Introduce Running Environment

OS: Windows 10 with VirtualBox VM.

CPU: 2 CPUs, Execution Cap 100%

Motherboard: 2048MB

Storage: 40GB Dynamic

Progress Diary

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| --- | --- | --- | --- |
| Stage | Step | Task Description | Comments |
| 1 | 1 | Download Ubuntu 16.04 | - |
| 1 | 2 | Download VirtualBox | - |
| 1 | 3 | Install VirtualBox | Easy installation |
| 1 | 4a-c | Create virtual machine | Took a few moments to decide how much CPU, and storage to dedicate to the virtual machine. There was an option asking to create a dynamic or fixed size of the drive to be used in the virtual machine, I chose dynamic with a base of 40GB space. |
| 1 | 4d | Install Ubuntu | - |
| 2 | 1 | Download kernel | Downloaded latest stable kernel 4.12.5 |
| 2 | 2 | Compile Linux kernel source code | This part was quite confusing. I had originally followed the guide shown in the assignment document, but when I reached the “# make config” section, I was presented with many many questions from the terminal. It turns out that make config will ask for configuration for everything inside the kernel. I used “make menuconfig” instead which allowed me to simply save the config and proceed on with the next step.  Before proceeding I ran this command to install some programs  sudo apt-get install gcc  sudo apt-get install python-pip python-dev libffi-dev libssl-dev  sudo apt-get install libncursesw5-dev  Running “make” after “make menuconfig” took quite a long time to complete. Rebooting failed twice with 2 errors, but the third time passed. uname -r returns 4.12.5, which is the kernel that I had compiled. |
| 3 | 1 | Create helloworld.c file | Created a directory called helloworld inside the extracted folder as well as a C file titled helloworld.c |
| 3 | 1 | Create makefile in helloworld folder |  |
| 3 | 1 | Create entry in syscalls.h | Location: ~/Downloads/linux-4.12.5/include/linux |
| 3 | 1 | Create system call in syscall\_64.tbl | Location: ~/Downloads/linux-4.12.5/arch/x86/entry/syscalls |
| 3 | 1 | Added helloworld call to makefile |  |
| 3 | 2 | Recompile Linux kernel and reinstall the kernel | Run make config  Run make  Run make modules\_install  Run make install  Run reboot |
| 3 | 3 | Compile and run the program | gcc helloworld.c  ./a.out |
| 3 | 3 | Display dmesg |  |