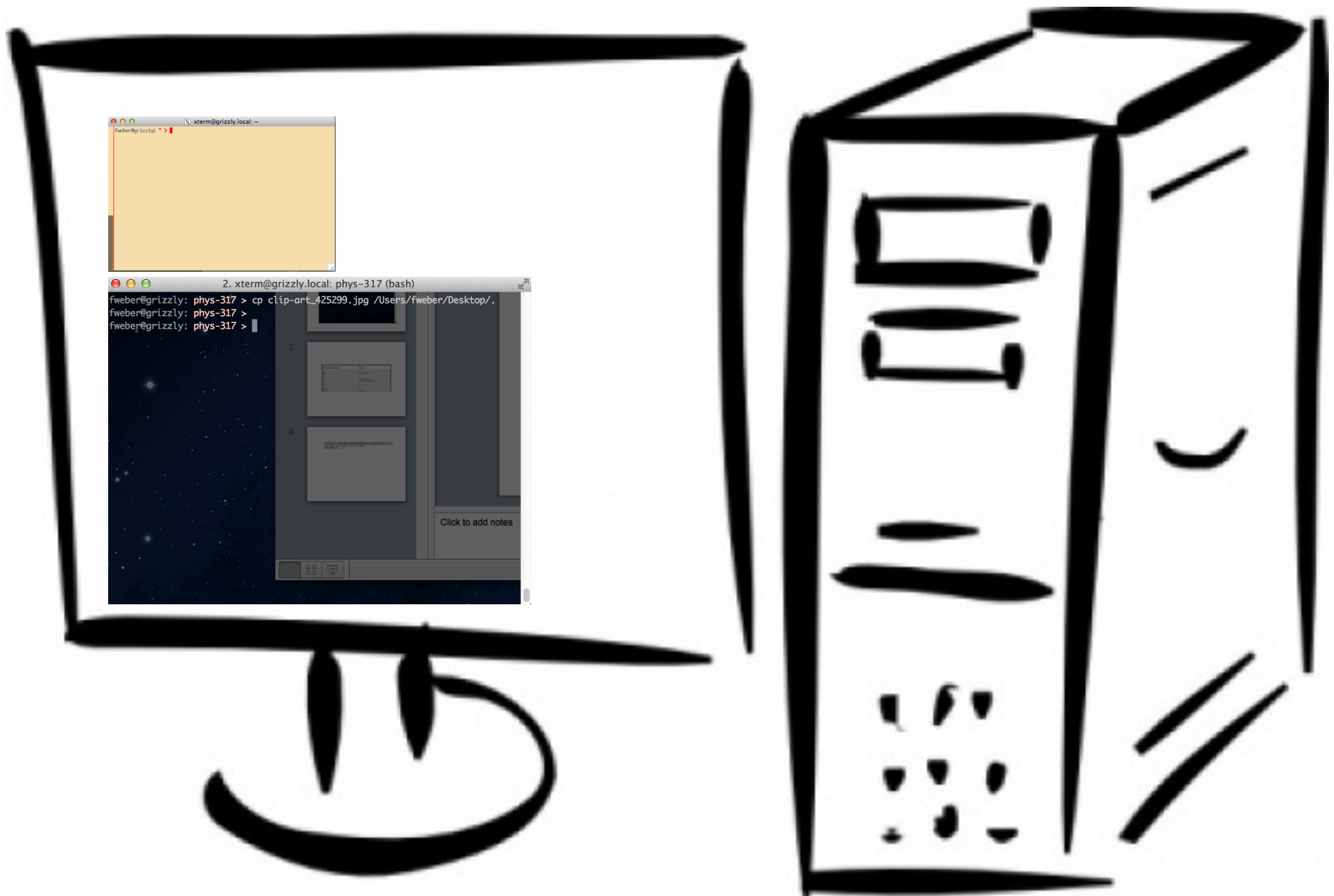


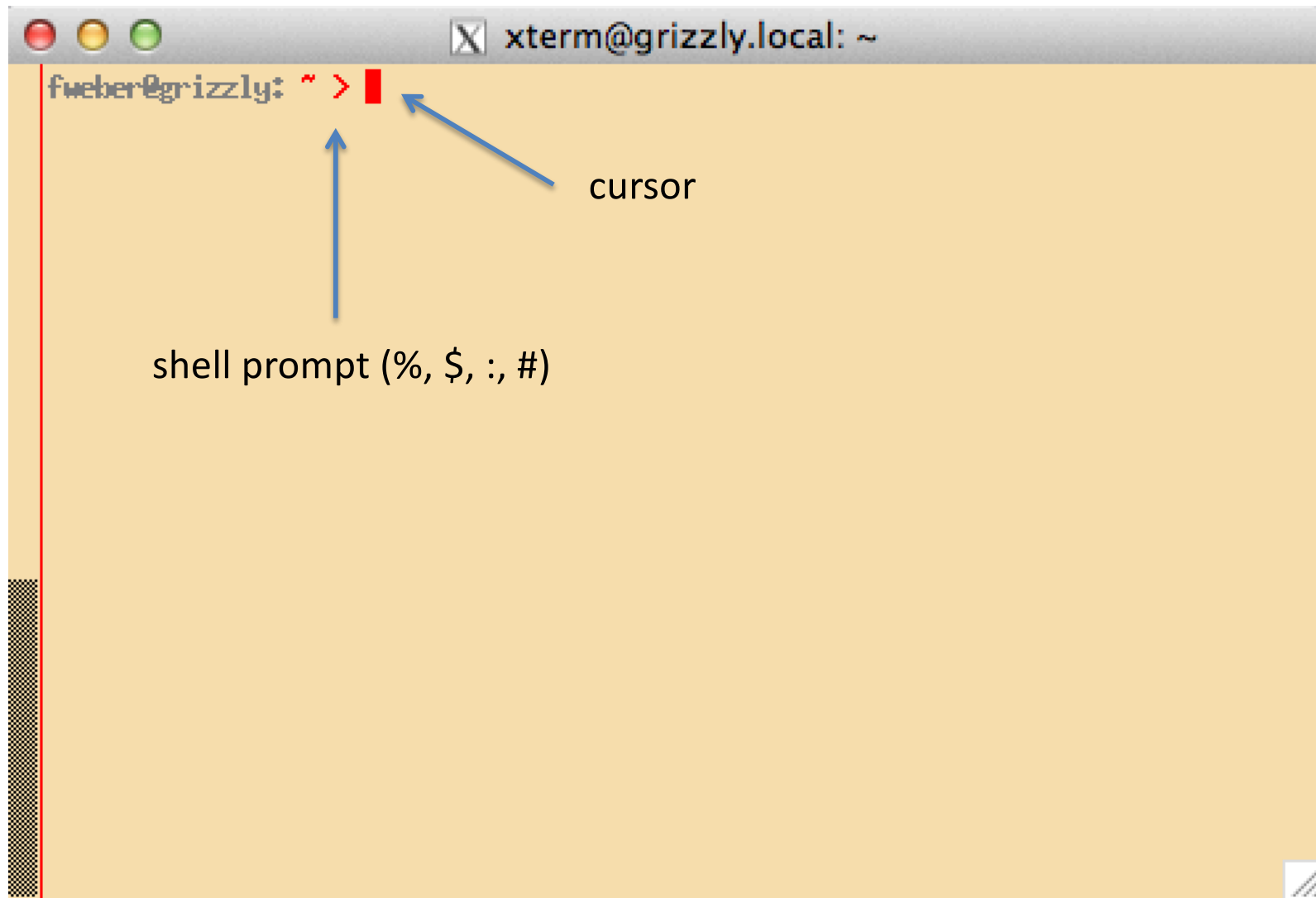
Unix/Linux Basics

Chapter 1 in Class Textbook



- ❑ Operating systems: Unix/Mac OSX/Linux (**Ubuntu**, Linux Mint, SuSE, etc.)
- ❑ Required software: Fortran/Cpp compiler, text editor, plotting program, LaTeX

Terminals — “xterm” (Linux, OSX)



Terminals — “iTerm” (OSX)



Example: shell response to **pwd**



```
3. xterm@grizzly: ~ (bash)
[grizzly: ~/] (+1) > pwd
/Users/fweber
[grizzly: ~/] (+1) > █
```

Example: shell response to ls

```
3. xterm@grizzly: ~ (bash)
[grizzly: ~/] (+1) > ls
Applications MathTensor bin iNews numerical proposals
Desktop Mathematica books letters orgzations refReports
Documents Movies business metrics papers scans
Downloads Music classes miscF90 phys-317 software
GRTensor Pictures colleagues multimedia phys-317f90 students
Library Public dataPool myLatex phys-570 sysFiles
LuminaQuest SDSU events myPapers posters visitors
MQ7 Sites family myStyles prns w3
Maple UCSD fellowships myWebpage proceedings
MathCode artwork funding nsf projects
[grizzly: ~/] (+1) > █
```

