UNIX Basics

Telnet

Telnet is the primary protocol used on the Internet for remote login. From a school or home computer you can perform a routine telnet session. This will typically consist of an interactive Linux (and/or Unix) session on the Challenge machines **mode** and/or **pi**.

The UNIX operating system

Unix is text-based, as opposed to graphical, and it requires some effort to learn the commands. For example, there are no menu bars, and so you must remember commands. Also, you cannot use a mouse, and so navigation is done with the arrow keys. The most difficult thing for beginners to remember is that you will be operating two computers at the same time—the desktop and your UNIX account.

▲ Login and change your password

A UNIX system can accommodate many users at the same time. Each user is assigned an individual account. You need to go through a procedure called "logging in" each time you want to access your account. You will need your user name, your temporary password, and your new password in order to complete the login process.

1. Launch telnet.

2. Login.

   You will now go through the procedure called logging in. Logging in allows authorized users access to a system, while keeping unauthorized users out. At the **Open** window type

   ```
   telnet mode.lanl.k12.nm.us
   ```

   You should then be connected to **mode**. When **mode** prompts for a Username, enter your challenge account login name. It should be similar to "ch099abc" (no quotes_ where the "ch" stand for Challenge, the "099" will be replaced with your team number, and the "abc" are your initials). Next you will be prompted for your SuperComputing Challenge password. After successfully login in you should see the message of the day appear on your screen. You are then ready to issue a command or invoke a utility.

3. Change your password

   Your first UNIX command is **passwd**, which allows you to change your password. You will need to type in your old password and then your new one. Here is a sample dialog (yours may be different):

   ```
   mode:> passwd
   Changing password for pavery
   (current) UNIX password:
   New UNIX password:
   ```

   Note that the password does not echo back on the screen. This is a security precaution. Next time you login, you must use your new password.

4. Logout

   To close your account, type **logout**. The screen will go away, but the Telnet application is still active. If you are finished, select Quit from the File menu.

▲ Survival UNIX

1. Login with your new password.
2. Check to see if there are other users logged onto the server. Use these UNIX commands and write down what each does.

   finger

   w

   who

   users

   whoami

   last

3. List the contents of your directory.

   Let's see what files are in your directory. The command for listing the content is **ls**. Try the following commands and see what the differences are.

   ls

   ls -a

   ls -l

   ls -al

   Many UNIX commands have options, which follow the command with a space, a minus sign, and the letter of the option. Here are some options for the command ls:

   -a all (includes hidden files)
   -l line form (one listing per line)
   -al all, one line per listing

4. Logout.
5. Practice opening a connection, logging in, listing your files, and finding who's on line. When you are ready to demonstrate your proficiency, ask your teacher to sign off (on last page).

▲ Make a .plan

"Dot" files are files in a user's home directory that contains user information to be used by the system. They are called dot files because the file names start with a period or dot. Your dot plan (.plan) is your biography and is available to other users. You must have a dot plan, and it must not contain anything that would embarrass you or your parents, or your teacher or school.

You will use a text editor to create your dot plan. Text editors are utility programs that allow you to create new text files or change existing files. **Pico** is one of several text editors available on UNIX systems. It is a simple-to-use display oriented editor with on-line help available. You will use **Pico** to create your computer programs as well other needed files. **Pico** is also the default e-mail text editor.

You invoke the editor by typing
pico <filename>
at the system prompt.

1. Log onto your account and verify that the contents of your directory do **not** contain a ".plan". **ls** will not display dot files, so use **ls -a.**

2. Open a file using the pico editor called ".plan".
   mode:> pico .plan

   (pico opens the pico text editor; .plan is the name that the file will be saved as)

3. A new window will open. Two bottom lines of the screen display the editing features. Starting at the cursor, type in your dot plan. You cannot use the mouse to edit any errors; you must navigate using arrows or keyboard commands.

Your plan should contain at least the following information:

- your real name
- your school
- your teacher's name
- something about you

4. When you are satisfied with the results, save and close your dot plan.

Note: the user keys displayed at the bottom of the screen start with "^"; this means to hold down the control key at the same time you press the other key. Hold down the control and **O** keys at the same time to save your file. A dialog will ask you if you want to save the file and prompt you for a name. Hold down the control and **X** keys at the same time to exit pico. If you have made changes, a dialog will prompt you.

