Working On Athena

Prerequisite:
  • Athena: First Course

Instructor:

I/S-AthenaTraining Group

Copyright © 2003 Massachusetts Institute of Technology
© ATHENA is a registered trademark of the Massachusetts Institute of Technology.
What This Course Will Cover

• Working with Files and Directories: naming, listing, moving, removing, sharing, permissions

• Input & Output Redirection

• Job Control

• Typing Commands: entering, history, lineedit
What is UNIX?

This course is an introduction to using the UNIX operating system.

• An ‘operating system’ is a set of programs to control and organize all the parts of a computer system: hardware (screens, keyboards, printers, disks, etc.) and software.

• ‘UNIX’ -- actually a family of operating systems all descended from the original UNIX developed at Bell Laboratories. As of Athena system release 9.2 our workstations are running these versions:

  SUN: Solaris 2.9
  Dell: Red Hat Linux 9.0
What is a Shell?

• A ‘shell’ is an interpreter program.

• The system automatically starts a shell running in your xterm window.

• Each command you type at the xterm prompt (athena%) is actually read and interpreted by the shell.

• The result is then passed along to the operating system, to be executed.

• The default shell on Athena is the tcsh (“t shell”) -- an enhanced version of csh (“C shell”).

You can learn more about the shell in the Dotfiles minicourse. For now, you just have to know that of the material covered:

• some applies to all UNIX systems,
• some only to users running csh or tcsh
• and some is just specific to Athena.
About Files

Information on Athena is stored in files.

Examples:

- plain text files
- formatted text
- graphics—JPEG, GIF, etc
- sound—.wav, .au, etc.
- applications programs
- data—various formats from application programs

You will create files when you run various Athena applications: for text editing and formatting, math, mail and communications, design, courseware, games, etc. Sometimes the program will automatically create and name the file for you.
Naming Files

• Every file must have its own unique filename.

• Filenames can include lower-case and UPPER-case letters, digits, periods, hyphens and underscores:

   a b c d e f g h i j k l m n o p q r s t u v w x y z
   A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
   0 1 2 3 4 5 6 8 9
   . _ _

• Upper- and lower-case letters are different. These:

   my_letter
   My_Letter

   name two different files.

Using other characters in filenames can confuse the shell or operating system.
Listing Files

ls — list files

athena% ls

Mail Private Xmhello.c dog-8-it
Nightwork Public athena-comment giant-bugs
OldFiles Rights aunt-died hello.c
Poems Rights.ez bin quote.txt

athena% ls -l

total 27
drwx------ 3 joeuser 2048 Jul 21 1992 Mail
-rw-rw-r-- 1 joeuser 332 Aug 7 19:24 Nightwork
drwxrwxr-x 8 joeuser 2048 Jul 2 1993 OldFiles
drwxrwxr-x 2 joeuser 2048 Aug 7 21:22 Poems
drwx------ 2 joeuser 2048 Jun 15 1992 Private
drwxr-xr-x 2 joeuser 2048 Jun 15 1992 Public
-rw-rw-r-- 1 joeuser 2880 Aug 13 1992 Rights
-rw-rw-r-- 1 joeuser 3126 Aug 10 1992 Rights.ez
-rw-rw-r-- 1 joeuser 631 Jul 2 1993 Xmhello.c
-rw-rw-r-- 1 joeuser 240 Aug 7 21:31 athena-comment
-rw-rw-r-- 1 joeuser 203 Aug 7 21:15 aunt-died
drwxrwxr-x 2 joeuser 2048 Aug 7 19:10 bin
-rw-rw-r-- 1 joeuser 231 Aug 7 19:16 dog-8-it
-rw-rw-r-- 1 joeuser 172 Aug 7 21:13 giant-bugs
-rw-rw-r-- 1 joeuser 97 Aug 11 1991 hello.c
-rw-rw-r-- 1 joeuser 240 Aug 7 20:09 quote.txt

athena% ls -a

.
.. .login Nightwork athena-comment
.Xresources .mh_profile OldFiles aunt-died
.cshrc .my_aliases Poems bin
.cshrc.mine .plan Private dog-8-it
.emacs .startup.X Rights giant-bugs
.environment .startup.tty Rights.ez hello.c
.history Xmhhello.c

athena% ls *.c
Xmhhello.c hello.c

-l, -a are examples of command options. Learn more about them with: athena% man ls
* is a “wildcard”
Looking at a File

cat filename — display a file

athena% cat quote.txt

Occasionally, you may experience some of the frustration that always is associated with being on the leading edge of a new technology.