Filenames

Allowed symbols:

a through z
A through Z
0 through 9
_ · — ,

Avoid () [] * ? \$! # @ = + / \

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Examples:

Thesis
thesis
thesis.tex
thesis_bup1.tex
book.pdf
.hidden_file
newton.f
newton.f90
long_file___name.txt
abd...def..ghj-jk
#not_good
*even_worse.f90
also#bad

Filenames → use file extensions

Allowed symbols:

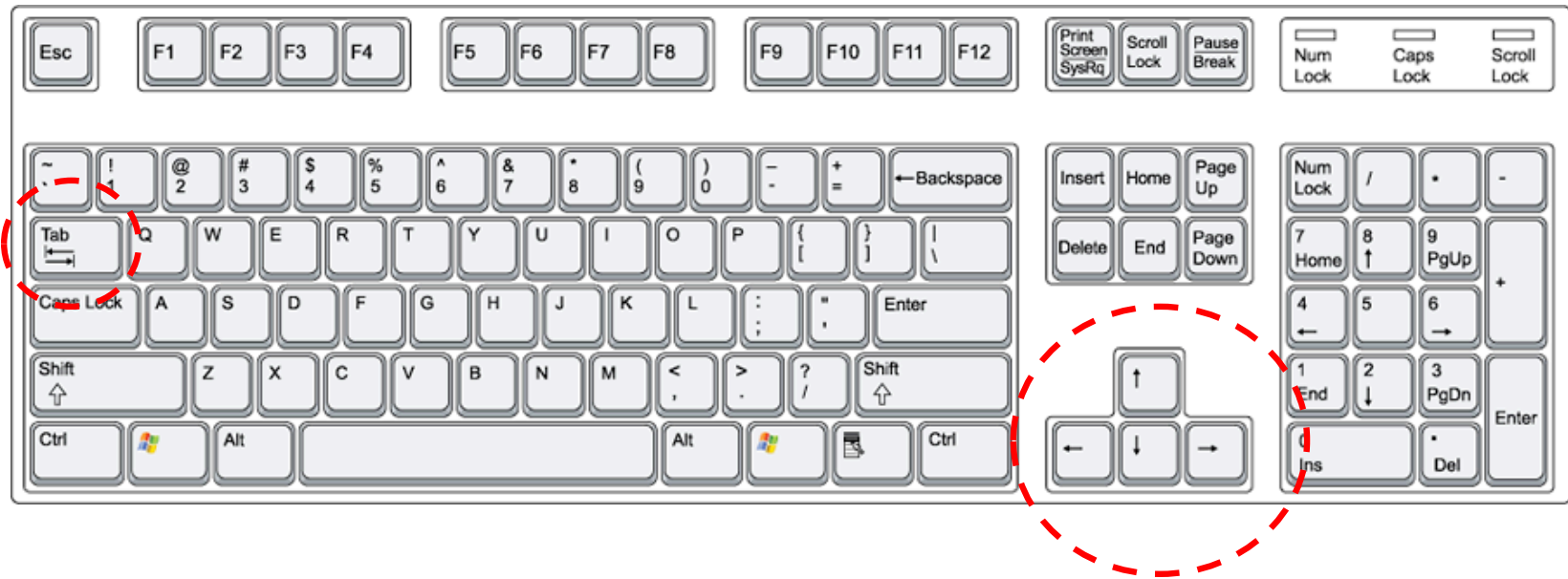
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There is **no** need to type the same shell command again and again ...



Use **arrow** keys!!

Important Unix/Linux commands

Unix/Linux Commands	Description
date	Print date
pwd	Print working directory
cd	Change directory
cd ..	Move one directory up from where you are now
cd .	Does nothing
cd ~	Change to home directory
man	Man pages
cp	Copy
cp -i cp -iv cp -R cp *.f90 ~/dir1/dir2/.	i=write a prompt to the standard output before copying a file that would overwrite an existing file. v=verbose (showing files as they are copied) R=recursive (copies directory and entire subtree) *=wildcard symbol
mv	Move
mv -i	
ls	Listing
ls -a, ls -lF, ls -alF	
cd .. ; ls	Change directory followed by listing
touch	Create empty file
w, who	Who is logged in

