

## CS 140 Introduction to Computer Science

### Lab#1

Go through every page on this handout and complete the exercise on page 14.

Due Date: finish it today in class.

#### **Lab Goal – To build skills in the following areas:**

- 1) Using the PC as a Remote Terminal to ZFS
- 2) Logging in/out.
- 3) How to utilize some of the Linux file and directory commands.
- 4) How to use the script command.
- 5) How to use the pico text editor.
- 6) How to compile and run a JAVA program on ZFS and PC
- 7) How to print from within the Windows laboratory
- 8) Exploring Java Tutorials, Cal Poly, and CS Department's web pages

#### **Lab Guidelines:**

- 1) For this lab, students will work individually.
- 2) If you have any questions, try to see if those around you are able to answer them, chances are one of your fellow students has encountered your problem and has figured out how to solve it. Ask the instructor for help as a last resort.
- 3) Proceed slowly through the exercises and do the best you can. It may be helpful to check off those you have completed and to make notes or questions where required.

## Logging in, logging out, and general information

- 1) All machines in the lab have a dual boot system running Windows XP and Gentoo Linux. When a machine starts, use the ↑ and ↓ keys to select which entry is highlighted. Press <enter> to boot the selected OS. For CS140, always select Windows and then press <enter>.
- 2) Now login using your BroncoName and BroncoPassword.
- 3) It is important that you change your password from time-to-time to ensure your account is secure. You don't need to do it now, but whenever needed, go to the website listed below and login. Once logged in, click on the link entitled password complexity rules - read what the requirements are.

[https://win.webdev.csupomona.edu/idm/login.aspx?ReturnUrl=/idm/user\\_account.aspx](https://win.webdev.csupomona.edu/idm/login.aspx?ReturnUrl=/idm/user_account.aspx)

OR

You may simply click on the “change password” link at the bottom of the Cal Poly Pomona main website and login.

- 4) When you have finished using the PC, **logout**. It is very important that you always remember to do this, otherwise, someone will have access to your account and corresponding files.

<b>Connecting to ZFS for a remote session</b>
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1) SSH to ZFS

Start → All Programs → CS Software → PuTTY → PuTTY

Double click login.cpp.edu.

Click Yes if PuTTY asks about WARNING POTENTIAL SECURITY BREACH.

You are now using the PC (a Windows system) to talk to ZFS (a Linux system). The ZFS will request your userid and password. This is your BroncoName and BroncoPassword.

Don't forget that Linux is case-sensitive — upper and lower case letters are not considered equivalent.

OR

You may simply click on “PuTTY” on the computer's desktop and enter your userid and password.

2) Type **logout** at the command line.

You have now disconnected the PC from ZFS.

NOTE – to connect to ZFS from home, you need some extra steps:

- for PC users: If you don't have PuTTY on your computer, download PuTTY first from the website below.

<http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html>

Now run PuTTY, enter login.cpp.edu in the Host Name field, and login to ZFS with your BroncoName and BroncoPassword. A warning will pop up about “PuTTY Security Alert”. Click yes.

- for Mac users: Open a terminal, then type

```
$ ssh YourBroncoName@login.unx.csupomona.edu
```

Now enter your BroncoPassword.

<b>File handling: ls, cat</b>
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- 1) Log back in to ZFS.
- 2) List the files in your directory:  
**\$ ls**
- 3) Create a file called test.dat. We signal the end of input by pressing Ctrl-D, which I indicate below as ^d.

```
$ cat > test.dat  
this is a line of text  
this is another  
^d
```

- 4) List the files in your directory:  
**\$ ls**  
You should now have a file named test.dat.
- 5) List the information in long form:  
**\$ ls -l**  
Lists in long format, giving ACL(Access Control List) indication, size in bytes, and time of last modification for each file.
- 6) Use the cat command to display the contents of the file test.dat.  
**\$ cat test.dat**

Note the difference between cat > and just plain cat.

