



## Using UNIX: Learning the Basics

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### Welcome

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Welcome to the UNIX system of University of Hawai'i Information Technology Services (ITS). This document will introduce you to the basics of using the system. If you have trouble getting started, we recommend that you read the following ITS documents (in this order):

<i>Getting Started with UNIX from O'ahu</i>	UNIX003
<i>Getting Started with UNIX from Kaua'i, Maui, Moloka'i, Lana'i, and Hawai'i</i>	UNIX004
<i>About UNIX</i>	UNIX006/UNX020
<i>Getting Started with Pine</i>	UNIX013
<i>Getting Started with Pico</i>	UNIX011/UNX130

These documents are available on the web at: <http://www.hawaii.edu/itsdocs>.

## Conventions Used in this Document

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- Courier** Text printed in the **Courier** typeface (with no bolding) denotes text such as commands and options, and/or output from commands as shown on the computer screen.
- Courier bold** Text printed in the **Courier bold** typeface denotes text that you type into the computer, such as commands and options you need to enter.
- Courier italic* An item printed in *Courier italic* should be replaced with an actual instance of the item being described.
- [item] An item in **Courier** enclosed in [ ] means that the *item* is not required (optional).
- ^c Stands for a control character.
- Holding down the **Control** key and pressing any other key produces a control character.
- The *c* in the ^*c* stands for a character. Thus, ^*s* stands for the control character generated by holding down the **Control** key and pressing the **s** key.
- Return** Press the **Return** key after typing each UNIX command.

Example: `/home/1/charles% pico [filename]`

means that you should not type `/home/1/charles%`. You start typing with the word **pico** followed by a space and then, instead of typing the word *filename*, you should type the name of the file you wish to use with the **pico** command, and then press the **Return** key. Note that *filename* can be omitted.

**Remember!** Press **Return** after each UNIX command.

## Accessing UNIX

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### VIA THE UH NETWORK OR INTERNET

Terminals are available in the ITS lobby on the first floor of Keller Hall. The PC Lab (Keller 213), Keller 105 computer lab, and the ITS Hamilton lab (Phase III, 2<sup>nd</sup> floor, Hamilton Library) have computers that have network connections.

If you are using a PC, use the SSH application to remotely login to *uhunix* (available from the Help Desk web page at <http://www.hawaii.edu/help/software/pcsoft.html>). If you are using a Macintosh with OS 10.x, use the Terminal application located in the Applications/Utilities directory to remotely login to a *uhunix* system. If you are using a Macintosh with OS 9.x, use the MacSSH application (available from the Help Desk web page at <http://www.hawaii.edu/help/software/macsoft.html>).

## DIALING IN

You may also configure your computer to connect to the UNIX system. You will need to have a modem connected to your computer.

To configure your computer, please view the documents *Getting Started with Dial-Up Networking* (Windows 2000 & XP), or *Connecting to the UH Modem Pool from a Macintosh*. These documents can be viewed on the Web at <http://www.hawaii.edu/itsdocs>. These documents are also available on the ITS CD-ROM.

## Defining Your Terminal Characteristics

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### SETTING YOUR TERMINAL TYPE

Here are the most common types you can specify:

<i>For This Terminal Type</i>	<i>Type this abbreviation:</i>
DEC VT-100 (recommended)	<b>vt100</b>
Zenith Z-19	<b>z19</b>
Zenith Z-29	<b>z29</b>
DEC VT-52	<b>vt52</b>

You must specify the type of terminal you are using so that the UNIX system can properly display things on your screen. The default terminal type is a VT-100. In the unlikely event that you need to change your terminal type after login, you can use the **setenv** command:

```
uhunix% setenv TERM YourTermType
```

To see which terminal types are defined, type:

```
uhunix% more /usr/share/lib/termcap
```

To automatically define your terminal type upon login, and not have to type the **setenv** command every time you login, edit your `.login` file as follows: (learn to use an editor such as `pico` before doing this) Note: do not change other lines in the `.login` file. It could cause your future `uhunix` sessions not to function properly.

- Start up `pico` and open the `.login` file  

```
uhunix% pico .login
```
- Locate the line: **setenv TERM vt100**
- Change the **vt100** on that line to your terminal
- Type abbreviation (e.g., **vt100**, **z19**, **z29**, etc.)

