the running results into your lab report (i.e., lab1.docx).

4) **GitHub repository**. Create a **private** GitHub repository to host your lab submissions. Upload your lab1 report (e.g., lab1.docx) and C code (e.g., lab1.c for problem 2) to this GitHub repository under directory "**lab1**", and then invite TA and instructor to your GitHub repository through email addresses: jeevte01@pfw.edu and chenz@pfw.edu.

   You may need to create the personal access token in GitHub. Please refer to https://docs.github.com/en/authentication/keeping-your-account-and-data-secure/creating-a-personal-access-token. Please choose "No expiration" for Expiration and check "repo" in Select scopes.

If you have troubles in installing VM or pushing the report/code to GitHub repository, please let the TA or the instructor know.

Grading rubric:

- VirtualBox and SEED Ubuntu 20.04 VM (i.e., screenshot)   – 25pt
- C program (i.e., lab1.c)   – 25pt
- GDB   – 25pt
- GitHub repository   – 25pt