Computing Environment
Shell Commands

Unix

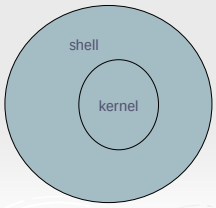
- Generic name for a type of operating system(OS)
- First version in 1969 by Ken Thompson by AT&T Bell Laboratories
- Multiuser and interactive; progressive for its time
- Is written mostly in 'C', and a little bit in assembly
- Has been ported to many different processors
- Two basic versions have evolved
  - derived from Unix System V (owned by AT&T)
  - derived from Berkeley Software Distribution, or BSD
- In 1980's, SunOS branched out from BSD
- Recent 64-bit versions of SunOS are called Solaris™

Linux

- Linux (a.k.a GNU) is similar to Unix
- However it is not proprietary OS like Windows or Solaris
- Users can obtain it freely, modify it and redistribute freely
- Most non-windows labs in CIS are Linux

Shell

- Shell provides user interface between OS and user
- Thus Unix/Linux is *command* driven
  - Graphical User Interface also exist e.g. KDE



Shell (contd..)

- several different shells exist
- *bash* is popular w/ Linux
  - we will not be using bash in this course
  - However, default shell upon login in Linux machines is bash shell
- we will use *csh* (pronounced "sea shell")
  - Command interpreter with syntax similar to C language
  - Enhanced version is **tcsh** (t = tenex)
    - allows step up/down through history list using arrow keys
    - Completes file/directory search with 'tab' key
  - **To switch from bash mode to csh/tcsh: type "csh/tcsh" at prompt**

Login In

- Your accounts are on eniac server
- Eniac account is also mounted on Linux PC's
- From an existing shell, log into eniac using the current username

  % ssh eniac.seas.upenn.edu

- To open a new shell with a different user name on the same system

  % su - username

File Permissions

- After entering: ls
- Desktop mail Maildir public_html
- html Mail

- After entering: ls -l
- drwxr-xr-x 2 username username 4096 2006-09-04 06:51 html
- lrwxrwxrwx 1 username username 4 2006-08-30 09:21 mail -> Mail
- drwxr-xr-x 3 username username 4096 2006-09-04 06:50 Mail
- drwxrwx--- 2 username username 4096 2006-08-30 09:21 Maildir
- lrwxrwxrwx 1 username username 4 2006-08-30 09:21 public_html -> html

"d" = directory / folder

size

Date & Time

Directory /File name

File Permissions(contd..)

- After entering **ls –l** in my home directory, I see:

```
drwxr-x---  6 palsetia palsetia 4096 2006-09-04 06:52 CIT593_f06
drwxr-xr-x  2 palsetia palsetia 4096 2006-09-04 06:51 html
lrwxrwxrwx 1 palsetia palsetia   4 2006-08-30 09:21 mail -> Mail
drwxr-xr-x 3 palsetia palsetia 4096 2006-09-04 06:50 Mail
lrwxrwxrwx 1 palsetia palsetia   4 2006-08-30 09:21 public_html -> html
```

user group world

r = read permission
w = write permission
x = execute permission

chmod commands

```
drwxr-x---  6 palsetia palsetia 4096 2006-09-04 06:52 CIT593_f06
drwxr-xr-x  2 palsetia palsetia 4096 2006-09-04 06:51 html
lrwxrwxrwx 1 palsetia palsetia   4 2006-08-30 09:21 mail -> Mail
drwxr-xr-x 3 palsetia palsetia 4096 2006-09-04 06:50 Mail
lrwxrwxrwx 1 palsetia palsetia   4 2006-08-30 09:21 public_html -> html
```

user group world

chmod 700 filename
user can read, write and execute

chmod 600 filename
user can read and write

chmod 500 filename
user can read and execute

chmod 755 filename
for publishing on the web

$0_8 : 000_2$	---
$1_8 : 001_2$	--x
$2_8 : 010_2$	-w-
$3_8 : 011_2$	-wx
$4_8 : 100_2$	r--
$5_8 : 101_2$	r-x
$6_8 : 110_2$	rw-
$7_8 : 111_2$	rwx

Settings: .cshrc

.cshrc

- gets executed anytime you start up a **csh** (pronounced *sea shell*)
- This where one would change there environment settings or define shortcuts

To view .cshrc file

- **ls –al list all the files/directories in your home directory**

source .cshrc

re-executes your .cshrc file (at your request)

Preferences and settings

- **Edit .cshrc to perform your settings:**
- **To view your directory path upto 4 directories down:**
  if ($?prompt) set prompt="username%c04:"
- **To create shortcuts use *alias* command**
  - alias ***e*** *emacs* (emacs is an editor)
  - alias **c** *clear* (clear command clears the screen)
- **Add a particular directory to your search path:**
  - **set path = ($path .) add search path before "."**
  - **E.g. set path = ($path /usr/javaj2sdk1.4.2/bin .)**

Managing Directories (folders)

mkdir newdir
make a new directory **newdir** under the current directory

cd newdir
change directory to **newdir** (must be under current directory)

cd ..
change to the next directory above this one

rmdir newdir
you can only delete it if it's empty

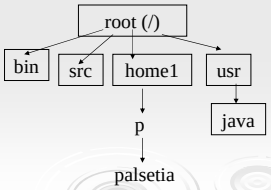
ls -al
show me all files in current directory, including . (hidden) files

ls -l
show me normal files in long form (including their permissions), but omit . (hidden) files

ls
show me all files in short form (directories end in /)

File System

- In UNIX-based systems, files are organized into a 'tree' structure.
- In this tree, there is a 'root,' which is a directory that contains every other directory on the system.
- Other directories, which are 'branches' of the tree.