## More file handling: cp, rm, mv, and the man command

- 1) Use the cat command to create a file named animals.txt that contains ten lines. For each of the ten lines put in a name of a type of animal.

```
$ cat > animals.txt
Kangaroo
Mouse
etc
```

- 2) Verify that you did it correctly.

```
$ cat animals.txt
```

- 3) Make a copy of this file as copy1.txt.

```
$ cp animals.txt copy1.txt
```

- 4) Make another copy of animals.txt as copy2.txt.

```
$ cp animals.txt copy2.txt
```

```
$ ls -l
```

Note that animals.txt, copy1.txt, and copy2.txt are all the same size.

- 5) Delete animals.txt

```
$ rm animals.txt
```

- 6) Now try the rm command with the i parameter, which prompts you to confirm the deletion. Remember, Linux has no undelete command.

```
$ rm -i copy1.txt
```

- 7) Use the mv command to rename copy2.txt to animals.txt

```
$ mv copy2.txt animals.txt
```

- 8) Verify that animals.txt contains the contents you would expect.

```
$ cat animals.txt
```

- 9) Use the man command to learn more about the rm command.

```
$ man rm
```

```
Press g to top
      G to end
      q to stop
      h for help
```

Note – you can use the man command to find out more about any other command.

## Directories: pwd, cd, mkdir, rmdir

As in Linux, files and directories on ZFS are organized as a tree. A typical login directory is:

/user/tadiaz

- 1) Login to ZFS. Verify your current directory by typing

**\$ pwd**

This means “print working directory” — it will show you where you are in the directory tree.

- 2) You can move upward one level in the tree by typing:

**\$ cd ..**

Check out where you are by using the pwd command.

**\$ pwd**

You should now see:

/user

- 3) If you ever get lost in the tree use the cd command to get back to your login directory.

**\$ cd**

Verify where you are at by using the pwd command again.

- 4) The mkdir command creates a subdirectory in your current working directory.

**\$ mkdir foo**

**\$ ls -l**

This will show that you have created the subdirectory foo of your login directory. How can you tell that foo is a subdirectory and not just a file?

- 5) Enter the subdirectory by typing

**\$ cd foo**

Verify your location with pwd. Use the ls command to show that there are no files in the subdirectory foo.

- 6) Copy one of my files into your subdirectory foo by typing

**\$ cp ~tadiaz/cs140/Hello.java .**

The tilde (~) means to use the login directory of user tadiaz. The second

argument to the `cp` command is a dot (.) which means keep the same name when the file is copied. Now, when you type `ls`, you will find that the subdirectory `foo` contains a file `Hello.java`.

How to read the content of `Hello.java`?

- 7) Let's create another subdirectory of your login directory. Type:

```
$ cd
```

```
$ mkdir bar
```

This creates a subdirectory `bar` in your login directory. Verify this by typing `ls -l`.

- 8) Use the `rmdir` command to *delete* the subdirectory `bar` by typing:

```
$ rmdir bar
```

Verify that `bar` is gone by typing `ls -l`.

- 9) Can we delete the `foo` subdirectory by typing the following?

```
$ rmdir foo
```

Note, you can't delete a directory unless it's empty — that is, containing no files or subdirectories. Do whatever is required to delete the subdirectory `foo`.

## Making transcripts: the script command

NOTE – when you use ZFS for your programming assignments, you will need to use the script command to capture the output of your programs. Be sure you understand how to use it.

- 1) Turn on scripting. The following command will cause Linux to make a file copy of what appears on the screen.

**\$ script mywork**

Enter a few commands so that your file mywork will contain a transcript of your keystrokes. Try something like:

**\$ ls**

**\$ cat animals.txt**

- 2) Now exit scripting.

**\$ exit**

- 3) Verify that you have created a script file named mywork.

**\$ ls**

- 4) Check out its contents.