## CHANGING YOUR CHARACTER ERASE KEY

The default character erase key is `Delete`. If you would rather use the `Backspace` key, type:

```
uhunix% stty erase
```

and press **Backspace**. Note: When you press `Backspace` in the above example, you should see a `^H` being displayed.

You can also change your default character erase key by replacing the `^?` in the `stty erase ^?` command in your `.login` file.

## Special Control Characters

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The control characters that follow have special meanings in a UNIX environment. Denoted by the character `^` followed by a letter, each control character can be generated by holding down **Control** and pressing the specified letter, then releasing both keys.

- `^c` Interrupt a process (applicable for most processes); used to halt a process immediately.  
  
Pressing `^c`, for example, enables you to stop the listing of a long file. However, if the file is very long, there may be a noticeable time delay before the process is actually interrupted.
- `^d` Terminate a process; end-of-file marker (EOF). If a process does not have a clean termination command and pressing `^c` does not work, try pressing `^d`.
- `^s` Suspend terminal output to your system. To resume terminal output, press `^q` (see below). `^s` is usually referred to as XON.  
  
To view text a page at a time, use the `more` command.
- `^q` Resume terminal output suspended by pressing `^s` (see above). `^q` is usually referred to as XOFF.
- `^z` Suspend the foreground process, that is, place the current active program in a paused state.  
  
Type the `fg` command to reactivate a process in the foreground. A foreground process will usually keep control of your keyboard and terminal.  
  
Type the `bg` command to reactivate a process in the background. A background process will let you type other commands on the keyboard while it is running in a detached state.
- `^u` Erase command line.
- `^w` Erase previous word on a UNIX command line. A word is a string of characters separated by a space or tab.
- `^r` Retype current command line (most useful when accessing *uhunix2* via a modem over a noisy phone line).

## Basic UNIX Commands

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### FILE AND RELATED COMMANDS

<code>cat file</code>	List the contents of <i>file</i> .
<code>More file</code>	List the contents of <i>file</i> pausing after each screen (press <b>Space</b> to continue listing).
<code>Rm file</code>	Delete <i>file</i> .
<code>cp file1 file2</code>	Copy the contents of <i>file1</i> to <i>file2</i> .
<code>mv file1 file2</code>	Move <i>file1</i> into <i>file2</i> .  Use <code>mv</code> to move a file into or out of directory or to rename a file.
<code>ls [-la]</code>	List files and subdirectories in current working directory.  If you specify the <code>-l</code> option (that is, the lowercase L option), more information about each file/subdirectory will be displayed (file size, last modification date, file protection code).  If you specify the <code>-a</code> option, a list of all files will be displayed. (By default, filenames beginning with a period will not be listed).
<code>grep string file</code>	Search <i>file</i> for occurrences of <i>string</i> .
<code>pico file</code>	Edit <i>file</i> using the Pico full screen editor (user friendly).

### DIRECTORY COMMANDS

<code>cd [directory]</code>	Change current working directory to <i>directory</i> .  If <i>directory</i> is not specified, you are sent to your home directory.
<code>mkdir directory</code>	Create a new subdirectory called <i>directory</i> .
<code>rmdir directory</code>	Delete a subdirectory called <i>directory</i> ; <i>directory</i> must be empty to be deleted
<code>pwd</code>	Displays current working directory.

## COMMANDS INVOLVING OTHER SYSTEMS/COMPUTERS

`ftp` File transfer between Internet hosts (e.g., `ftp.hawaii.edu`, etc.).

## OTHER COMMANDS

`print file` Send *file* to the UNIX laser printer. Printout is filed by username on the first floor shelves of Keller Hall.

`man command` Display information about *command*.

`apropos keyword` List commands/programs that contain *keyword* in their description.

`du` List the number of Kbytes for each directory below current working directory.

`talk username` Interactively communicate with *username*; *username* has to be logged-in.

`finger username` Find the username for *username*.

`w` Display current activity on the system.

`who` Show users that are currently logged-in.

`tin` A program to read a collection of newsgroups (new articles arrive daily).

`help [command]` If specified without *command*, a brief introduction is listed.  
If *command* is specified, `help` displays the man page for *command*.

`pine` Send email through the Internet

`quota -v` Display disk usage and disk quota. This command does not display your email quota.

