

Programming Assignment 0

Objectives

- 1) Access your student csscxxxx class account using SSH.
- 2) Become familiar with Unix commands: `cd`, `cp`, `ls`, `mkdir`, `pwd`, `rm`.
- 3) Use the command line to compile your Java source code and `java` command to run it.
- 4) Place source file(s) in the grading directory called "handin."

Background Reading

- **Basic Unix Tutorial :** <https://edoras.sdsu.edu/doc/unixtut/>
- History of Operating Systems:
 - <https://www.studytonight.com/operating-system/introduction-operating-systems>
 - <https://www.studytonight.com/operating-system/evolution-of-os>
 - <https://www.studytonight.com/operating-system/types-of-os>

Introduction

Writing a computer program involves creating source code with an editor, saving that code in a file, compiling the code, and running the program by invoking the execution application. In this assignment, you will go through that process where the end result is you store the source file in your own class account provided on a campus computer named "edoras."

What is edoras? The name itself refers to a realm of Middle Earth in J.R.R. Tolkien's Lord of the Rings trilogy. At SDSU, it is a CentOS 7.6 server (a high performance computer) running Linux 7 (an operating system). The idea is: a computing machine and the software that manages its resources. Some other paired systems you might recognize are an Apple Mac running macOS Mojave, a Dell Inspiron desktop running Microsoft Windows 10, and a Samsung Galaxy S10 phone running Android 9.0 Pie. [Read about [Operating Systems](#) now.]

Why do we use edoras? edoras's operating system, SLinux 7, is a version of the LINUX operating system (OS). Linux is a successor to UNIX OS. We use edoras's set of powerful system tools and commands to collect and score programs. [edoras software](#) includes: compilers for many computer languages; databases, debuggers; math/stats tools; Web processing; Internet; and more. After you place a program in your `handin` directory, it is harvested by an automatic grading program that has the ability to examine your code, compile it, run it, and compare the results to expected results. Programs can also be compared to others submissions to check for uniqueness (aka, insure no submitted programs are too much alike).

How can I connect to edoras? Each student receives a unique 8-character account that begins with "cssc" — this is what is referred to as your "cssc ID." Your csscID and password will be emailed to you

and/or put into a column in Blackboard's grade center. Because edoras is a separate computer, you need to make a connection to it. We recommend using "SSH", the **Secure Shell** software which uses the Internet to connect your computer to SDSU's. SSH is already installed on the lab computers. Mac systems come with SSH installed; PC users need to download and install it. It is available at edoras.sdsu.edu/software/#Internet. Instructions to install and the command to connect to edoras are available on our course Bb site under "Resources."

IMPORTANT! The "csscID" account is good for only the current semester and will be removed (along with all content) at the end of the semester. You must use the csscID account for program submission.

Assignment

Step 1.

Get or verify that you have the software installed to connect to the edoras server. Connection "how to" documents are available on Blackboard for

- SSH Windows: PuTTY, Secure Shell Client
- X-Win32
- MobaXterm
- SSH Mac

Step 2.

Establish a connection to edoras using either SSH (for a text only session) or X-Win32/MobaXterm (for a graphical connection).

The host is: **edoras.sdsu.edu**.

For this lab you will be using the csscxxxx user account and password issued by the instructor. These instructions will use *cssc0604* as the csscID account.

Step 3.

The default shell is **bash**. Once logged into edoras, you should see the shell prompt, made up of symbols somewhat like this:

```
[cssc0604@edoras ~]$
```

The tilde '~' character indicates your "home directory", that is, the top folder of your directory structure.

UNIX commands are very cryptic. You will get used to them! We will use some now to navigate and view the content of directories, change the account password to something memorable, and do a few other things.

Step 4.

See what exists in your directory. Type "ls" (lowercase LS that is, "ell ess", which stands for "list the files")

```
[cssc0604@edoras ~]$ ls
```

You should see "handin" listed. Notice the result of the command is output and then the prompt appears ready for your next command.

```
[cssc0604@edoras ~]$ ls
handin
[cssc0604@edoras ~]$
```

Step 5.

Unix terminology for what you may be used to calling a "folder" is a "directory." To see which directory you are currently in, type "pwd" for "print working directory"

```
[cssc0604@edoras ~]$ pwd
```

You should see *something like this*, but with your class account:

```
[cssc0604@edoras ~]$ pwd
/home/cs/pkraft/cssc0604
[cssc0604@edoras ~]$
```

This is your **home** directory, your starting place. Your permissions are set to allow you to control the files and directories in your "home" directory. You do not have permissions to access other class accounts. To prove it, navigate up a directory (i.e., go to the parent directory). Type "cd ..", that is "cee dee space dot dot", followed by "ls".

```
[cssc0604@edoras ~]$ cd ..
[cssc0604@edoras pkraft]$ ls
cssc0440  cssc0461  cssc00482  ...
[cssc0604@edoras pkraft]$
```

Pick one of these other than your own and try to navigate into it. Type "cd cssc0440", for example, then follow with "ls" and "pwd".

```
[cssc0604@edoras pkraft]$ cd cssc0440
-bash: cd: cssc0440: Permission denied
[cssc0604@edoras pkraft]$ ls cssc0440
ls: cannot open directory cssc0440: Permission denied
[cssc0604@edoras pkraft]$ pwd
/home/cs/pkraft
[cssc0604@edoras pkraft]$
```

Time to get out of there! To go "home" just type "cd". A "pwd" will show you indeed are in your home directory.

```
[cssc0604@edoras pkraft]$ cd
[cssc0604@edoras ~]$ pwd
```

```
/home/cs/pkraft/cssc0604  
[cssc0604@edoras ~]
```

Step 6.