**\$ cat mywork**

Note, the script file mywork records two time stamps:

the time the file was started and the time the script was done

- 5) If mywork has many lines, you can display mywork page by page by typing:

**\$ more mywork**



## Editing (pico)

The pico editor is an intuitive text-based editor available on ZFS and recommended for use in this class. Tutorials on the use of pico can be found by googling “pico text editor tutorial”

- 1) To create/edit a file with the pico enter:  
**\$ pico animals.txt**
- 2) Now try doing the following:  
use the arrow keys to move around  
add a few lines at the top  
add a few lines at the bottom  
add a few lines in the middle  
make some changes to existing lines  
write out the file (^o)  
make the file so long that it fills more than one screen  
use ^v and ^y and the arrow keys to move around the file  
exit pico (^x)
- 3) See how you have changed the size of the file animals.txt:  
**\$ ls -l**
- 4) Look at the file animals.txt using the cat command.  
**\$ cat animals.txt**

## Compiling and running a Java program on ZFS

This section demonstrates how you can create a Java program file, compile it, and execute it from within your ZFS account.

First create a subdirectory cs140 of your login directory by typing the following:

```
$ cd
$ mkdir cs140
```

Now create a file in pico in subdirectory cs140 by typing the following:

```
$ cd cs140
$ pico Example.java
```

Now enter the following code into Example.java:

```
// both you and your partner names
// date
public class Example
{
    public static void main(String[] args)
    {
        System.out.print("This is an example Java program");
        System.out.println();
        System.out.println(" ...a very SIMPLE one...");
    }
}
```

Exit pico and take a look at your newly created file. It should look like:

```
$ cat Example.java
// both you and your partner names
// date
public class Example
{
    public static void main(String[] args)
    {
        System.out.print("This is an example Java program");
        System.out.println();
        System.out.println(" ...a very SIMPLE one...");
    }
}
```

Now compile the source code with the `javac` command to produce the java class file.

```
$ javac Example.java
```

Note that the file Example.class has been created. Verify it with the `ls` command.

```
$ ls -l
-rw----- 1 tadiaz csupomona 521 Jan 4 12:32 Example.class
-rw----- 1 tadiaz csupomona 238 Jan 4 12:32 Example.java
```

Now execute the program with the java interpreter.

```
$ java Example
This is an example Java program
...a very SIMPLE one...
$
```

Congratulations, you have created, compiled, and executed your first Java program!

<b>Printing from a lab computer inside CS Lab in 8-51</b>
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The printer is located right outside the 8-52 lab inside 8-51.

To print a file, you just need to follow the instructions posted on the wall.

Note that you need to have a pre-paid card for the printing.

## Copying files between ZFS and PC

Using WinSCP to access login.cpp.edu:

- 1) Double click on the icon “WinSCP” located on your desktop.
- 2) A window will pop up asking for login information. Enter `login.cpp.edu` in the Host Name field, enter your *BroncoName* and *BroncoPassword*, and click the Login button. A warning will pop up asking about a “Key not found in the cache”. Click yes.
- 3) A new window will pop up. The right pane displays the files you have on `login.cpp.edu`. The left pane displays your `my Documents` (by default) folder that is on your computer.

Since `my Documents` on machines in the lab are mapped to your ZFS share, you will see both right and left panes display the same list of files (when you use WinSCP at home, you will see different lists). You may click the drop down menu on the upper left corner of this window to select `Desktop` in order to save ZFS files on your local machine. Note that all files saved on `Desktop` will be cleared the next time the computer restarts. You shall use `Desktop` only as temporary storage.

- 4) To pull files from `login.cpp.edu` just select the desired files in the right pane and drag them over to the left pane. This will copy those files over to your computer.
- 5) To upload files to `login.cpp.edu` from your computer just drag the desired files from the left pane over to the right pane. This will copy those files from your computer to your share on `login.cpp.edu`.
- 6) When quitting the program a prompt will appear asking you if you want to close the session. Select yes.

If you don't have WinSCP on your laptop, follow instructions below to get and install WinSCP for home use.

