

Quick Tour of Linux & IDL

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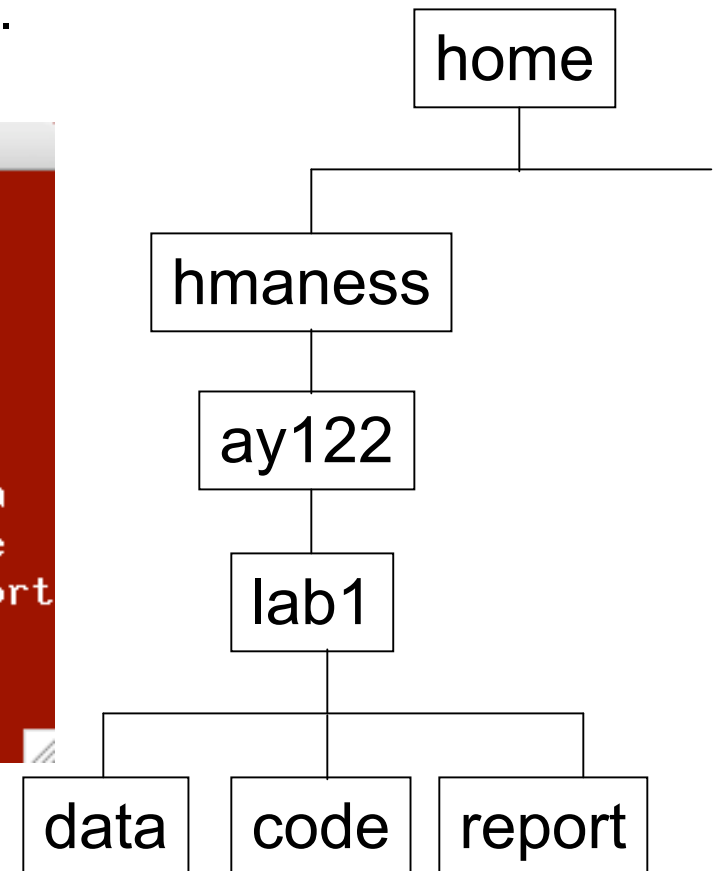
Additional information in Carl's Unix & IDL handouts

Essential Linux Knowledge

Directory Tree: stay organized!

- Example:
 - Login with user name and password.
 - Open a terminal (right-click).
 - Display your present working directory.
 - Make a directory tree.

```
aquarius>/home/hmaness% pwd
/home/hmaness
aquarius>/home/hmaness% mkdir ay122
aquarius>/home/hmaness% cd ay122
aquarius>/home/hmaness/ay122% mkdir lab1
aquarius>/home/hmaness/ay122% cd lab1
aquarius>/home/hmaness/ay122/lab1% mkdir data
aquarius>/home/hmaness/ay122/lab1% mkdir code
aquarius>/home/hmaness/ay122/lab1% mkdir report
aquarius>/home/hmaness/ay122/lab1% ls
code/ data/ report/
aquarius>/home/hmaness/ay122/lab1%
```



Directory Navigation

- Open a text file in Emacs in the code directory. Save the file & exit Emacs.
- Move the text file to the report directory.
- Suppose you change your mind and want copies of the text file in both directories. Copy the file ending in .txt back to the code directory.
- Suppose you don't want to include the text file in your report directory after all. Remove it.

```
xterm
aquarius>/home/hmaness/ay122/lab1/code% emacs dummy_file.txt &
[1] 20947
aquarius>/home/hmaness/ay122/lab1/code%
[1] Done
aquarius>/home/hmaness/ay122/lab1/code% ls *.txt
dummy_file.txt
aquarius>/home/hmaness/ay122/lab1/code% mv *.txt ../report
aquarius>/home/hmaness/ay122/lab1/code% cd ../report
aquarius>/home/hmaness/ay122/lab1/report% ls
dummy_file.txt
aquarius>/home/hmaness/ay122/lab1/report% cp *.txt ../code
aquarius>/home/hmaness/ay122/lab1/report% rm dummy_file.txt
rm: remove regular file `dummy_file.txt'? y
aquarius>/home/hmaness/ay122/lab1/report% ls
aquarius>/home/hmaness/ay122/lab1/report% █
```

```
emacs@aquarius.ugastro.berkeley.edu
File Edit Options Buffers Tools Help
Here is some text I've written.
u:-- dummy_file.txt (Parindent Fill)--L1--C30--All
Wrote /home/hmaness/ay122/lab1/code/dummy_file.txt
```

Other Essential Commands

- Display documentation on a specific command: man
% man ls
- Print the contents of a file in double-sided mode
% lp -o duplex dummy_file.txt
- View the contents of a text file one screen at a time
% less dummy_file.txt
- Log in from an xterm at home: ssh
% ssh hmaness@ugastro.berkeley.edu
- Abort the current task & regain user control of a terminal
<Ctrl>+c
- Open IDL:
% idl