The directory called "handin" is the place to put files for grading. While a program is being developed, it is better to work in a "sandbox" so let's make one of those. The Unix command is "mkdir" for "**make directory**."

```
[cssc0604@edoras ~] mkdir sandbox
```

You should see a new addition when you list the directory content.

```
[cssc0604@edoras ~] ls  
handin  sandbox  
[cssc0604@edoras ~]
```

Navigate into the sandbox directory.

```
[cssc0604@edoras ~] cd sandbox  
[cssc0604@edoras sandbox]
```

Perhaps you have noticed that the current directory name is showing up in the prompt.

Step 7.

Now let's add a file by copying one from my shared directory. Type the following command *exactly*. [That's a "tilde" preceding "pkraft", and don't forget the third part which is the dot at the end indicating the destination directory is the current directory.]

```
[cssc0604@edoras sandbox] cp ~pkraft/shared/HelloStudent.java .
```

This will copy a Java text source file `HelloStudent.java` into your current directory.

Step 8.

Check to see that the new file exists by listing the files in the directory. Type "ls". You should see *something like this* (if not, verify that you didn't skip a step or type a wrong command):

```
[cssc0604@edoras sandbox] ls  
HelloStudent.java  
[cssc0604@edoras sandbox]
```

Step 9.

The file `HelloStudent.java` is a complete Java program. Sure, it's a very small one, but it is complete! Compile and run this source file. The command to compile the file is:

```
[cssc0604@edoras sandbox] javac HelloStudent.java
```

If the compile succeeds, there will be no output, that is, you will simply see the edoras prompt appear.

```
[cssc0604@edoras sandbox] javac HelloStudent.java
[cssc0604@edoras sandbox]
```

Notice a new file has been created: `HelloStudent.class`.

```
[cssc0604@edoras sandbox] ls
HelloStudent.class  HelloStudent.java
[cssc0604@edoras sandbox]
```

This new file, `HelloStudent.class`, is the Java bytecode created by the compile process. You cannot edit this file, but you can run (execute) it. The command is:

```
[cssc0604@edoras sandbox] java HelloStudent
```

You should see this:

```
[cssc0604@edoras sandbox] java HelloStudent
Hello, Student!
[cssc0604@edoras sandbox]
```

Step 10.

Time to turn in the work you've done.

For grading purposes, each assignment must be placed into a subfolder within the "handin" directory. Unless instructed otherwise, only the source file(s), *not* the bytecode file, should be in the handin directory. Navigate to the handin folder and create a new folder USING ALL LOWERCASE.

```
[cssc0604@edoras sandbox] cd
[cssc0604@edoras ~] cd handin
[cssc0604@edoras handin] mkdir prog0
[cssc0604@edoras handin] ls
prog0
```

Copy the sandbox file to the turn in directory:

```
[cssc0604@edoras handin] cp ~/sandbox/HelloStudent.java ~/handin/prog0/
[cssc0604@edoras handin] cp HelloStudent.java ~/handin/prog0/
[cssc0604@edoras handin] ls prog0/
HelloStudent.java
```

From here the grading script will extract your work, compile it and run/test it.

Notice we ONLY turn in the source code. Not the bytecode file (or any other executable).

You could also have stayed in the sandbox, created the prog0 directory, and copied `HelloStudent.java` into the it. This would entail copying from the current directory (the sandbox directory) into the destination directory (handin/prog0). The "tilde" notation indicates your home directory and a single dot (period character) symbolizes the current directory. So the copy command of the form

"cp source-dir/file-name the-current-directory-as-the-destination-dir" becomes "**cp HelloStudent.java ~/handin/prog0/**"

Delete the copy you just made, then try this command. Delete is "rm" for "remove." Reply with 'y' to confirm you wish to remove (delete) the file. Note when you "ls" the directory, it is empty so there is no output, just the prompt.

```
[cssc0604@edoras handin] rm prog0/HelloStudent.java
[cssc0604@edoras handin] ls prog0/
[cssc0604@edoras ~] cd ~/sandbox
[cssc0604@edoras sandbox] cp ./HelloStudent.java ~/handin/prog0/
[cssc0604@edoras sandbox] ls ~/handin/prog0
HelloStudent.java
[cssc0604@edoras sandbox] ls
HelloStudent.class HelloStudent.java
[cssc0604@edoras sandbox] cd
[cssc0604@edoras ~]
```

Step 11.

You've accomplished a lot!

Generally, you will create your programs in some IDE and upload them to edoras. Most students find FileZilla to be a convenient software utility for this. It is graphical "drag and drop" interface, and directory icons are folders, which should seem familiar. You can use it to create directories too.

Step 12.

Quit the edoras session: type **logout** or **exit**, then close the application.

Grading Rubric

Criteria	Proficient	Competent	Novice	Unsatisfactory
Delivery, execution, and results	The program was delivered on time to edoras:/handin/prog0, it compiles, runs, and student receives notification of success via email.	The program was delivered on time to edoras:/handin/prog0, it compiles and runs, but the student does not receive notification of a successful run via email.	The program was delivered on time to edoras:/handin/prog0, it does <u>not</u> compile, or runs incorrectly; student receives notification of this result via email.	No code was present on edoras or the code did not compile.
Feedback	Ready for Program 1	Notify instructor of your correct email address	Check spelling of every directory (all lower case). Check file extension spelling/correct format. Check directory structure.	Complete assignment. Check things in Competent and Novice categories too.