COSC1114
Semester 2
Assignment 1

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Introduce Running Environment

OS: Windows 10 with VirtualBox VM.
CPU: 2 CPUs, Execution Cap 100%
Motherboard: 2048MB
Storage: 40GB Dynamic

Progress Diary

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
			`#include <linux/kernel.h>`
			
			`asmlinkage long sys_helloworld(void){`
			
			`printk("Hello world\n");`
			`return 0;`
			`}`

3	1	Create makefile in helloworld folder	`obj-y := helloworld.o`

3	1	Create entry in syscalls.h	`asmlinkage long sys_helloworld(void);`
			
			`#endif`
			Location: ~/Downloads/linux-4.12.5/include/linux

3	1	Create system call in syscall_64.tbl	`331 common pkey_free sys_pkey_free`
			`332 common statx sys_statx`
			`333 64 helloworld sys_helloworld`
			
			Location: ~/Downloads/linux-4.12.5/arch/x86/entry/syscalls

3	1	Added helloworld call to makefile	`ifeq ($(KBUILD_EXTMOD),)` `core-y += kernel/ certs/ mm/ fs/ ipc/ security/ crypto/ block/ helloworld/`
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	`[ 150.822813] input: VirtualBox USB Tablet as`
			`usb1/1-1/1-1:1.0/0003:80EE:0021.0002/input/inp`
			`[ 150.885595] hid-generic 0003:80EE:0021.0002`
			`se [VirtualBox USB Tablet] on usb-0000:00:06.0`
			`[ 893.693574] Hello world`