Essential IDL Knowledge

Variable types & arrays

```
IDL> print, 3*5
      15
IDL> a = 3*5
IDL> help, a
A          INT          =          15
IDL> a = 3*5.0
IDL> help, a
A          FLOAT        =          15.0000
IDL> a = [1,2,3,4,5,6]
IDL> print, a, 2*a
      1      2      3      4      5      6
      2      4      6      8     10     12
IDL> b = sqrt(a)
IDL> print, b
      1.00000      1.41421      1.73205      2.00000      2.23607      2.44949
IDL> c = a^0.5
IDL> print, max(b-c) & print, min(b-c)
      0.00000
      0.00000
IDL> print, total(b)
      10.8318
IDL> █
```

More on arrays, for loops & where

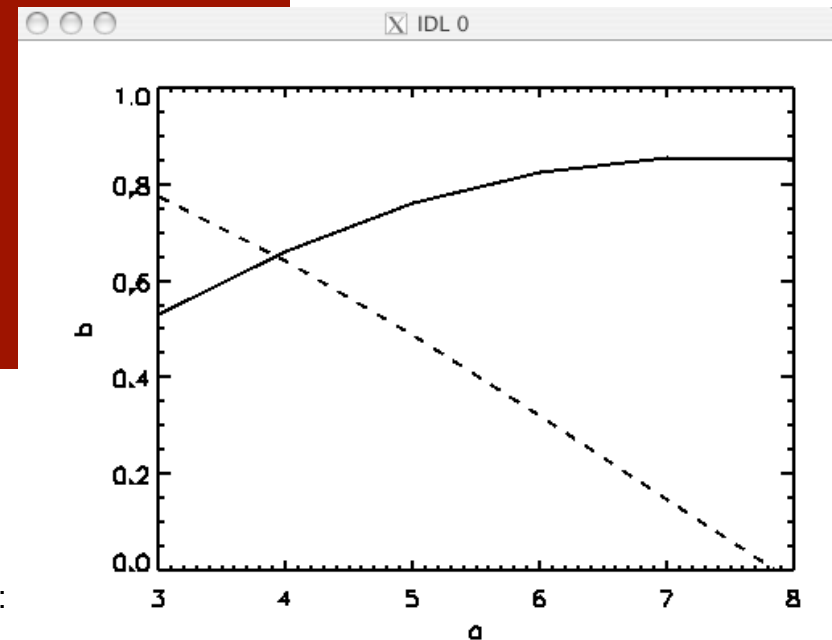
```
IDL> a = fltarr(6)
IDL> print, a
0.00000 0.00000 0.00000 0.00000 0.00000 0.00000
IDL> a = findgen(6)
IDL> print, a
0.00000 1.00000 2.00000 3.00000 4.00000 5.00000
IDL> a = a+3
IDL> print, a
3.00000 4.00000 5.00000 6.00000 7.00000 8.00000
IDL> print, a[0], a[5]
3.00000 8.00000
IDL> print, a[2:4]
5.00000 6.00000 7.00000
IDL> for i=0, n_elements(a)-1 do print, i, a[i], a[i]^2
0 3.00000 9.00000
1 4.00000 16.0000
2 5.00000 25.0000
3 6.00000 36.0000
4 7.00000 49.0000
5 8.00000 64.0000
IDL> index_threshold = where(a gt 4.5)
IDL> print, index_threshold
2 3 4 5
IDL> print, a[index_threshold]
5.00000 6.00000 7.00000 8.00000
IDL> z = fltarr(3,2)
IDL> print, z
0.00000 0.00000 0.00000
0.00000 0.00000 0.00000
IDL>
```


Plotting and documentation

```
IDL> b1 = sin(a/5.) / exp(a/50.)
IDL> plot, a, b1
IDL> ?
% ONLINE_HELP: Starting the IDL online help assistant.
IDL> plot, a, b1, xtitle='a', ytitle='b'
IDL> b2 = cos(a/5.) / exp(a/50.)
IDL> oplot, a, b2, line=2
IDL> psopen, 'myplot.ps'
% Compiled module: PSOPEN.
IDL> plot, a, b1, xtitle='a', ytitle='b'
IDL> oplot, a, b2, line=2
IDL> psclose
% Compiled module: PSCLOSE.
IDL> $ls *.ps
myplot.ps
IDL> doc_library, 'psopen'
% Compiled module: DOC_LIBRARY.
```