Example: shell response to `ls -al`

```
3. xterm@grizzly: ~ (bash)
[grizzly: ~/] (+1) > ls -al
total 712
drwxr-xr-x+ 136 fweber  staff   4624 Jan 22 12:05 .
drwxr-xr-x   8 root    admin   272 Dec 19 18:17 ..
-r-----   1 fweber  staff    7 Dec 19 18:09 .CFUserTextEncoding
-rw-----@  1 fweber  staff 73732 Jan 19 21:13 .DS_Store
drwxr-xr-x   2 fweber  staff    68 Nov 28 2012 .InstallAnywhere
-rw-r--r--   1 fweber  staff 2634 Dec 19 20:26 .QtGrace_Settings.ini
drwx-----  8 fweber  staff   272 Jan 22 12:11 .Trash
-rw-----   1 fweber  staff 1388 Jan 16 19:28 .Xauthority
-rw-r--r--   1 fweber  staff 1617 Nov 10 2014 .Xdefaults
-rw-r--r--   1 fweber  staff  457 Nov 10 2014 .Xresources
drwxr-xr-x   4 fweber  staff   136 Feb 15 2010 .a2ps
-rw-r--r--   1 fweber  staff  910 Jan 10 18:58 .aspell.en.prepl
-rw-r--r--   1 fweber  staff 1978 Jan 10 18:58 .aspell.en.pws
-rw-----   1 fweber  staff 6752 Jan 22 12:14 .bash_history
-rw-r--r--   1 fweber  staff  671 Jan 12 19:34 .bash_profile
drwx----- 33 fweber  staff 1122 Jan 12 14:11 .bash_sessions
-rw-r--r--   1 fweber  staff 2987 Jan 12 17:39 .bashrc
-rw-r--r--   1 fweber  staff 3050 May 18 2016 .bashrc_backup
-rw-r--r--   1 fweber  staff 3006 Nov 10 2014 .bashrc~
drwxr-xr-x   5 fweber  staff   170 Jan 21 12:02 .bluefish
drwxr-xr-x   3 fweber  staff   102 May 24 2013 .cache
```

Access rights and file system permissions

```

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[grizzly: ~/] (+1) > ls -al
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```

user others

 group

d = directory, l = link, + = A(ccess) C(ontrol) L(ist)

rwX permissions for ugo

Unix/Linux Commands	Description	
wc	Word and bite count	
head	Display first lines of a file	
tail	Display the last part of a file	
more	View content of a text file	
less	Similar to more, but allows backward/forward movement in a file	
mkdir	Make directory	
rmdir	Remove directory	
rm -rf	Remove	
rm *.f, rm *.pdf		
passwd	Change password	
grep	Print lines matching a pattern	
grep "string" file		
h, history	Display history list	
! 123	Repeat command line # 123	

Unix/Linux Commands	Description
chmod	Change file modes
chmod u-rwx file/directoryName	
chmod ugo+r file/directoryName	
Compiling a numerical program	
gfortran -o prog.o prog.f	Fortran 77 program
gfortran -o prog.o prog.f90	Fortran 90 program
cpp -o prog.o prog.cpp	C++ program
Running the program	
./prog.o	Output written to screen
Redirecting screen (data) output	
>	Pipe (redirect) output
./prog.o > output.dat	Redirect screen output to file
ls -a /home/p317/ > print.txt	
enscript -o print.ps print.txt	

Unix/Linux Commands	Description
Connecting to remote machines	
ssh	Open secure shell (SSH) client
ssh -X username@hostname	
sftp	Secure file transfer program
sftp username@hostname	
put	Transfer files from local to remote machine
get	Transfer file from remote to local machine
pwd	Print working directory on <u>remote</u> machine
! pwd	Print working directory on <u>local</u> machine
ls	Listing on <u>remote</u> machine
! ls	Listing on <u>local</u> machine

Unix/Linux Commands	Description
Printing	
lp, lpr	lp -d printername filename.ext
enscript	Convert text files to postscript & syntax coloring
enscript -o print.ps code.f90 enscript --highlight=f90 --color=1 -o print.ps code.f90	
a2ps	Convert text file to postscript & syntax coloring
a2ps -o pint.ps textfile.txt	
File compression	
gzip, gunzip	Compressing/decompressing files
bzip2, bunzip2	Compressing/decompressing files
Creating archive files	
tar	
tar -xzf	x=extract all files from archive file
tar -czvf ../backup.tgz .	c=create archive file
tar -czvf ~/bup/backup.tgz *.f	z=gzipped, v=verbose, f=filename
tar -tzvf backup.tgz more	t=list archive content
tar -cjvf ../backup.tar.bz2 .	Use bzip2 compression mode