`mydiskspace` Display uhunix disk usage only. This command does not display your email quota.

`write username` Writes files or text to *username*.

`!!` Repeats last command.

## CHANGING YOUR PASSWORD

The *passwd* command has been disabled on uhunix. Password changes can be made from a web browser. Please visit the Account Management web page at <http://www.hawaii.edu/account> .

## File System

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### BASIC DEFINITIONS

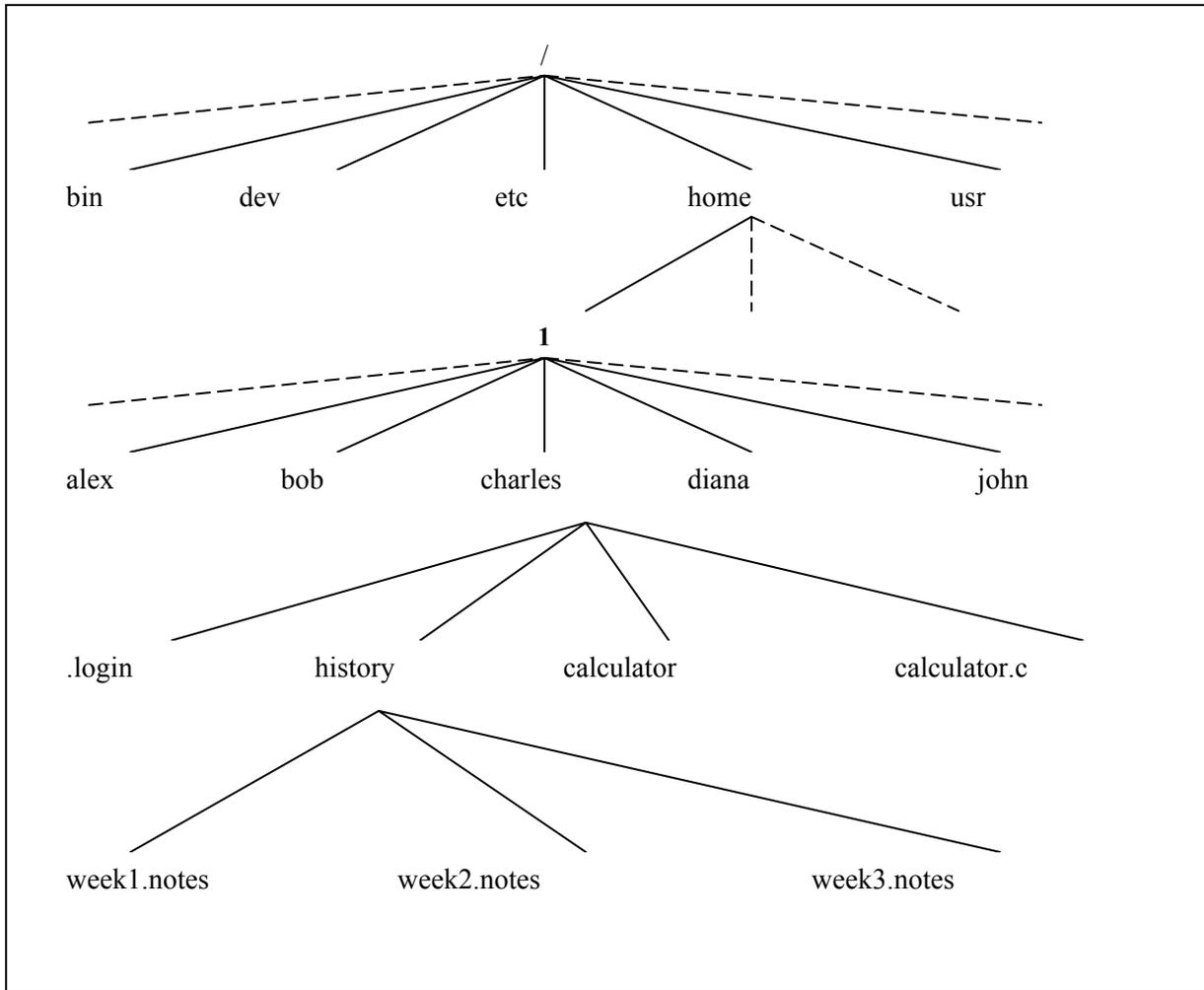
A **file** is a collection of information stored on a computer system.