-- Prof. Steven Lerman
former director of Project Athena

athena% cat Rights
(file rapidly scrolls all the way through to the end)

7th Amendment
In suits at common law, where the value in controversy shall exceed twenty dollars, the right of trial by jury shall be preserved, and no fact tried by a jury shall be otherwise re-examined in any court of the United States than according to the rules of the common law.

8th Amendment
Excessive bail shall not be required, nor excessive fines imposed, nor cruel and unusual punishment inflicted.

9th Amendment
The enumeration in the Constitution of certain rights shall not be construed to deny or disparage others retained by the people.

10th Amendment
The powers not delegated to the United States by the Constitution, nor prohibited by it to the states, are reserved to the states respectively, or to the people.
Using ‘more’

more filename — display file, one windowful at a time

athena% more Rights
(the window clears)

The Bill of Rights
(The first 10 amendments to the U.S. Constitution)
1st Amendment
Congress shall make no law respecting an establishment of religion, or prohibiting the free exercise thereof; or abridging the freedom of speech, or of the press; or the right of the people peaceably to assemble, and to petition the government for a redress of grievances.
2nd Amendment
A well-regulated militia, being necessary to the security of a free state, the right of the people to keep and arm bears, shall not be infringed.
3rd Amendment
No soldier shall, in time of peace, be quartered in any house, without the consent of the owner; nor in time of war, but in a manner to be prescribed by law.
4th Amendment
The right of the people to be secure in their persons, houses, papers, and effects, against unreasonable

You may type:

[SPACE]  Advance one screenful
b  Back up one screenful
[RETURN]  Advance one line
q  Quit reading the file
?  Help -- get full list of commands
Look At Part of a File

```
head [-n] file — print (n) lines from start of file
tail [+n][-n] file — print (n) lines from end of file
```

```
athena% head Rights
The Bill of Rights
(The first 10 amendments to the U.S. Constitution)
1st Amendment
Congress shall make no law respecting an establishment of
religion, or prohibiting the free exercise thereof; or
abridging the freedom of speech, or of the press; or the right
of the people peaceably to assemble, and to petition the
government for a redress of grievances.
2nd Amendment
A well-regulated militia, being necessary to the
```

```
athena% tail Rights
fines imposed, nor cruel and unusual punishment
inflicted.
9th Amendment
The enumeration in the Constitution of certain rights
shall not be construed to deny or disparage others
retained by the people.
10th Amendment
The powers not delegated to the United States by the
Constitution, nor prohibited by it to the states, are
reserved to the states respectively, or to the people.
```

```
athena% tail +75 Rights
10th Amendment
The powers not delegated to the United States by the
Constitution, nor prohibited by it to the states, are
reserved to the states respectively, or to the people.
```

```
athena% tail -1 Rights
reserved to the states respectively, or to the people.
```

The default number of lines for head or tail is 10.
Copying and Renaming Files

**cp**  
[-i] filename  
new-filename  
— copy

**mv**  
[-i] filename  
new-filename  
— rename or move

```
athena% ls
Mail               Private       Xmhello.c       giant-bugs
Nightwork          Public         aunt-died       hello.c
OldFiles           Rights        bin             quote.txt
Poems              Rights.ez     dog-8-it

athena% cp -i quote.txt remark

athena% ls
Mail               Private       Xmhello.c       giant-bugs
Nightwork          Public         aunt-died       hello.c
OldFiles           Rights        bin             quote.txt
Poems              Rights.ez     dog-8-it       remark

athena% mv -i remark athena-comment

athena% ls
Mail               Private       Xmhello.c       dog-8-it
Nightwork          Public         athena-comment   giant-bugs
OldFiles           Rights        aunt-died       hello.c
Poems              Rights.ez     bin             quote.txt

athena%
```

The `-i` is optional. It means the system will warn you if there is already a file with the new filename.
Removing Files

```
athena% ls
Mail   Private   Xmhello.c   dog-8-it
Nightwork  Public  athena-comment  giant-bugs
OldFiles   Rights   aunt-died   hello.c
Poems   Rights.ez   bin   quote.txt

athena% delete quote.txt

athena% delete -v athena-comment
delete: athena-comment removed

athena% ls
Mail   Poems   Rights   aunt-died   giant-bugs
Nightwork  Private  Rights.ez   bin   hello.c
OldFiles   Public   Xmhello.c   dog-8-it

athena% lsdel
athena-comment  quote.txt

athena% undelete quote.txt

athena% ls
Mail   Poems   Rights   aunt-died   giant-bugs
Nightwork  Private  Rights.ez   bin   hello.c
OldFiles   Public   Xmhello.c   dog-8-it   quote.txt

athena% lsdel
athena-comment

athena% expunge -v
expunge: athena-comment (1k) expunged (1k total)

athena% lsdel

athena%
```

