# Assignment 2

## Preface

The objective of this assignment is for you to learn how to obtain useful information about an operating system and/or computers on which it is running. Again, because our network is a Linux-based network, the assignment will require you to login to the network to answer the various questions. Hopefully, you will discover the power of the command line in doing this assignment.

## Overview

There are many type of questions that can be answered very easily with a few commands typed on a command line. For example,

- How many physical processors are on each of the computers in our network?

- What is the range of IP addresses used by the computers in the lab?

- Which machine has IP address 146.95.214.48?

In this assignment, you will find the answers to various questions like these and write them in a file that you will then submit using the `submithwk_cs340` command that you learned how to use in the last assignment. To facilitate the grading of this assignment, I have created a specific file that you must copy into your own home directory, edit, and submit. ***You must follow the instructions below exactly in order to receive full credit.***

## Deadline

You must complete this assignment before its *deadline*, which is **Wednesday, February 16, at 7:00 PM. This is important.**

## Suggestions and Tutorial

The `bash` shell has many features that make work on a Linux system efficient. Linux also has various commands to make you more productive. In this section I go over a few of these.

### Using ssh to execute a single command

You can use *ssh* to execute a command or command sequence on a remote host. If you have not set up *ssh authentication* for your account, you will be prompted for you password to execute the command. To set up an ssh key pair, you can follow the instructions in the tutorial that I wrote here:

http://www.compsci.hunter.cuny.edu/~sweiss/resources/settingup_ssh_keys__derived.pdf

Suppose that you are logged into `eniac`. You can execute the command "`ls -l`" on `cslab12` by typing

```
$ ssh cslab12 'ls -l'
```

If you have set up the ssh keys it will execute without any further prompt. Otherwise you will have to type your password when prompted.

### Using bash looping

`bash` has a loop construct so that you can repeat a command with different parameters. For example, to print the numbers 1 to 10 one per line on the screen:

```
for i in 1 2 3 4 5 6 7 8 9 10 ; do
    echo $i
done
```

Every part of this syntax is important. The semicolon, the words `do` and `done`, etc. Since the `seq` command can output a sequence of numbers, you could instead type

```
for i in $( seq 1 10 ) ; do
    echo $i
done
```

Again, the syntax must be used exactly. If you wanted to run the `date` command on every host in the network you could type

```
for i in $( seq 1 15 ) ; do
    ssh cslab${i} date
done
```

This is pretty powerful!

**Filtering Output**

If you want to limit the output that a command produces to only those lines that contain a specific pattern, you can use the `grep` command in a pipeline. For example, the `last` command can produce a lot of output. To see all lines that `last` outputs that contain the string "`Feb 4`" I could type

```
last | grep 'Feb  4'
```

To see lines that have any of the dates Feb 1,2,3, or 4, I would type

```
last | grep 'Feb  [1-4]'
```

With this information doing what is asked below can be easier. Read the man pages for these commands to learn how to use them.

**Useful Commands**

You should read the man pages for a few commands and or files. I am suggesting that you review the pages for

- `last`

- `proc` : The man page is long but it lists what the contents of each directory and file are. Some of these are needed to answer these questions.

- `seq`

## Detailed Instructions

1. Using any *ssh client* on your computing device, remotely login to `eniac.cs.hunter.cuny.edu` using your CSDN username and password.

2. When you login successfully, ssh to **any cslab host.** For example, to ssh to `cslab8` you would type:

   ```
   $ ssh cslab8
   ```

3. The remaining instructions assume that you have logged into some `cslab` host.

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4. Copy the file /data/biocs/b/student.accounts/cs340_sw/hwks/hwk2_questions to your home directory using the command

   ```
   $ cp /data/biocs/b/student.accounts/cs340_sw/hwks/hwk2_questions ~
   ```

5. Answer the questions in the file hwk2_questions that you just copied into your home directory. You will need to use a text editor to do this. ***Do not use a word processor to do this.*** If you do, the file will not be readable and you will get a zero on the assignment. Instead, if you edit it on Linux, use an editor such as vim, emacs, pico, nano, gedit, or geany. On Windows, use WordPad or NotePad. On a Mac, use an editor such as NotePad++, atom, or any command line editor like the ones in the Linux list above. Make sure that you follow the instructions for how to write the answers in order to receive full credit.

6. Save your file and make sure that you ***do not add an extension to its name***. It can be named anything, but do not add an extension such as ".txt".

7. Assuming the file is named my_hwk2_questions, to submit it, run the command

   ```
   submithwk_cs340  -t  2  my_hwk2_questions
   ```

   The program will copy your file into the directory

   ```
   /data/biocs/b/student.accounts/cs340_sw/hwks/hwk2/
   ```

   and if it is successful, it will display the message, "File hwk2_*username* successfully submitted."

   where *username* is your username. You will not be able to read this file, nor will anyone else except for me.

8. ***You can do step 7 as many times as you want. Newer versions of the file will overwrite older ones.***

## Grading Rubric and Deadline

This assignment is 1.5% of your final grade. Each question is 25% of the grade for the assignment. Partial credit will be given for partially correct answers. Again, the deadline is **Wednesday, February 16 at 7:00 PM**.