A **directory** is a special file that contains the names of other files and/or subdirectories. Files can be organized efficiently with the use of directories. A directory can be used to group related files and subdirectories together. Think of a directory as a manila folder that you can stuff files into.

A **subdirectory** is a directory within a directory.

## FILE ORGANIZATION

Files can be organized into a hierarchy of directories. A typical UNIX file organization structure resembles an upside-down tree.



*Figure 1*  
(Almost all examples given in this chapter are based on Figure 1)

In this inverted-tree structure, any file can be accessed from anywhere in the tree.

## MORE DEFINITIONS

The home directory is a directory assigned to a user. Usually, all files created by the user are within this directory.

The current working directory (.) is the directory in which you are currently located. After you login, your *current working directory* is your *home directory*.

The parent directory (..) of a file is the directory which directly encloses the file. For example:

```
history is the parent directory of week1.notes, week2.notes, and week3.notes

charles is the parent directory of .login, history, calculator, and
calculator.c
```

The root directory (/) is the directory that encloses ALL files and directories; therefore, it has no parent directory.

## PATHNAMES

Because of this hierarchy of directories, it is sometimes necessary to specify the path to a file or directory.

Example: /home/1/charles/history/week1.notes and history/week1.notes are both parameters to the week1.notes file

Note that / is used to separate directory names.

**Absolute Pathname:** A pathname that starts with / (the root). Since the path always starts at the root, it is correct regardless of what the current working directory is.

**Relative Pathname:** A path that starts from the current working directory. Any pathname that does not start with / is taken to be a relative pathname.

Example: If the current working directory is /home/1/charles then the absolute and relative pathnames to week1.notes respectively are  
/home/1/charles/history/week1.notes  
and  
history/week1.notes

## FILE NAMING CONVENTIONS

Filenames (file and directory names) can consist of upper and lowercase letters, numbers, the period, the comma, the percent sign, the underscore (\_), and the hash symbol (#). For example:

```
ics.dir           100%_Cotton           Technote#100,103
```

Filenames that start with a period are called invisible dotted files. By default, they will not appear when you try to list them with **ls** or **dir**. To see these files, use the **-a** option. For example:

```
uhunix% ls
history calculator calculator.c
uhunix% ls -a
.login history calculator calculator.c
```

The maximum length of a filename is 255 characters.

## File and Directory Handling

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### DISPLAYING THE CONTENTS OF A FILE

The `cat` command displays the entire contents of a file without pausing. However, remember that you can stop the scrolling with `^s` and resume it with `^q`.

```
uhunix% cat filename
```

On the other hand, the `more` command displays the contents of a file one screen at a time.

```
uhunix% more filename
```

`more` pauses at the end of each screen and displays the percentage of the file that has been displayed thus far. When `more` is paused, you can

press the **Space** bar to continue viewing the file, press **q** to exit `more` (to stop viewing file), type **/string** and press the **Return** key to search for and go to the next occurrence of **string** in the file being viewed, press **n** to repeat the last string search.

### DISPLAYING THE CONTENTS OF A DIRECTORY

To list the contents of a directory, use the `ls` command:

```
uhunix% ls
calculator      calculator.c    history
```

An alternative to the `ls` command is the `dir` alias which is defined in every user's `.login` file as

```
alias dir 'ls -sFC'
```

This variation of `ls` will display more information about each file. For example, it prints the size in Kbytes before each filename, puts a slash after directory names, puts an asterisk after executable files, etc.

```
uhunix% dir
total 4
1 calculator*      2 calculator.c      1 history/
```

### FILENAME PATTERN MATCHING

This is a mechanism for generating a list of files that match a specified pattern. The most commonly used patterns are `*` and `?`

- \* Matches any number of characters (including zero)
- ? Matches exactly one character

Patterns can be used wherever a filename is expected. They are characters that can be inserted anywhere in a filename, in any combination, and as many times as desired. A pattern can even be used all by itself as a filename specification.

- \* Stands for all files

? Stands for all files that are one-character long

Patterns are especially helpful when dealing with filenames that are similar because they allow you to use a single filename to represent two or more filenames.

