



Introduction to Unix

Getting a Unix Account

- Fill out form at ITC Accounts office in Wilson 234,
- or send email to “accounts@virginia.edu”,
- or use Web form at URL “<http://holmes.acc.virginia.edu/accounts/unixacct.html>”.

Available Machine Names

- ITC IBM RS/6000's for general use: blue.unix.virginia.edu
- ITC SGI Origin 200's for GCG/Seqweb and computationally intensive programs:
Health Sciences: crick.med.virginia.edu (aka gcg.med.virginia.edu)
College: gcg.sp2.virginia.edu (aka o200-1.sp2.virginia.edu)

Getting Help and Information

- From within Umenu select “*On-line Help and Documents*”
- or from Unix prompt type “*hints*” for ITC documents and program information,
- or “*gwis*” for general information about Uva and access to Internet resources,
- or “*man command-name*” for information about specific use of a Unix command,
- or send email to “consult@virginia.edu”,
- or call the ITC Help Desk at 924-3731 between 8:00am - 5:00pm on weekdays,
- or walk in to the ITC Help Desk in Wilson 235 between 8:00am - 5:00pm weekdays,
- or use ITC Web URL “<http://www.itc.virginia.edu>”,
- or HSC Web URL “<http://www.med.virginia.edu>”,
- or call ACHS at 982-4025 for ACHS (Health Sciences) specific questions.

Dialin Modem Phone Numbers

- 28.8k Modems 296-8963 (30-minute limit) 963-4624 (60-minute limit)
- 14.4k Modems 982-5084 (30-minute limit) 243-7673 (60-minute limit)

Accessing ACHS Unix Accounts (for using GCG from the ACHS labs, use “guest” if no ACHS account)

- From a Sun, SGI or Dec workstation in the ACHS facility, login using your loginid and password. For more details see ITC Document U-014, “*Introduction to the X Window System*”.
- From a PC start eXceed, login using your loginid and password. For more details see ACHS document ACHS-111, “*Introduction to eXceed 5*”.
- From a Mac start MacX, login using your loginid and password. For more details see ACHS document ACHS-207, “*Introduction to MacX 1.5*”.
- For information on accessing your accounts from other ITC public labs or from dialing in from home see ITC Document U-002, “*Introduction to Unix*”, in the section “*Connecting to a Unix Computer.*”

Unix Interfaces

- Umenu - default menu driven screen for new RS/6000 accounts. Easy to use for reading email and news, setting default printer and editor, registering for email, and some basic unix commands.
- Command line - prompt for typing Unix commands, must be used for some programs.
- X-Window - mutli-screen, mouse driven, window environment, must be used for certain X-window programs such as Seqlab and Netscape. Runs natively on Sun, DEC, and SGI Unix machines, on PC's use the program eXceed, and on Mac's use the program MacX.

Unix Umenu

- Default for new blue accounts, can be invoked with command “*umenu*” on older accounts.
- Email - read and send personal electronic messages to others at UVa or around world.
- News - read or create messages viewed publicly by users interested in certain topics.
- File Management - view, edit, delete, or copy files, print files and check on their status, move files to or from Unix to PC, and check account quota information.
- System Customization - register for email, set default printer, change default editor, mailer, or newsreader, change password, create a dialin account or homepage.
- On line Information - documents and information about programs and courses.
- Internet Services - information about UVa and connection to other systems via telnet.
- Go to Unix - suspend menu interface and allow direct Unix command input at command line prompt.
- Exit - end session on computer
- For more information see ITC Document U-001A, “*Unix Menu System (Umenu)*”.

Unix File Structure

- Files - basic computer software units, can hold document text, programs or images. Can be created, deleted, displayed or run. Can be located in personal account or system areas of computer.
- Directories - collection or holding place for groups of files. Same as folders on PC's. Directories can be created and deleted. They can have directories within directories called sub-directories which are arranged in a heirarchical arrangement called a directory tree.
- Path - list of directories and sub-directories that describe the location of a particular directory or file. Directory names are listed in order separated by a / which is called a forward slash.
- Absolute Path - list of directories starting from the main system directory called the root. An absolute path always starts with a / and contains all intervening sub-directories. For example the absolute path of a file in a users mail directory in her home account may look like: /home/mary/mail/letter1.
- Relative Path - list of directories starting at some middle location in the absolute path proceeding to the file. A relative path never begins with a / but only the name of the sub-directory. For example if the user were currently in her home directory, /home/mary, the relative path to the same file in her mail directory would be: mail/letter1.
- For more details see ITC Document U-002, “*Introduction to Unix*”, in the section “*The File System*”.

Special Characters

- Some characters have special meaning and are used either in place of long file or directory names or to perform a special function. The following is a list of the most commonly used special characters:

.	Indicates the current directory
..	Indicates the parent of the current directory
?	Matches any single character
*	Matches 0 or more characters
>	Writes command output to a file
>>	Appends command output to a file
<	Reads command input from a file
	Sends output from one command to input of another

Unix Commands

- Naming Conventions - Unix is case sensitive. Most commands are lower case letters, but either upper or lower case can be used in naming files and directories. Most names are abbreviated forms of the real command word, formed by removing the vowels of the word or using the first letters if multit-word.
- Syntax - Most commands can have one or more optional parameters or arguments which are usually preceded by a hyphen (-), followed by one or more file names: “*command -argument file*”.
- For more information see ITC Document U-002, “*Introduction to Unix*”

Exiting and Stopping Programs

- To stop a command before it completes execution, hold the Control key down and press “c” (Ctrl-c).
- To stop a program that is hung or running in the background, find the process ID (PID) of the program using the “*ps -fu loginid*” command, then terminate it with the command “*kill -9 PID*”.