If you do not expunge your deleted files, they will be **destroyed forever** anyway, about 3 days after you delete them.
Directories

A directory is like a folder that can hold files.

```
athena% ls -F
Mail/  Poems/  Rights  aunt-died  giant-bugs
Nightwork  Private/  Rights.ez  bin/  hello.c
OldFiles/  Public/  Xmhello.c  dog-8-it  quote.txt
```

```
athena% ls Poems
march  nuts  ophelia  soap  taste
```

```
athena% more nuts
nuts: No such file or directory
```

```
athena% more Poems/nuts
(clears page and poem ‘nuts’ is displayed)
```

Dear Sir,

Oft-times thou feelest like unto a nut,
And yet, M’lord, anon, feel’st thou not so.
Yon Almond Joy these selfsame nuts doth have,
Whilst Mounds contrariously doth have them not.

Thou may’st for this slogan, new-compos’d at thy
requesting, foreward payment to me at the Globe Theatre.
yr Hmbl &t Obt,

-- Wm. Shakkespere

```

```
athena%
```

The -F option indicates directories with a trailing slash (/)
Make a Directory

**mkdir**  *directory-name*  — make a directory

**rmdir**  *directory-name*  — remove a directory

```
athena% ls -F
Mail/    Poems/    Rights    aunt-died    giant-bugs
Nightwork Private/ Rights.ez bin/ hello.c
OldFiles/ Public/ Xmhhello.c dog-8-it quote.txt

athena% mkdir excuses

athena% ls -F
Mail/    Private/ Xmhhello.c excuses/
Nightwork Public/ aunt-died giant-bugs
OldFiles/ Rights bin/ hello.c
Poems/    Rights.ez dog-8-it quote.txt

athena%
```
Putting Files into a Directory

mv file directory — move file into directory

athena% ls -F
Mail/ Private/ Xmhello.c excuses/
Nightwork Public/ aunt-died giant-bugs
OldFiles/ Rights bin/ hello.c
Poems/ Rights.ez dog-8-it quote.txt

athena% mv -i dog-8-it excuses

athena% ls -F
Mail/ Poems/ Rights aunt-died giant-bugs
Nightwork Private/ Rights.ez bin/ hello.c
OldFiles/ Public/ Xmhello.c excuses/ quote.txt

athena% ls excuses
dog-8-it

athena% mv -i aunt-died excuses

athena% mv -i giant-bugs excuses

athena% ls -F
Mail/ Poems/ Rights bin/ quote.txt
Nightwork Private/ Rights.ez excuses/
OldFiles/ Public/ Xmhello.c hello.c

athena% ls excuses
aunt-died dog-8-it giant-bugs

athena% more dog-8-it
dog-8-it: No such file or directory

athena% more excuses/dog-8-it
(the file dog-8-it is displayed)
/mit/joeuser is joeuser’s “home directory” (or “homedir”) (sometimes shown as ~/)

Under AFS, joeuser’s homedir = /afs/athena.mit.edu/user/j/o/joeuser

/afs/athena.mit.edu/user/j/o/joeuser = /mit/joeuser = ~/
Moving to a Directory

**pwd** — print working directory ("where am I?")

**cd  dir-name** — change current directory to *dir-name*

**cd** — change current directory to *homedir*

```
athena% ls
Mail Poems Rights bin quote.txt
Nightwork Private Rights.ez excuses
OldFiles Public Xmhello.c hello.c

athena% pwd
/afs/athena.mit.edu/user/j/o/joeuser

athena% cd excuses

athena% pwd
/afs/athena.mit.edu/user/j/o/joeuser/excuses

athena% ls
aunt-died dog-8-it giant-bugs

athena% cd

athena% pwd
/afs/athena.mit.edu/user/j/o/joeuser

athena%
```
Directories: Abbreviations

athena% `ls -aF`

./ .history .startup.tty Rights
../ .login Mail/ Rights.ez
.Xresources .mh_profile Nightwork Xmhello.c
cshrc .my_aliases OldFiles/ bin/
cshrc.mine .path Poems/ excuses/
.emacs .plan@ Private/ hello.c
.environment .startup.X Public/ quote.txt

athena%

. = the current working directory

.. = the directory above the current working directory

~/ = your home directory, eg:

~/Xmhello.c = /mit/joeuser/Xmhello.c
Other Directories

**add directory** — attach directory and adjust $path\(^1\)

**ls /mit/directory** — list contents of attached directory\(^2\)

You can read and use files in other directories besides your own by using the **add** command.