File and Directory Navigation

cd /
change to the root directory (from where ever you are)

cd $HOME
change to your home directory (from where ever you are)

pwd
print working directory (shows where you currently are)

cd ..
go up one directory (from where ever you are)

cd ../..
go up two directories (from where ever you are)

cd ../progs
go up one directory, then from there go down into the **progs** dir

cd /newdir
change directory to **/newdir** (underneath root directory **/**)

More File Commands

mv oldfilename newfilename
change a directory or file name

cp oldfilename newfilename
make a new copy of a file

rm filename
delete **filename** (be *very careful* before using **rm * ** or **rm *.***)

rm *
WARNING: removes all files lacking an extenstion

rm *.*
WARNING: removes all files having an extension

More Commands

cd .
change to the current directory (doesn't really do anything)

cd ~
change to your home directory (on some systems, but not on all)

tput clear
clear console screen ("terminal put" clear)

cat filename
list file contents on screen (file must contain only text chars)

About Files

- **text files**
  - can be displayed, edited or printed
  - contain only ASCII characters up to 127_{10}, including a few *allowed* control chars (e.g. !, & etc.)
  - divided into lines; end of line marked by a control character
  - a C source file is an example of a text file
- **binary files**
  contain arbitrary bit patterns; do not print or display!
- **executable file**
  a binary file; cannot be displayed or printed by the usual means

shell commands for handling files

file *filename*
attempts to report on whether the file is text or binary

cat *filenam*
- not useful for binary files
- attempts to display the file on the terminal
- if file longer than 25 lines, top part may scroll off

cat *filename* | more
display a text file (piped through the pager program, **more**)
- this shows you 25 lines at a time

press any key to get more lines

od – x filename (Will come back here when we learn binary represtation)
displays a file (text or binary) as hex byte values

tar command

- **UNIX archive file commands:**
  - tar xvf tarfile.tar - extract
  - tar cvf tarfile.tar - sourcedir/file(s) – compress
  - tar tvf tarfile.tar - show table of contents
- **v=verbose, x=extract, f=file, t=table of contents**

pipe and redirect

% command1 | command2

a pipe can be placed between any two shell commands

- it funnels the output of the 1st command to the 2nd one
- EXAMPLE: **cat collatz.c | more**

displays file collatz.c in paged mode

% command > filename

redirects the output of command to a new copy of filename

- EXAMPLE: **ls –al > all_files.txt**

% command >> filename

redirects the output of command to the *end* of filename (appends)

- EXAMPLE: **ls –al >> all_files.txt**

Viewing your shell "environment"

echo $HOME

displays the full name of your home directory

echo $PATH

displays all the directories in your search path

setenv

displays all the environment variables and their values

e.g: setenv PATH "/bin:/usr/bin:/usr/sbin:ucb/bin"

Sets the environment path to search for files in the /bin, /usr/bin, /usr/sbin and usb/bin directory.

ENV and Path Search

- **palsetia~:env**
  - **DESKTOP_SESSION=kde**
  - **PATH=/bin:/usr/bin:/usr/X11R6/bin:/usr/local/bin:/usr/java/j2sdk1.4.1_01/bin:/usr/lib/mit/bin:/usr/lib/mit/sbin:/usr/lib/qt3/bin:.**
  - **GNOMEDIR=/opt/gnome**
  - **CPU=i686**
  - **GDM_XSERVER_LOCATION=local**
  - **KONSOLE_DCOP_SESSION=DCOPRef(konsole-28991,session-1)**
  - **PWD=/home1/p/palsetia**
- **palsetia~:echo $PATH**
  - **/bin:/usr/bin:/usr/X11R6/bin:/usr/local/bin:/usr/java/j2sdk1.4.1_01/bin:/usr/lib/mit/bin:/usr/lib/mit/sbin:/usr/lib/qt3/bin:.**

More enquiries

whoami

displays the current user's login name

whereis *command*

displays the directory where *command* is stored, if found

man *command*

displays the online documentation for *command*, if found

hostname or **uname -n**

displays the fully qualified name of this UNIX host

uname -X

displays version info on the operating system

isalist

lists the instruction set architectures (ISA's) of this host

fpversion

displays the floating point unit and other hardware for this host

finger

displays info about users currently logged on

Calendar Command

cal 2006

```
Oct                  Nov                  Dec
 S  M Tu  W Th  F  S   S  M Tu  W Th  F  S   S  M Tu  W Th  F  S
 1  2  3  4  5  6  7               1  2  3   4                  1  2
 8  9 10 11 12 13 14   5  6  7  8  9 10 11   3  4  5  6  7  8  9
15 16 17 18 19 20 21  12 13 14 15 16 17 18  10 11 12 13 14 15 16
22 23 24 25 26 27 28  19 20 21 22 23 24 25  17 18 19 20 21 22 23
29 30 31              26 27 28 29 30        24 25 26 27 28 29 30
                                            31
```

Text Editors

- Become expert in either one of the following
- *emacs* (very popular)
  - **Has menu bar like MS word along with keyboard shortcuts**
  - **http://www.ucc.ie/doc/editing/emacs.html**
- *vi* (less commonly used) *vim* is a more robust version
  - **http://www.linux.org/lessons/beginner/l5/lesson5c.html**