In the example below the user with loginid *guest* determines the PID of the *gcg* program with the *ps* command and terminates it with the *kill* command.

```
$ ps -fu guest
  USER      PID    PPID    C   STIME     TTY   TIME CMD
  guest    261118 178169    0 11:42:32 pts/115 0:00 -ksh
  guest    278340 261118    0 11:42:45 pts/115 0:00 ksh /uva/bin/gcg9
$ kill -9 278340
```

- When you are finished working on the computer you must log out by typing “*exit*” or pressing “*Ctrl-d*”.

File Permissions

- Display file permissions with the command *ls -al* as shown below with column numbers for reference.

1	2	3	4	5	6	7	8
-rw-r--r--	1	abc3f	usr	800	Jun 6	14:28	.profile
-rw-r--r--	1	abc3f	usr	1424	Jun 6	14:28	.variables.ksh
drwxr-xr-x	2	abc3f	usr	144	Jun 9	16:21	News
drwxr-xr-x	4	abc3f	usr	144	Apr 16	14:34	docs
-rw-r--r--	1	abc3f	usr	3289	Nov 9	10:09	junk

Column 1: The first character is the type of file:

d = directory

l = symbolic link to a file

- = ordinary file

The next nine characters specify the file permissions given to user *abc3f* (first three characters), the group to which *abc3f* belongs (next three), and the other users on the system (last three).

The permission characters are as follows:

r for read

w for write

x for execute

- for permission denied

Column 3: owner of file.

Column 4: group to which owner belongs.

Column 5: number of bytes (characters) in the file.

Column 6: date file was last modified.

Column 7: time file was last modified.

Column 8: file name.

- To change permissions - use the “*chmod mode filename*” command where “*mode*” is string of parameters consisting of which users permissions are to be changed, how they will be changed and which permissions to change.

Parameters can be selected from the following list:

u = user

+ gives permission

r = read

g = group

- denies permission

w = write

o = other

x = execute

a = all (default)

Example: “*chmod go-r personal*” removes read permission on the file “*personal*” for everyone except the file owner.

- For more information see ITC Document U-002, “*Introduction to Unix*”.

Unix Commands

- Basic Commands

<i>cat file</i>	(concatenate) display <i>file</i>
<i>cat file2 >> file1</i>	appends <i>file2</i> to end of <i>file1</i>
<i>chmod go+r file</i>	changes permission of <i>file</i>
<i>cd dir</i>	change directory to <i>dir</i>
<i>cp file1 file2</i>	copy <i>file1</i> to <i>file2</i>
<i>find . -name filename -print</i>	finds occurrences of <i>filename</i>
<i>grep string file</i>	displays lines in <i>file</i> containing <i>string</i>
<i>kill -9 PID</i>	stops program with process ID <i>PID</i>
<i>ls, ls -al</i>	list filenames in a directory, brief or full info
<i>man command</i>	show the on-line manual entry for <i>command</i>
<i>mkdir dir</i>	make a new directory <i>dir</i>
<i>more file</i>	read or display <i>file</i> on the screen
<i>mv file1 file2</i>	move or rename <i>file1</i> to <i>file2</i>
<i>nohup command &</i>	starts <i>command</i> in background and continues even if you logout
<i>ps -u loginid</i>	shows processes started by user <i>loginid</i>
<i>pwd</i>	displays your current working directory
<i>rm file</i>	remove or delete <i>file</i>
<i>rmdir dir</i>	remove or delete directory <i>dir</i>
<i>sort file</i>	displays sorted lines in <i>file</i> on screen

- Printing Commands

<i>lpr -Pprinter file</i>	send <i>file</i> to <i>printer</i> as is
<i>lpq -Pprinter</i>	check status of <i>printer</i> queue
<i>lprm -Pprinter job#</i>	remove <i>job#</i> from <i>printer</i> queue
<i>enscript -2rhG -Pprinter file</i>	format <i>file</i> and send to <i>printer</i>
<i>manpage -Pprinter command</i>	send manpage of <i>command</i> to <i>printer</i>

- Network Commands

<i>ftp hostname</i>	(file transfer protocol) connects to remote machine <i>hostname</i> and allows users to transfer files. Commands within ftp are: <i>ascii</i> sets ascii mode for transfer of text file, usually default <i>binary</i> sets binary mode for transfer of binary (non-text) files <i>get file</i> transfers <i>file</i> from remote to local machine <i>put file</i> transfers <i>file</i> from local to remote machine
<i>telnet hostname</i>	connects to <i>hostname</i> and allows user to login and execute commands on remote machine
<i>rlogin hostname</i>	same as telnet, more robust, used between two Unix machines

- X-Window Commands

Command executed on local machine giving permission for display from remote machine:

xhost +remote-machine.subnet.Virginia.EDU

Command executed on remote machine to tell it where to send output:

DISPLAY=local-machine.subnet.Virginia.EDU:0.0

- Account Maintenance

<i>compress file</i>	compresses <i>file</i> to reduce disk space
<i>install.startup</i>	installs new set of default account startup files
<i>install.startup -x</i>	installs new set of X-Window startup files
<i>install.umenu</i>	installs files to have Umenu startup on login
<i>quota</i>	displays account disk space information
<i>uncompress file</i>	returns compressed file to original form