```bash
athena% add sipb

athena% webster
```

*Word: athena*

Athe.na or Athe.ne \*--'the--n* (.ne- n [Gk Athe-ne-] : the goddess of wisdom and of women’s crafts in Greek mythology

*Word: gullible*

No definition for ‘gullible’.

*Word: moonphase*

```bash
athena% moonphase

*** The Moon is Waxing Crescent (5% of Full) ***
```

- You can only read or use files in other directories if their owner has made them available to the public. Unless you make your files public, no one else can read or change them.
- DO NOT do anything to change or delete public files without explicit permission from their owner!

(1) You can learn more about $path in the Dotfiles minicourse.
(2) ‘Lockers’ (directories) are not always ‘mounted’ in /mit

```bash
athena% attach
```

will show where they are.
Sharing Files

• Remember: NEVER tell anyone your password, for any reason, ever!

• You don’t need to give away your password to share files.

• There are ways to share files safely, or make them accessible to other users:
  
  • Public directories—Your ~/Public and ~/www directories were created with more relaxed permissions.

  • Permissions—You can relax the ‘permissions’ on a directory, so that other users can read or even edit the files in it.
Directories and Permissions

You control whether other users can read any of your files—by changing the permissions on your directories.

Directories help you organize your files, so you can give other users access to some of them. Initially, your directories have these permissions assigned:

- ~/Private: Files you put in here will be accessible by no one but you.
- ~/Public: If you put a file in here, everyone will be able to list it (see its name) and read it.
- ~/www: Same as ~/Public—used for web pages.
- All other directories: Other people can list the files in them, but only you can read them.

You can change the permissions on any directory to allow specified users to read -- or even change -- the files in it.

Another important directory:

- ~/OldFiles: contains a ‘read-only’ snapshot of your files, from which you can copy if you accidentally delete or damage a needed file.

For more information on how to change permissions, see the AFS on Athena and Managing Your Athena Account documents.
The Public Directory

Any file you put into your ~/Public directory will automatically be world-readable.

```
athena% ls Poems
kramer  march  nuts  ophelia  soap  taste

athena% mv Poems/kramer Public

athena% ls Poems
march  nuts  ophelia  soap  taste

athena% ls Public
README  announce  kramer
```

janeuser can attach joeuser’s locker, then read or copy the file.

```
athena% add joeuser

athena% more /mit/joeuser/Public/kramer
(file is displayed)

athena% cp -i /mit/joeuser/Public/kramer k-poem
```
**Directory Permissions**

A directory’s ‘access rights’ control who is allowed to list, read, edit, rename, create, remove, etc. any files in that directory.

**Permissions:**

- **l** list the filenames in the directory (must have this to use any other access)
- **r** Read the contents of files in the directory.
- **w** Write or edit the contents of files in the directory.
- **d** Delete files or subdirectories from the directory.
- **i** Insert files or subdirectories into the directory (i.e., create new files or move existing files into the directory).
- **a** Administer or change the rights on the access control list.
- **k** Set an advisory lock on a file (used mainly by application programs).

Common abbreviations for useful combinations:

<table>
<thead>
<tr>
<th>Alias</th>
<th>Expands to</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>read</td>
<td>rl</td>
<td>read and list rights</td>
</tr>
<tr>
<td>write</td>
<td>rlidwk</td>
<td>all rights but administer</td>
</tr>
<tr>
<td>all</td>
<td>rlidwka</td>
<td>all rights</td>
</tr>
<tr>
<td>none</td>
<td></td>
<td>used to clear access</td>
</tr>
</tbody>
</table>

This system of access control permissions applies to files stored on AFS servers only.
**List Directory Permissions**

`fs la directory` — show directory’s access rights

```
athena% fs la excuses
Access list for excuses is
Normal rights:
  system:expunge  ld
  system:anyuser  l
  joeuser  rlidwka

athena% fs la Public
Access list for Public is
Normal rights:
  system:expunge  ld
  system:anyuser  rl
  joeuser  rlidwka

athena% fs la
Access list for . is
Normal rights:
  system:expunge  ld
  system:anyuser  l
  joeuser  rlidwka

athena% fs la /mit/sipb
Access list for /mit/sipb is
Normal rights:
  system:gsipbbin  rlidwka
  system:anyuser  rl
```

athena%
Set Directory Permissions

**fs sa dir user rights** — set directory rights

