



Lab 2: Using Commands

The purpose of this lab is to explore command usage with the shell and miscellaneous UNIX commands.

Preparation

Everything you need to do this lab can be found in the Lesson 2 materials on the CIS 90 Calendar: <http://simms-teach.com/cis90calendar.php>. Review carefully all Lesson 2 slides, even those that may not have been covered in class.

Check the forum at: <http://oslab.cis.cabrillo.edu/forum/> for any tips and updates related to this lab. The forum is also a good place to ask questions if you get stuck or help others.

If you would like some additional assistance come to the CIS Lab on campus where you can get help from instructors and student lab assistants: <http://webhawks.org/~cislab/>.

Procedure

This lab must be done on Opus to get credit

Please log into the Opus server at oslab.cis.cabrillo.edu via port 2220. You will need to use the following commands in this lab.

banner	clear	finger	man	uname
bash	date	history	passwd	whatis
bc	echo	id	ps	who
cal	exit	info	type	

Only your command history along with the three answers asked for by the **submit** script will be graded. You must issue each command below (exactly). Rather than submitting answers to any questions asked below you must instead issue the correct commands to answer them. Your command history will be scanned to verify each step was completed.

The Shell

1. What shell are you currently using? What command did you use to determine this? (Hint: We did this in Lab 1)
2. The **type** command shows where a command is located. This is how you determine the name of the directory a command is located in. Note it will only search for a command along the path and complain if it was not found. Enter each the following commands and discover where the commands such as **man**, **uname**, **tryme** etc. are located.

```
type man
type uname
type tryme
type echo
type type
type bogus
```

Can the **type** command take multiple arguments? Try:

```
type man uname type
```

3. Use the **echo** command to show the value of all these shell variables.

```
echo $HOME
echo $TERM
echo $LOGNAME
echo $PS1
echo $SHELL
echo $PATH
```

Can you specify more than one variable as an argument? Try it.

```
echo $TERM $HOME $LOGNAME
```

Use the **echo** command again and notice why the **\$** metacharacter is important.

```
echo $LOGNAME
echo LOGNAME
```

What happens with a variable that does not exist? Try:

```
echo $BOGUS
```

Now try supplying both text and variables as arguments to the **echo** command:

```
echo I am $LOGNAME and I like the $SHELL shell
```

4. Use the following to display your terminal type and compare it to your terminal device:

```
echo $TERM
tty
```

Note that your terminal type (\$TERM) and terminal device (**tty** output) are two different things.

Set the TERM environment variable to "dumb", and execute the **clear** command. What happens?

```
TERM="dumb"  
clear
```

Show the new setting then set TERM to "vt100" or "ansi". What happens now with the clear command?

```
echo $TERM  
TERM="ansi"  
clear
```

Set the TERM environment variable back to what it was when you logged in.

```
TERM="xterm"
```

5. What happens when you enter the following commands? Why?

```
DATE  
Date  
date
```

6. What results do you get from the command: **who -g**
What program outputs the "invalid option" error message?

7. Enter each command below (exactly) and observe the results. How many arguments does each of the following command lines have?

```
echo one two threefour  
(be sure to include the extra spaces in the command above)
```

```
echo "My TERM type is" $TERM  
echo one.two.three
```

8. What is the difference in output between the following two commands? Note, the \$ and > are part of the prompt, you don't need to type them.

```
$ echo red 'white  
> and blue'
```

and

```
$ echo red white \  
> and blue
```

Note: the *Enter* key is pressed immediately after the last character of each line.

9. Use the shell metacharacter ";" to write out a one line command that will clear the screen, print out the date and the current month's calendar.

```
$ _____
```

Commands

10. If you have not already done so, use the **passwd** command to change your password. Name three things you should never do with your password:

1. _____

2. _____

3. _____

11. Use a single **uname** command with the necessary options to display ONLY the *network node hostname*, the *kernel release* number and the *operating system*. Your command should produce the following output exactly:

```
oslab.cis.cabrillo.edu 2.6.32-504.16.2.el6.i686 GNU/Linux
```

Hint: Use the **man uname** command, scroll up/down and use q to quit.

12. What is the difference in output between the following two commands?

```
banner I am fine
banner "I am fine"
```

13. simben90 is another user account on Opus. Use the **finger** command to find out what simben90's plan is. (Hint: Use simben90 as an argument to the **finger** command.)

simben90's plan:

14. What is the UID (User ID) number for your own account? (Hint: we did this in Lab 1)

Using online documentation

15. Issue a **man bc** command. Scroll up and down then use **q** to quit.

16. What is the **whatis** command?

Use the command with the argument: **bc**

How does this compare to using the **man** command with **-f** option?

```
man -f bc
```

17. Is **tryme** a UNIX command? Use the commands you know to find out.

18. Use the manual pages and the **who** command to output a count of the number of users logged on.

19. Run the command: `man -k boot`

Use the manual pages to find out what the `-k` option does.

What command is `man -k` equivalent to? Run the equivalent command and verify.

20. Run the command: `info bash`

See if you can explore the hot links (marked with a *). Use the up and down arrows to select a link. Use Enter key to follow a link. Use `␣` to go back to last page. Use `q` to quit.

21. Now use your web browser (outside of Opus) and google "linux bc command". If you find any interesting sites you can post them on the forum.

22. Here's a challenging task: Use the `man` command to discover how you can use the `bc` command to obtain the square root of 361. The `bc` command is an example of an interactive command, because you must enter the numbers to calculate from the keyboard while the program is running.

Submit your work

Now that you have finished this lab on Opus, you may submit your work using the following two commands:

```
history -a
submit
```

When the `submit` command asks you which assignment to submit, respond with `2` followed by the *Enter* key. Then answer the three questions.

You can submit as many times as you wish up to the deadline. Only your last submittal will be graded. You can use the `verify` command to check what will be graded.

Grading Rubric

27 points	For entering all the commands on Opus asked for in each step of the lab. The instructor will scan the commands in your history file and take off a point for any missing commands.
3 points	For correct answers to the three questions asked by the submit script (1 point each)

Remember, **late work is not accepted**. If you can't finish the lab before the deadline then submit what you have completed before the deadline for partial credit.

Extra credit (2 points)

For a small taste of what you would learn in CIS 191 let's add a new user to your Arya VM. Once added we will see how the new account is represented in */etc/passwd* and */etc/shadow*.

1. Log into your Arya VM as the cis90 user. Make sure it's your VM and not someone else's.
2. Add a new user account for yourself. You may make whatever username you wish. The example below shows how Benji would make the same username he uses on Opus:
sudo useradd -G sudo -c "Benji Simms" -m -s /bin/bash simben90
3. Set a STRONG password for your new user. The example below is how Benji would do it:
sudo passwd simben90
4. Exit back to Opus then log in again to your Arya using your new username and password.
5. View the */etc/passwd* file and find the new line added at the end. See if you can identify your UID, Group ID, home directory and shell in this line.
cat /etc/passwd
6. Use the **id** command and confirm your UID and Group ID for your new account match the line in */etc/passwd*.
7. View the */etc/shadow* and find the new line added for your account. See if you can identify the encrypted version of your password.
sudo cat /etc/shadow

Run the **submit** command on Opus to record information from the new lines in */etc/passwd* and */etc/shadow*.