5. Make your .plan available to everyone.

   Type **chmod 644 .plan** and hit <return>.
   DO NOT put a space between the period and plan or you will be locked out.

6. Verify that your dot plan now exists (use the **ls -a** command).

7. Verify that your .plan works by fingering yourself. Finger a classmate and verify the purpose of a .plan.

8. Practice opening and closing the pico text editor and saving files. When you are ready to demonstrate proficiency with pico and finger, ask for a check off.

▲ Read and reply to your e-mail

One of the services available to you on the Internet is electronic mail, usually called e-mail. E-mail has several advantages over "snail mail:" it is quick, usually arriving at its destination within seconds, and it allows a variety of reply, forward, and save options.

E-mail allows you to send messages to anyone who has an Internet e-mail address. Internet addresses do not have the same hierarchy as the US post office, which sorts by state, city, zip code and street address. A typical e-mail address has this format:

user@server.host.domain

user = username (the name used to login)

server.host = name of the computer and organization that hosts the user's account

domain = class of institution
choices here include com (commercial), edu (educational), org (nonprofit organization), mil (military), net (computer network), or gov (government). If you see a domain name other than one of these, it represents a foreign country code (jp = Japan, au = Australia, etc.)

Note: the address is a single word (no spaces). The username is followed by "@;" the address contains only letters, numbers, periods and underscores (_); no other characters are recognized.

When you send e-mail to someone who is on the same system that you are, you need only to supply the username and the system will append the rest of the address. But if you send e-mail to someone on a different machine, you need to supply the entire address.

UNIX has a mail utility, appropriately called mail. A more user-friendly mail utility called pine (Program for Internet News and Electronic mail) is also available on most UNIX machines that makes e-mail much easier to use.

1. Login. You will probably get a message that you have new mail.

2. At the system prompt, start the pine utility by typing the command
   mode/username% pine

   If this is the first time you have used the pine utility, you will get a long message about the utility. You can save the instructions or not. You will then see the pine main menu. It gives you the option to compose new mail, see a list of folders, etc. Study the menu and its options. You can return here anytime from pine by typing **m** (menu).

   Type **i** (index) to see a list of the mail waiting for your attention. A list of your messages will appear on the screen. Use the arrow keys (not the mouse!) to move down to the mail message that you want to read and press the enter or return key. Your selected mail message will appear on the screen.

   The command options are displayed at the bottom of the screen. You can move forward one screen by pressing the space bar (if your message is long). The **–** (minus sign) will move you back one screen. If you have more than one message, you can go to the next by typing **n**. You can go to the previous message by typing **p**.

3. Read and answer the message from you teacher.

   After reading a mail message, you can easily send a reply. Type **r** (reply). Pine will ask you if you want to include the original message. If the message was sent to more than one person, pine will also ask if you want to reply to all parties (be careful about responding to all parties). Pine will automatically put in the correct return address for you, and a subject header.

You should recognize the pico text editor. You can use the return key to move from line to line, as well as the arrow keys. You can edit the message on the screen by using the arrow keys to move around the screen. When you are ready to send the mail, hold down the control and x keys at the same time (**^x**). You can cancel your message by typing **^c**.

4. Delete the original mail message by typing **d**.

5. Quit from pine with **q**.

▲ Compose and send new e-mail

1. Login and open your pine account.

2. Send a message to someone else and send a copy to your teacher.

   To send mail from the main menu or within pine, type **c** (compose). A form will appear on which you type the address, the subject and the message.

   ```
   To:
   Cc:
   Attchmnt:
   Subject:
   ```

   Type in the address of the person you want to send a message to. If you are writing to someone on mode, simply type in his or her username. If the person is at another computer, you must supply the entire e-mail address (user@host.domain). Use the arrow, tab or return key to move to the next line. Cc will send copies to another person. Enter your teacher's login name here.

   Move to the subject heading. It is a good practice to give a meaningful subject to each of your messages. This could determine how quickly your reader responds.