```
athena% fs la Poems
    Access list for Poems is
    Normal rights:
    system:expunge ld
    joeuser rlidwka

athena% fs sa Poems dizzy read
athena% fs la Poems
    Access list for Poems is
    Normal rights:
    system:expunge ld
    dizzy rl
    joeuser rlidwka

athena% fs sa Poems tsmonk write; fs la Poems
    Access list for Poems is
    Normal rights:
    system:expunge ld
    dizzy rl
    joeuser rlidwka
    tsmonk rlidwk

athena% fs sa Poems system:jazzmen read; fs la Poems
    Access list for Poems is
    Normal rights:
    system:jazzmen rl
    system:expunge ld
    dizzy rl
    joeuser rlidwka
    tsmonk rlidwk
```

You can also ban a user by assigning "negative rights".
Who’s in a Grouplist?

blanche listname [options]

athena% fs sa Poems system:jazzmen read; fs la Poems
Access list for Poems is
Normal rights:
  system:jazzmen rl
  system:expunge ld
  dizzy rl
  joeuser rlidwka
  tsmonk rlidwk

athena% blanche -v jazzmen
blanche jazzmen
USER:dryfoo
USER:joeuser
USER:teacher
USER:uadmin
STRING:benny_carter@eveningstar.com

-v means “verbose” -- in this case indicate whether list-member is an
Athena USER, e-mail address STRING, or another LIST.

blanche has options to allow you to add or remove people from lists.
See also listmaint. There are man pages for both.
Directory Quota

Two ways to check your disk usage/quotas:

```
fs lq ~
quota -v
```

```
athena% fs lq
Volume Name    Quota  Used  %Used  Partition
user.joeuser    500000 11357    2%    45%

athena% quota -v
Disk quotas for dryfoo (uid 17321):
Filesystem     usage  quota  limit  files  quota  limit
/mit/joeuser   11357  500000  500000
```

The default Athena AFS quota is currently 500 megabytes.
Input and Output

A UNIX command usually:

- expects some input (eg. a file)
- produces some output

```
athena% tail -5 Poems/taste
chorus:
Cigarettes! Cigarettes! American through and through!
The Truest Taste of Freedom is Cigarettes and You!
The Truest Taste of Freedom is Cigarettes and You!
(Cigarettes! Cigarettes! Cigarettes! Cigarettes!)
```

- If no filename given, takes whatever you type at keyboard as input, called ‘standard input’ or ‘stdin’.

- Results of command usually shown in xterm, as ’standard output’ or ’stdout’.

```
athena% bc
16 * 9
144
[C-d]
```

```
athena% date
Wed Aug 21 13:01:20 EDT 2002
```

`bc` and `date` are two simple programs used to illustrate redirection. More about them at their respective man pages.
Redirecting I/O --
  to and from files

*command* `< file` — use file as input
*command* `> file` — write result of command to file
*command* `>> file` — append result to end of file