For example, assume you had the following six files:

```
best1, best2, best.2.2, test1, test2, test.2.0
```

then

<b>test*</b>	<i>stands for</i>	test1, test2, test.2.0
<b>test?</b>	<i>stands for</i>	test1, test2
<b>*est1</b>	<i>stands for</i>	best1, test1
<b>t*2*</b>	<i>stands for</i>	test2, test.2.0
<b>?est?</b>	<i>stands for</i>	best1, best2, test1, test2
<b>*test*</b>	<i>stands for</i>	test1, test2, test.2.0

## MANAGING FILES

To erase a file, use the `rm` (remove) command:

```
uhunix% rm filename
```

Note that once you have deleted a file, there is no command to undelete it.

To make a copy of a file, use the `cp` (copy) command:

```
uhunix% cp fromfile tofile
```

To rename a file, use the `mv` (move) command:

```
uhunix% mv oldfile newfile
```

Example:

```
uhunix% pwd
/home/1/charles
uhunix2% ls
calculator calculator.c      history/
uhunix%
uhunix% cp calculator.c prog.c
uhunix% ls
calculator calculator.c      history/      prog.c
      (prog.c is now an exact copy of calculator.c)
uhunix% mv calculator calc
uhunix% ls
calc calculator.c      history/      prog.c
      (calculator is now called calc)
uhunix% rm prog.c
rm: remove prog.c (yes/no)?y
uhunix% ls
calc calculator.c      history/
```

## MANAGING DIRECTORIES

To create a directory, use the `mkdir` (make directory) command:

```
uhunix% mkdir directoryname
```

To erase a directory you must first remove all files and subdirectories that the directory contains. To erase a directory, use the `rmdir` (remove directory) command:

```
uhunix% rmdir emptydirectoryname
```

To go from one directory to another, use the `cd` (change directory) command:

```
uhunix% cd directoryname  
uhunix% cd
```

The latter takes you to your home directory.

To find out where you are, use the `pwd` (print working directory) command:

```
uhunix% pwd  
/home/1/charles
```

To move files from one directory to another, use the `mv` command:

```
uhunix% mv filename destination
```

When used for renaming a file, `mv` actually moves the file onto a new file with a new name.

See *Figure 2* for an illustrated example of file handling commands.

## Getting Information and Help

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### GETTING ON-LINE INFORMATION

The `man` command is used to display information about a particular command.

```
uhunix% man command
```

It displays information using `more` (i.e., it pauses at the end of one screenful of text, etc.) The man pages are stored in the `/usr/man` directory.

The `apropos` command generates a list of commands that contain a specified keyword in their descriptions.

```
uhunix% apropos keyword
```

```
uhunix% apropos doc  
nroff (1) - format documents for display or line printer  
troff (1) - typeset or format documents
```

### REFERENCES

*A Practical Guide to the Unix System*  
Mark G. Sobell  
The Benjamin/Cummings Publishing Company, Inc. 1984

*The Unix C Shell Field Guide*  
Gail Anderson, Paul Anderson  
Prentice-Hall

O'Reilly & Associates  
981 Chestnut St.  
Newton, Massachusetts 02164  
(617) 527-4210

*Unix in a Nutshell (Berkeley Edition)*  
O'Reilly & Associates  
Newton, Massachusetts 02164  
(617) 527-4210

ITS Documents: A series of locally written documents available on the Web at  
<http://www.hawaii.edu/itsdocs>.

### EMAIL TO HELP DESK

You can email your questions to the ITS Help Desk ([help@hawaii.edu](mailto:help@hawaii.edu)) via the pine email client, e.g.  
uhunix% **pine help**

Enter your UH Email Account at the Cc: prompt if you want to receive a carbon copy of your message (or Press **Return** key if not) Then enter a subject line, type your message, and send with a **Control-x**

Your screen should look similar to:

```
PINE 4.21  COMPOSE MESSAGE  Folder: (CLOSED)  No Messages
To      : Help Desk Email Account <help@hawaii.edu>
Cc      :
Attchmnt:
Subject : How do I delete files?
----- Message Text -----
Dear Help Desk,
How do I delete files in my directory?
thank you

^G Get Help  ^X Send      ^R Read File  ^Y Prev Pg   ^K Cut Text   ^O Postpone
^C Cancel    ^J Justify   ^M Where is  ^U Next Pg   ^U UnCut Text ^T To Spell
```