   Tab or return down below the Message Text line and begin your message. You can edit your message using the delete key and the arrow keys (you are using the pico text editor). You can cut an entire line of text by using ^k. Cancel the message with ^c. When you are finished, use ^x to send the message.

3. When you are finished, use **q** to quit.

▲ Create a custom signature file for your e-mail.
Send an attachment

Your .signature will be automatically added to all your e-mail if…
- it is called ".signature" and
- it is in your home directory

1. Use the pico text editor to create a file called .signature.
   `pico .signature`

   Here are some guidelines:
   - Do not make it longer than four lines (this just clogs up the electronic lines).
   - Including your name and school is OK, but NEVER add your home address, phone number, or anything personal.
   - You may include your favorite slogan if you wish, but remember to keep it decent and wholesome.

When you are satisfied with the results, save your signature file (control-x).

2. Send your teacher a new e-mail message with your signature file and your .plan as an attachment.

   If your signature file does not automatically appear at the bottom of your message, you did not create it correctly.

   On the line Attchmnt, write the name of the file you are sending (.plan).

Write a brief message and send it.

▲ Customize your e-mail account with addresses and folders

PINE has many features that you can customize to make your life easy. These include an address book and the ability to create different folders to save your mail by topic. If you are curious about other features, choose the help command at the main menu.

Keep your mail box tidy—all those messages take up room on the hard drive. When you are finished with a message and have no further use for it, delete it. From within a letter, you can type **d** to delete. If you erred, type **u** to undelete. You can also delete messages from the index.

1. Create an address book with the name of your teacher and at least three other people by nickname.

   It could become tedious remembering the addresses for all the people with whom you correspond. Pine has an address book feature to remember your e-mail addresses. If you are in the main menu, type **a** (address) to move to the address book. To add a name, type **a**, and pine will prompt you for information. The nickname you choose can be used in while you are in the compose mode to insert a complete address. Alternately, the command **^t** will take you to the address book (in the compose mode).

   You can address e-mail by simply typing in the nickname that you defined in your address book (you can change it any time).

   If you have a received a message, and you want to add the address of the sender to your address book, use **t** to move to the address book. Pine will prompt you for a nickname and verify the information.

2. Create at least two file folders in your mail account (give them meaningful names!).

   After you have read your mail and quit pine, the messages are automatically moved to a “read-mail” folder (unless you have deleted them). If you save many messages, eventually you will have a long list of unsorted mail. An easier way to store your mail is to create folders to store related messages.

   To do this, type **s** (save) after reading a message. You will see the message

   save to folder in <mail/[ ]> [saved-message]:

   At this point you can name a folder in which to save the message. (The default folder is "saved-messages".) If this is the first time you have saved a message to the folder you will see the message

   folder <name> in <mail/[ ] doesn't exist. Create?

▲ More UNIX

You should already know the following UNIX commands. Take a minute to jot down what each does, because you are soon going to forget what you already know.

finger

logout

ls

man

passwd

pico

pine

user

who

In this assignment, you will learn to use these additional commands:

cal	**cd**	**date**	**more**	**pwd**
cat	**cp**	**mkdir**	**mv**	**rm**

1. What do the following commands do?

   date

   cal

   If you use `cal` with additional arguments, such as **`cal 2001`**, the system will print a calendar for the entire year. What day of the week will your birthday fall on in the year 2010? When you have mastered **`cal`** and **`date`**, get teacher check-off.

