Lab 1 – Installing Linux in a Virtual Machine
CMSC 242
Spring 2015
Due Friday, Feb. 6th

One of the skills I want you to develop in this class is facility with the Linux command line. One of the best ways to understand how Linux works is to set up a virtual machine and install Linux on it. The lab systems come with a package called "VirtualBox" that will allow you to do this. I also want you to become familiar with vim. To that end, we are going to play some "vim golf".

Part 1: Installing Linux

The distribution I'd like you to use is called "Kali Linux". You can download an ISO image for it from:

https://www.kali.org/

(Click on the Downloads link and grab the 64 bit ISO).

VirtualBox, by default, will store your machine images in your home directory. This will count against your quota (which can cause problems) and will also be really slow. In fact, the amount of data it will transfer across the network can cause the lab to be slow for everyone.

To avoid this problem, make a folder under the /scratch directory on the system you're working from. When you create your disk image, store it in your new scratch folder. The /scratch directory is stored on the local hard drive of the workstation and doesn't count against your quota. This prevents problems with network storage, but also means that you won't be able to work on your lab from other systems (at least, not without copying the files over).

Installing an operating system is a basic, but very important skill for any system administrator. This is sometimes done by "imaging" a new machine. Imaging means installing both the operating system and a default set of applications that users of the organization need. Often, this is done by setting up a prototype system and then copying all the files from its hard drive to new systems. There are many commercial products for distributing these images over a network, but it turns out that it's also fairly easy to roll your own solution in Linux using SSH, tar, and a little shell script magic.

Before an image can be distributed, though, a prototype system needs to be configured. In this lab, I want you to set up a basic kali image and then install the following packages:

Firefox
Libreoffice
Gimp
Vim

I want you to configure your system so that the root password is set to "cmsc242" (all lowercase).

Part 2: Vim Golf

Download the file "VimGolf.txt" from the course web site (located in the Course Materials section on the bottom left of the screen). This file contains two paragraphs. Below are seven tasks which I want you to try to accomplish with as few keystrokes as possible. For each task I have listed a "par". If you can beat the par score you will get 5 points. If you can accomplish the task, but it takes you more keystrokes, you will get only 3 points. If you fail to accomplish the task, you will get no points at all.

For each task, write down every keystroke in the space below. If you use special keys (such as space, tab, escape or return) place them in angle brackets like this:

<SPACE>
<TAB>
<ESC>
<RETURN>
<INSERT>

If you use the shift or control keys, indicate that by adding the word SHIFT- or CTRL- in front of the key in all caps. Shift and Control do not count as separate key strokes. For example, to insert the phrase “Hello World” into a file you would tell me to type:

i SHIFT-h e l l o <SPACE> SHIFT-w o r l d

This is 12 keystrokes.

You should consider each task as independent and completely separate from the others. The cursor starts at the top-right corner of the file at the beginning of each task.

A. Delete all text between double quotes. (15)

B. Wrap the text so that it fits into 80 columns without splitting words. (6)

C. Delete the first line of the file. (2)

D. Change the word “enemy” on the first line to the word “opium”. (15)

E. Copy the entire first paragraph and paste it at the bottom of the document with a blank line between each paragraph. (7)

F. Change the case of the first ten characters of the document (so that the B in bureaucracy will become a 'b' and the lowercase letters will become uppercase). (5)

G. Indent the first line of the file by one tab. (2)

Hints: Using Virtual Box

You can launch Virtual Box from the terminal by typing “VirtualBox” (note the capital letters) or from the menu by selecting Applications->System->Virtual Machine. Click the “New” button to create a new virtual machine and follow the instructions in the wizard. You will want to give your system at least 8Gb of RAM. When asked for a location for your start-up disk, be sure to click the little yellow folder icon so that you can tell VirtualBox to put the image file in the folder /scratch/*username* that you created. If you have not already created your scratch folder, you can do it by clicking the blue folder icon with the green plus on it in the File Dialog. You will want about 20Gb for your hard drive image.

Hint: Installing Programs

Once you've set up your virtual machine and gotten it to boot from the Kali image, you can start installing packages. Kali (like Ubuntu) is based on the Debian distribution which uses the “apt-get” command for this.

First update the list of packages by typing “apt-get update”. Then use the syntax “apt-get install <package>” to install each package. For example, to install gcc, you would type:

apt-get install gcc

You can specify several packages on the same command line. Just separate them by spaces.

Hint: Passwords

Set your root password by typing “passwd” at a terminal and hitting enter.
Set it to “cmsc242” (all lowercase).

Hint: Using Vim

You will want to learn at least the following commands:

dd
gqap
~
w
b
e
v
y
p
>>
G
:0
$

Submitting

There will be no online submission of this project. Instead, I will ask you to do a live demo in which I check that your system can boot and run the four software programs.