```
athena% date > now
athena% cat now

athena% cat hold1
2 + 5
4 * 9
2 ^ (2^3) + 1

athena% bc < hold1
7
36
257

athena% bc < hold1 > bc-result
athena% cat bc-result
7
36
257

athena% date >> bc-result
athena% cat bc-result
7
36
257
Wed Aug 21 13:06:00 EDT 2002
athena%
```

For more about I/O redirection to/from files: *athena% man csh*
Redirecting I/O --

command to command

cmd1  |  cmd2 — “pipe” output of cmd1 into cmd2

athena% ls -al

(file listing rapidly scrolls through to bottom)

athena% ls -al | more

total 59
  drwxrwxr-x  8 joeuser  2048 Aug 17 12:49 .
  drwxrwxr-x  2 root  6144 Aug  8 17:04..
  -rw-rw-r--  1 joeuser 1064 Dec 21 1989 .Xresources
  -rw-rw-r--  1 joeuser 2429 Aug 28 1989 .cshrc
  -rw-rw-r--  1 joeuser  972 Aug 16 21:12 .cshrc.mine
  -rw-rw-r--  1 joeuser 4865 Jul 29 1991 .emacs
  -rw-rw-r--  1 joeuser  313 Aug 28 1989 .environment
  -rw-rw-r--  1 joeuser  81 Aug 16 22:17 .history
  -rw-rw-r--  1 joeuser 1820 Aug 28 1989 .login
  -rw-rw-r--  1 joeuser  107 Jun 21 1989 .mh_profile
  -rw-rw-r--  1 joeuser 2072 Aug  7 19:09 .myAliases
  -rw-rw-r--  1 joeuser  298 Aug  9 21:18 .path
  lrwxr-xr-x  1 joeuser   12 Jun 15 1992 .plan -> Public/.plan
  -rw-rw-r--  1 joeuser  421 Aug 28 1989 .startup.tty
  drwx-------  3 joeuser  2048 Aug  9 21:24 Mail
  -rw-rw-r--  1 joeuser  332 Aug  7 19:24 Nightwork
  drwxrwxr-x  8 joeuser  2048 Aug 16 21:12 OldFiles
  drwxrwxr-x  3 joeuser  2048 Aug 16 21:50 Poems
  drwx-------  2 joeuser  2048 Jun 15 1992 Private
  drwxr-xr-x  2 joeuser  2048 Aug 15 20:39 Public
  -rw-rw-r--  1 joeuser  2880 Aug 13 1992 Rights

--More--[Press space to continue, ’q’ to quit.]

athena% ls -al | grep 1992

lrwxr-xr-x  1 joeuser  12 Jun 15 1992 .plan -> Public/.plan
  drwx-------  2 joeuser  2048 Jun 15 1992 Private
  -rw-rw-r--  1 joeuser  2880 Aug 13 1992 Rights

grep searches input for a specified pattern -- useful and powerful command, with lots of options. Learn more: athena% man grep
Jobs & Process control

A program (sometimes called ‘job’ or ‘process’) that you start can be:

• ‘running’—currently executing, in either:

  ♦ the ‘foreground’—shell waits until job is done before returning a prompt, or

  ♦ the ‘background’—Shell doesn’t wait; returns prompt immediately.

• ‘suspended’—stopped, waiting for restart

• ‘killed’—ended, done, over, finished, gone
Stopping a Process

*C-z* — interrupt (suspend) the foreground process
*stop* `%n` — suspend a background process
*C-c* — kill the foreground process
& — start job as a background process
*jobs* — list all background processes

```bash
athena% date
Thu Aug 2 17:04:22 EDT 2001

athena% ls
Mail Poems Rights bc-result hello.c quote.txt
Nightwork Private Rights.ez bin hold1
OldFiles Public Xmhello.c excuses now

athena% xclock -u 1
(a running xclock appears -- no prompt)

[C-Z]
^Z
Suspended
(xclock stops)

athena% xcalc&
[2] 5418
(an xcalc appears)

athena% emacs&
(an emacs window appears)

athena% jobs
[1] + Stopped xclock -u 1
[2] - Running xcalc
[3] Running emacs

athena% stop %3
(emacs window stops)

athena% jobs
[1] - Stopped xclock
[2] Running xcalc
[3] + Stopped emacs
```
Move a Process into Background

bg [%n] — restart stopped job in background
fg [%n] — restart stopped job in foreground

athena% jobs
[1] - Stopped xclock -u 1
[2] Running xcalc
[3] + Stopped emacs

athena% bg %1
[1] xclock -u 1 &
(xclock starts running again)

athena% jobs
[1] Running xclock -u 1
[2] - Running xcalc
[3] + Stopped emacs

athena% fg %3
emacs
(emacs starts running again, no prompt)

[C-Z]
^Z
Stopped
(emacs stops again)

athena% bg %3
[3] emacs &
(emacs starts again)

athena% jobs
[1] - Running xclock -u 1
[2] + Running xcalc
[3] Running emacs
Kill a Process

**kill \%n** — kill background job \#n

```bash
athena% jobs
[1] - Running xclock -u 1
[2] + Running xcalc
[3] Running emacs

athena% kill %2
[2] Terminated xcalc
   (the xcalc disappears)
```

You can also use the `ps` command to see a list of your processes:

```bash
athena% ps ux (standard options on most Unix systems)
athena% ps -lfu $USER (on the Suns)
```

`ps` has many options—for details, see