2. If you want to view the contents of a text file, there are several commands that you can use.

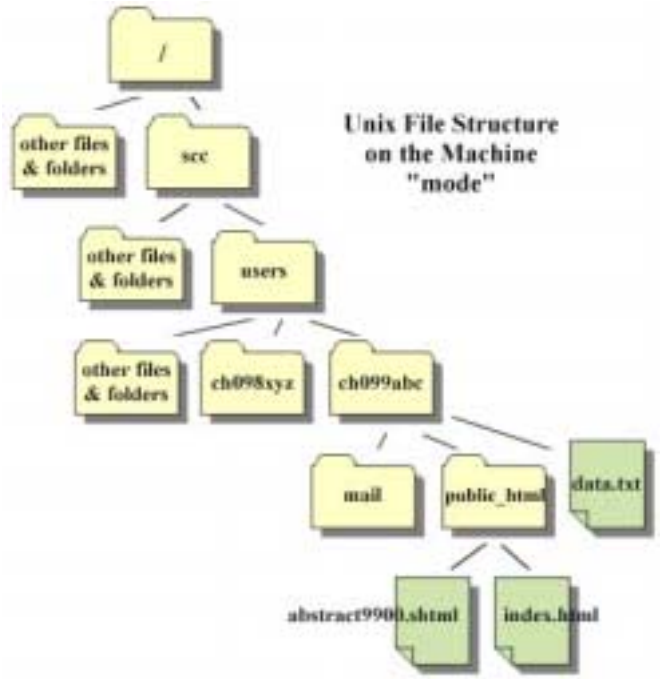
   pico *filename*
   opens up the pico text editor and allows you to change the contents

   cat *filename*
   displays the contents of a file all at once

   more *filename*
   displays the contents one page at a time

3. Practice using pico, more and cat to look at and edit text files. When you are sure of the difference, and when each is used, demonstrate to the teacher.

When you login, you are placed in your personal home ***directory***. A directory in the UNIX operating system is the same as a folder in the Macintosh or Windows operating system.



When you login, verify your location by typing **pwd** (present working directory).

There are times you need to access information in places other than your home directory. The commands you need to master to navigate through the server are **cd** and **pwd**.

In order to move to another directory, use the command cd (cd = change directory).

cd (without argument) always takes you to your home directory

cd / moves you to the root, or highest, directory

cd ~username moves you to the user's directory (the tilde is in the upper left corner)

cd .. (space and two periods) moves you up one level

cd <pathname> moves you to a specific location

3. Using the commands **cd** and **ls**, explore the server and make an outline map of where basic files are located. If you get a message that says "permission denied," you do not have the permission to access a particular file or directory. At any time, if you forget where you

are, you can type **pwd** on the command line. The server will return your current pathname.

▲ File and directory commands

Note: The prompt changes when you are in different directories It include information which indicates which directory you are currently in. This allows you to be aware of your location without having to use the **pwd** command. If a **~** appears in this information, it denotes where you are located with respect to your home directory.

Files are at the heart of the UNIX system. All the text files that you create, as well as the C++ programs that you will compile, are stored in files. You have learned how to create and display text files using the commands `pico`, `cat` and `more`. In this section, your will learn to delete, copy and rename files.

Directories are useful for organizing files on the UNIX system. You have used the **ls** command to display the files in a directory; you have also used the **cd** command to move around among different directories. In this section, you will also learn to create and delete sub-directories in your own directory.

1. Make some aliases
   The default commands in UNIX allow you to do some pretty scary things. For instance, if you tell UNIX to delete a file, it won't give you a chance to change your mind. Fortunately, there is a way around that. Just like there are options for `ls` (`ls -l`, `ls -a`, etc.), there are options for most UNIX commands. Rather than continually type the options, you can use the UNIX feature ***aliases*** to make these commands automatic.

   In your home directory, there is a file called **.bashrc**. This file loads when you login and it keeps track of the way you want to interact with the server. You are going to change this file, which means you will have to edit the `.bashrc` file. Be careful, or you may lock yourself out!

   ```
   pico .bashrc
   ```

   Under the line that says `# User specific aliases and functions`, insert the following lines:

   ```
   alias rm='rm -i'
   alias cp='cp -i'
   alias mv='mv -i'
   alias ls='ls -F'
   ```

The `-i` argument means that you want to confirm each change before it is made. The `ls -F` will add a '/ ' to directories so you can distinguish them from files. When you are finished, save your changes, log out and log in again to activate the changes.

The commands that you need for file management are **cp**, **mv**, **rm**, **mkdir**, and **rmdir**. The syntax for using these commands is given below.