- 1) In your web browser go to <http://winscp.net/>
- 2) Select Download. This will take you to the Downloads page.
- 3) Select the first WinSCP download and click on Installation Package.
- 4) This will prompt you to download a file. Save the file to your computer.
- 5) Once it is finished downloading find and run the installer.
- 6) Follow the on-screen instructions and the program will get installed.
- 7) Once the installation is finished check to see if a “WinSCP” icon is on your desktop. If you don’t see it on your desktop, then it is in your start menu under All Programs → WinScp → WinSCP.

For small files, alternatively, instead of using WinSCP you may do the following to copy a file from ZFS to PC:

- 1) Use the cat command on ZFS to display the file.
- 2) Highlight the text desired. Press space bar. This captures the selected text to Windows’ clipboard.
- 3) Start up Notepad on PC:  
  
Start → All Programs → Accessories → Notepad
- 4) Select [Edit | Paste].
- 5) Select [File | Save] to save the file to your computer Desktop.

<b>Exercise</b>
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*For every pair of student, do the following:*

Task 1. Generate a script file called Example.txt (note the file extension is .txt, not .java) in subdirectory cs140 with the following steps visible:

- 1) a pwd to show the current working directory
- 2) an ls to show the files in your cs140 directory
- 3) a cat to display Example.java
- 4) compile Example.java
- 5) execution of Example

Task 2. Use WinSCP to save the script file Example.txt to your Desktop.

Task 3. Submit Example.txt to your instructor on Blackboard:

- 1) Login to Blackboard
- 2) Click CS 140.02 → Assignments → Labs → Lab #1
- 3) Attach the script file that was saved on your computer Desktop, and then click the Submit button.

***Do not copy and paste the contents of the script file into the text box field. You must “attach” the file to your submission.***

## Browsing the World Wide Web

The web is a vast network of interconnected sites and pages, containing information, much of it worthwhile, much of it worthless.

Invoke the web-browser of your choice.

- 1) Try viewing a few web sites by entering each web site's Uniform Resource Locator (URL) in the appropriate box. Here are a few web sites you should become familiar with:

<http://www.csupomona.edu/~cs/>

(Cal Poly's Computer Science department)

<http://sci.csupomona.edu/>

(College of Science home page)

<http://www.csupomona.edu/~ehelp/>

(Cal Poly eHelp)

<http://www.csupomona.edu/>

(Cal Poly's home page)

<http://docs.oracle.com/javase/tutorial/>

(Java tutorials)

<http://www.oracle.com/technetwork/java/javase/downloads/index.html>

(You can download the most up-to-date version of Java)

<http://cyberduck.io/>

(WinSCP alternative for Mac)

## Editing, compiling, running Java on the PC

You can edit, compile and run your Java programs on the PC rather than on ZFS. However, you must use Java/Script programs on ZFS before you turn in the programming assignment to the instructor.

- 1) Start up the Windows' program, **Notepad**. Type in the Example.java program shown in a prior page of this handout. Save Example.java on your Desktop.

**OR**

If you are currently on ZFS in a SSH session, highlight the text desired. Press space bar. This captures the selected text to Windows' clipboard. Start up Notepad and select [Edit | Paste]. Save the file on your Desktop.

**OR**

Use WinSCP to download Example.java to your Desktop.

- 2) Open a **Command Prompt Window** and change directory to your Desktop. Try the dir command. You will see that Example.java is a file in the directory.

Start → All Programs → Accessories → Command Prompt

Z:\> **C:**

C:\> **cd Documents and Settings\BroncoName\desktop**

C:\Documents and Settings\BroncoName\Desktop> **dir**

- 3) To see its contents, give the command:

C:\Documents and Settings\BroncoName\Desktop> **type Example.java**

- 4) To compile this file:

C:\Documents and Settings\BroncoName\Desktop> **javac Example.java**

Give the dir command to verify that the file Example.class has been created.

- 5) To run the program:

C:\Documents and Settings\BroncoName\Desktop> **java Example**

Note – To make sure you can run java from the command line on your PC, use these instructions:

Windows: <http://www.skylit.com/javamethods/faqs/javaindos.html>

Mac: <http://www.cs.princeton.edu/courses/archive/spr04/cos126/hello/mac.html>