```bash
athena% man ps
```

This might help. (If not, ignore it.)
Typing Commands—the basics

When typing commands at the athena% prompt:

- Type and Delete -- until you hit [RETURN] nothing is sent.

  athena% cd x [DEL] eqx [DEL] [DEL] xcuss [DEL] es [RET]
  athena% pwd
  /afs/athena.mit.edu/user/j/o/joeuser/excuses

- Use the semicolon ‘;’ to put multiple commands on a single line:

  athena% cd ~/excuses/true; pwd
  /afs/athena.mit.edu/usr/j/o/joeuser/excuses/true

- Use the backslash ‘\’ to spread a command across multiple lines:

  athena% mkdir ~/Poems/really-really-long-subdirectory-name
  athena% mv ~/Poems/kramer \?
  ~/Poems/really-really-long-subdirectory-name

  athena%

The ? is a secondary system prompt indicating a continued line.
“line edit” and “history”

**line edit**: refer to previous commands and edit them using:

- Arrow keys: ↑ ↓ ← →
- Emacs-style control commands:
  - move cursor: C-n C-p C-b C-f C-a C-e etc.
  - kill, cut, paste: C-d M-d M-[DEL] C-y

**history**: an older (pre-tcsh) method using the “!” to quote previous commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>history</td>
<td>show recent cmds</td>
</tr>
<tr>
<td>!!</td>
<td>run previous cmd</td>
</tr>
<tr>
<td>!n</td>
<td>run cmd #n</td>
</tr>
<tr>
<td>!-n</td>
<td>run n(^{th}) most recent cmd</td>
</tr>
<tr>
<td>!$</td>
<td>use last word from most recent cmd</td>
</tr>
<tr>
<td>!string</td>
<td>use most recent cmd beginning w/ string</td>
</tr>
<tr>
<td>!n:$</td>
<td>use last word from cmd n</td>
</tr>
<tr>
<td>!n:m</td>
<td>use m(^{th}) word from cmd n</td>
</tr>
</tbody>
</table>

```
athena% where netscape
/mit/infoagents/arch/sun4x_57/bin/netscape

athena% !! ← (user types !!, hits return)

netscape ← (shell substitutes last element of previous line)
```

If you find that the lineedit commands aren’t working, try:

```
athena% set lineedit
```

For more about history:

```
athena% man csh
```
What We Covered

• Working with Files and Directories: naming, listing, moving, removing, sharing, permissions

• Input & Output Redirection

• Job Control

• Typing Commands: entering, history, lineedit

UNIX is a powerful and flexible environment. Other Unix topics you may find interesting:

• Customizing commands: aliases, variables

• Shell scripts & logic control statements: if, else, endif, while, foreach, etc.

• Filters: grep, sort, sed, awk, perl, etc.

• Software development tools: make, Imake
To Learn More

**On-line information**: we suggested several topics in these:

- **man pages**: `athena% man topic`

- **On-Line Help**: `athena% help`
  or Gnome “foot print” Menu: Help ➔ Athena Help ➔ Athena Help Pages
  or [http://web.mit.edu/olh/](http://web.mit.edu/olh/)

- **olc stock answers**: `athena% olc answers`
  or [http://web.mit.edu/answers/](http://web.mit.edu/answers/)

**Documents**: *Athena Pocket Reference, Working on Athena, Managing your Athena Account*. Available in On-line Help, and at the Copy Tech Center in 11-004.

**Manuals**: many books about UNIX and the various shells. Browse at technical bookstores, computer stores, and the campus libraries.
**ATHENA® MINICOURSE INDEX**

**Athena: First Course (First Course)**
Our introduction to the Athena academic computing environment: what you can do on Athena, your account, finding help, and other basics. Also includes E-mail, Zephyr, WebSIS, Stellar, and Residential Computing.
Suggested pre-requisites: None

**Working on Athena: Files and Unix (Working)**
Files, directories, setting permissions, job control, and more. What every new user should know about Unix, Athena’s operating system.
Suggested pre-requisite: First Course

**Latex (Latex)**
An introduction to Latex, a widely-used text formatter, used for converting a text file into an attractive, professional-looking document. It is a powerful and flexible program, with the capability to typeset many foreign characters and complex mathematical text.
Suggested pre-requisites: First Course, Working

**FrameMaker (Frame)**
FrameMaker is a powerful word-processing and document-preparation package now available on Athena.
Suggested pre-requisites: First Course, Working

**Latex for your Thesis (Latex Ths)**
Using the Latex text formatter to produce a fully-featured thesis that meets all MIT format requirements.
Suggested pre-requisites: Latex or some Latex experience

**FrameMaker for your Thesis (Frame Ths)**
FrameMaker, with a special template, can be used to produce an MIT thesis that meets all Institute formatting requirements.
Suggested pre-requisites: Frame or some FrameMaker experience

**Matlab (Matlab)**
An interactive program for scientific and engineering numeric calculation. Applications include: matrix manipulation, digital signal processing, and 3-dimensional graphics.
Suggested pre-requisites: First Course, Working

**Maple (Maple)**
A mathematics program that can perform numerical and symbolic calculations, including formal and numerical integration, solving algebraic or transcendental systems and differential equations, and series expansion and matrix manipulation. It also has extensive graphics capabilities.
Suggested pre-requisites: First Course, Working

**HTML: Making a WWW Home Page (HTML)**
Covers the basic features of HTML (“Hyper-Text Mark-up Language”) the language of the World-Wide Web, as well as the steps needed to post your own Web page on Athena.
Suggested pre-requisites: First Course, Working

**Serious Emacs (Ser. Emacs)**
The text editor introduced in First Course has many useful features not covered there. This course will be a time-saver for anyone who uses Emacs more than a few hours every week.
Suggested pre-requisites: First Course, Working, Emacs tutorial (on-line), and some Emacs experience

For schedules, etc. see [http://web.mit.edu/minidev/](http://web.mit.edu/minidev/)

©Athena is a registered trademark of the Massachusetts Institute of Technology. Just in case you were wondering.
Do you think that your teaching and presentation skills are important for a technical career?
As a minicourse instructor, you can improve them.

If you:
• Can explain technical topics clearly, or want to learn how,
• Are comfortable using Athena, and want to learn more about it,
• Need to add some teaching experience to your resume,
• Are an MIT student -- grad or undergrad...

...then we would like to talk with you.

As an Athena minicourse instructor you will:
• Present Athena minicourses during Orientation week, IAP, and each semester. Our yearly schedule is on-line at web.mit.edu/minidev/
• Earn money, including a paid training period, and
• Improve your teaching skills.

Prior Teaching Experience is NOT Required

To request an application, or more information, please visit http://web.mit.edu/minidev/Recruit/
Minicourse Questionnaire (cont’d)

Please fill out this side of the page AFTER taking the minicourse.

(please circle one in each row)

5. How was the instructor's pace?  
   - Too SLOW 1 3 5 3 1 - Too FAST  

6. How difficult was the course material?  
   - Too EASY 1 3 5 3 1 - Too HARD  

7. How well did you understand the instructor?  
   - POORLY 1 2 3 4 5 - PERFECTLY  

8. How well did the instructor answer questions?  
   - POORLY 1 2 3 4 5 - PERFECTLY  

9. Did you have any questions you didn’t ask?  
   If yes, why not?  
   __________________________________________

10. Was any topic not covered that you had expected to learn in this course?  
    If so, what topic?  
    __________________________________________

11. Why did you take this course? (check one)  
    - General Interest  
    - Required for a course. (Which? ________________________ )  
    - To be able to do something. (What? ________________________ )

12. Besides Athena, how much computer experience do you have?  
    (None) 1 2 3 4 5 - (Lots)  

13. How often have you used Athena in the past? (check one)  
    - never  
    - a few times  
    - once a week  
    - several times a week  
    - daily

14. How would you estimate your knowledge of the subject of this course...  
    ...Before taking it? (None) 1 2 3 4 5 - (Lots)  
    ...After taking it? (None) 1 2 3 4 5 - (Lots)

15. Additional comments:

[...Continued on another page...]

Athena Minicourse
Minicourse Questionnaire

Please fill out this side of the page BEFORE the class begins.

Minicourse Instructor: _________________________ Today's Date: ______________

1. MIT status (circle one):
   1  2  3  4  G  FACULTY  STAFF  OTHER

2. Is this your first Athena minicourse? (circle one):
   YES    NO

3. If No, check (✓) those you have already taken:
   - Athena: First Course
   - Working on Athena
   - Word processing Options
   - EZ
   - Latex
   - Latex Thesis
   - FrameMaker
   - FrameMaker Thesis
   - Other (please specify): _____________
   - Math Software Overview
   - Matlab
   - Xess
   - Maple
   - Information Resources
   - HTML
   - Serious Emacs
   - Customization (Dotfiles)

4. How did you find out about THIS minicourse? (only ONE answer, please)
   - Orientation ("Hitchhiker’s") Guide
   - Athena Orientation packet
   - Advertisement in The Tech
   - Advertisement in Voo Doo
   - Athena Minicourse Web-site
   - Other (please specify): _____________
   - Flyers/Poster in hallways
   - Poster in an Athena cluster
   - Friend told me
   - Professor or TA recommended
   - Description in previous minicourse