Cp	cp *file1* *file2*	makes an exact copy of file1 and calls it file2
		`cp .plan my_life`
		gives you two identical files, .plan and my_life
		`cp ~jrdoe/.plan Janes_bio`
		copies Jane's .plan into your directory and gives it a new name

Mv	mv *file1* *file2*	used to move files and rename them
		`mv .plan assign1`
		will rename .plan into assign1
		`mv assign1 Homework/my_life`
		will move the file into the directory Homework and rename it my_life

Rm	rm *filename*	used to delete (remove files) Warning: Be sure you have created the alias `rm -i`, or you will not get a chance to undo this command!
Mkdir	mkdir *dirname*	used to make new directories `mkdir Project` will make a new directory called Project. You can store the files related to your project here.
Rmdir	rmdir *dirname*	used to remove directories; directories must be empty to remove them

2. Go through the following exercise and pay attention to what each does.

```
cd
ls
mkdir Assignments
ls
pico words          type some UNIX words here and save them
cp words terms
ls
mv terms Assignments
cd Assignments
ls
rmdir Assignments   UNIX will tell you that you can't remove the directory because it isn't
                    empty
cd Assignments
ls
cd
rmdir Assignments
rm words
ls
```

3. Make a new directory called **Files**. In it, put a copy of your .plan and .signature files, with different names. Do not move the original files! Also put a copy of someone else's .plan in the Files directory. Make a new file called **UNIX** and type in some of the commands that you have learned. When you type `ls`, you should have four files. Practice this again if you need to….then demonstrate your proficiency in using **mkdir**, **mv**, **cp**, **rm**, and **rmdir** to your teacher.

▲

Accessing other people's computers

The telnet protocol allows users on all kinds of machines to access information on other kinds of machines. The personal computer that you work on becomes a "dumb terminal" when you use the telnet protocol, in that is only capable of text-based, command line interactions.

There is a wealth of information stored on computers all over the world. Some of this information can be accessed by anyone with an Internet connection. Although most of the information is now accessible through the World Wide Web (using http protocol), it is still useful to know how to use the telnet protocol.

The command **telnet** tells the server that you want to access another computer. You also need to supply the address of the remote server. You usually need a password to login to a remote computer, but not always. In this section, you are going to check the UNM library server, and then visit some other servers as well.

1. Look for books and other publications at the UNM library.

   Login to the UNM library server with the command
   `telnet libros.unm.edu`

   When asked for a password, type
   `libros`

   If asked for your terminal type, enter
   `VT100`

   You can browse all you like. Take note that this material will be available for your project work. You can disconnect almost any time with the command **^]**. This is a very useful telnet site, since it tells you what books and journals are available in the UNM libraries.

2. Search at least two of the servers listed below and answer two questions for each:

   - What kind of information is located on this server?
   - Describe the user interface (How is different from the UNM library? Is it friendly and easy to use?)

telnet locis.loc.gov	telnet library.wustl.edu
login is automatic	login: choose server type,
quit: 12	enter return, follow directions
	quit: q
telnet nih-library.nih.gov	telnet tycho.usno.navy.mil
login: nihuser	login: ads
quit: r (return to main menu)	quit: exit

▲ All those UNIX commands in one list

alias	finger	mv	rmdir
cal, ncal	logout	passwd	talk
cat	ls	pico	telnet
cd	man	pine	users
cp	mkdir	pwd	who
date	more	rm	ytalk

These files have special meaning...

.bashrc	.project
.plan	.signature

UNIX assignments

Pages	Assignment	what to do when complete	Check
1–2	change password	teacher signature	_____
2	master the commands who, w, users, finger, whoami ls and its options	teacher signature	_____
3	make a .plan and master finger command	teacher signature	_____
3	use the pico text editor	teacher signature	_____
4–5	respond to teacher email	do it	NA
5	compose and send new email, with a copy to your teacher	do it	NA
5–6	send your teacher your .plan as an attachment, with .signature file	do it	NA
7	create an address book and folders for your email account	teacher signature	_____
8	Date and cal	teacher signature	_____
8	Pico, cat, more	teacher signature	_____
9	Outline server hierarchy	on a separate sheet of paper	NA
9	cd exercise	send teacher email message	NA
10	Edit .bashrc file	do it or you will be sorry	NA
10–11	Demonstrate mkdir, rm, cp, mv, rmdir	teacher signature	_____
12	Telnet to libros	answer 2 questions and then demonstrate to teacher	_____
12	Telnet to 2 other sites	separate sheet	NA