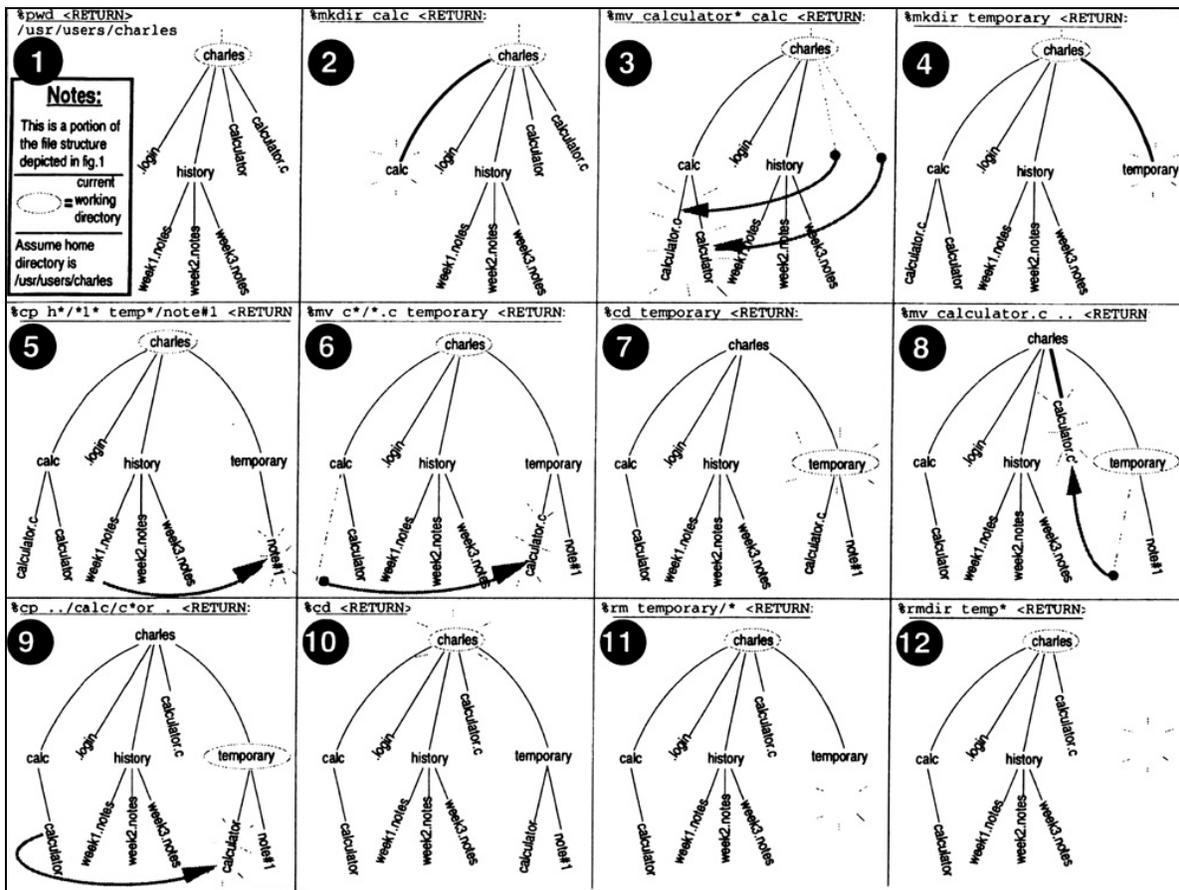


Figure 2

File and Directory Handling

(Figure 2 update. In box 1, /home/1/charles should appear in place of /usr/users/charles as user charles' home directory.)

For additional assistance, please phone the ITS Help Desk at (808) 956-8883, send email to [help@hawaii.edu](mailto:help@hawaii.edu), or fax (808) 956-2108. Neighbor islands toll-free (800) 558-2669

Or see the ITS Helpdesk home page at <http://www.hawaii.edu/help>

The ITS Help Desk is located in PC Lab in Keller 213, Keller 105 computer lab, and the ITS Hamilton Lab (Phase III, 2<sup>nd</sup> Floor, Hamilton Library) on the UH Mānoa Campus.

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