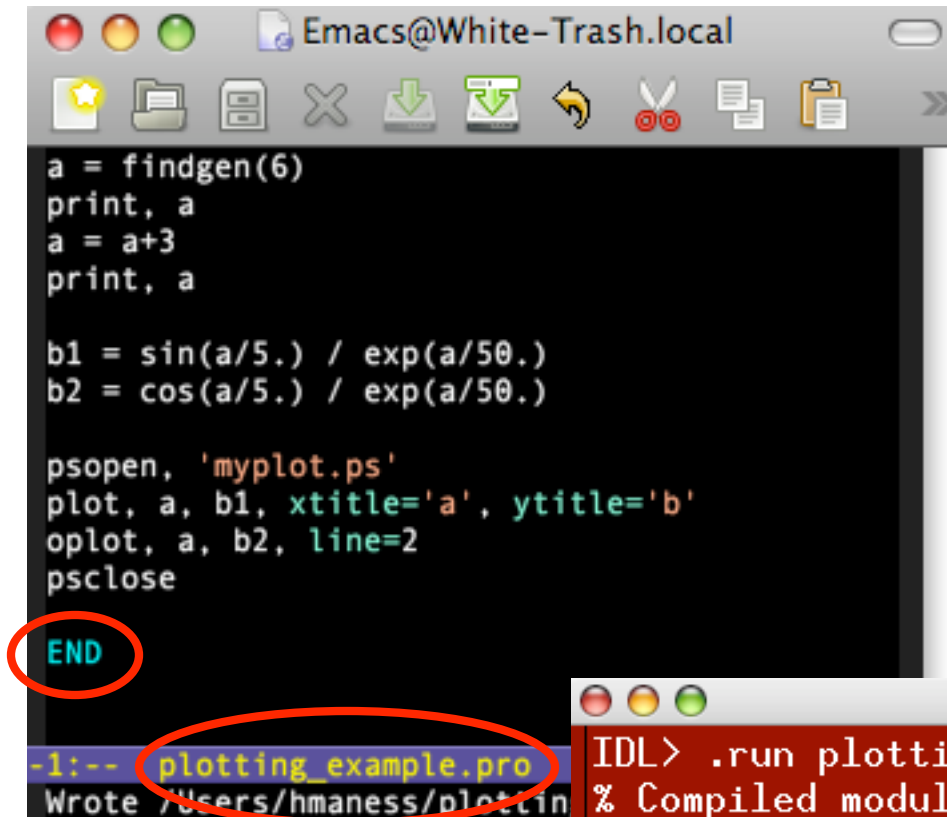
← Look at the documentation for plot (a built-in function)

↑ Look at the documentation for psopen (a user-defined function)



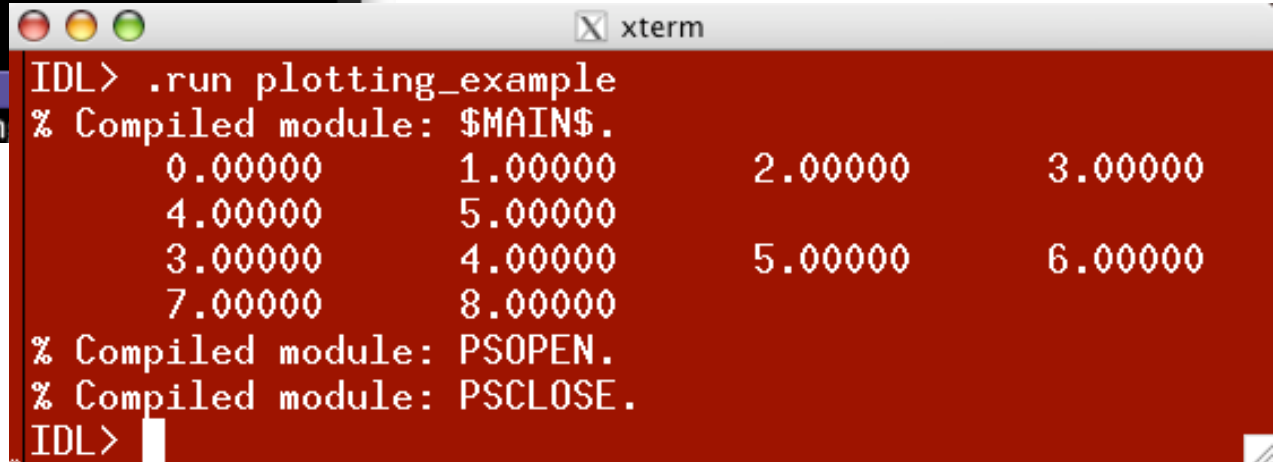
* You can look at the postscript file with Ghostview (from a terminal):
% gv myplot.ps &

Writing main programs



```
Emacs@White-Trash.local  
a = findgen(6)  
print, a  
a = a+3  
print, a  
  
b1 = sin(a/5.) / exp(a/50.)  
b2 = cos(a/5.) / exp(a/50.)  
  
psopen, 'myplot.ps'  
plot, a, b1, xtitle='a', ytitle='b'  
oplot, a, b2, line=2  
psclose  
  
END  
-1:-- plotting_example.pro  
Wrote /Users/hmaness/plottin
```

← Copy selected commands into emacs. Name the file plotting_example.pro . Type “end” at the end of the file. Save your file and run your new program in IDL.



```
xterm  
IDL> .run plotting_example  
% Compiled module: $MAINS$.  
0.00000 1.00000 2.00000 3.00000  
4.00000 5.00000  
3.00000 4.00000 5.00000 6.00000  
7.00000 8.00000  
% Compiled module: PSOPEN.  
% Compiled module: PSCLOSE.  
IDL>
```