ASTRONOMY 300 AUTUMN 2019

Introduction to Programming for Astronomical Applications

Dr. Toby Smith

Astronomy and Physics Building (PAB) C338

Email: pikaia@uw.edu

Office Hours: Email me to set up a time.

Website: Canvas

Class Meetings: Mon and Wed from 1:30 - 2:50 in PAB B360.

Background: This course offers an introduction to exploring, manipulating, and displaying astronomical data using modern programming languages. Python will be our primary language, but other topics such as the AWK, the LATEX scientific publishing package, and regular expressions will be covered.

Recommended for astronomy majors planning to take 400-level astronomy courses, to peruse individual research projects, or to apply for Research Experience for Undergraduate appointments (REUs). The examples used in class and assigned as homework will be specific to the field of astronomy.

Assignments: There will be assignments handed out in class. Some weeks will have two assignments, some only one. The due dates will depend on the assignment. No late work will be accepted.

Grading: Grades for the class will be based on the homework assignments. Here are no exams in the course, final or otherwise, but there is a midterm and final in-class project.

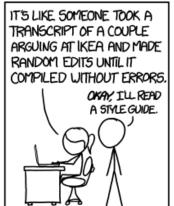
Course texts: All the course materials will either be online or handed-out in class. There is no textbook for the class.







IT'S LIKE A SALAD RECIPE



Unix/Linux Command Reference



File Commands

ls - directory listing

ls -al - formatted listing with hidden files

cd *dir* - change directory to *dir*

cd - change to home

pwd - show current directory

mkdir dir - create a directory dir

rm file - delete file

rm -r dir - delete directory dir

rm -f file - force remove file

rm -rf dir - force remove directory dir *

cp file1 file2 - copy file1 to file2

cp -r dir1 dir2 - copy dir1 to dir2; create dir2 if it
doesn't exist

mv *file1 file2* - rename or move *file1* to *file2* if *file2* is an existing directory, moves *file1* into directory *file2*

ln -s file link - create symbolic link link to file

touch file - create or update file

cat > file - places standard input into file

more file - output the contents of file

head file - output the first 10 lines of file

tail file - output the last 10 lines of file

tail -f *file* - output the contents of *file* as it grows, starting with the last 10 lines

Process Management

ps - display your currently active processes

top - display all running processes

kill pid - kill process id pid

killall proc - kill all processes named proc *

bg – lists stopped or background jobs; resume a stopped job in the background

fg - brings the most recent job to foreground

fg n - brings job n to the foreground

File Permissions

chmod *octal file* - change the permissions of *file* to *octal*, which can be found separately for user, group, and world by adding:

- 4 read (r)
- 2 write (w)
- 1 execute (x)

Examples:

chmod 777 - read, write, execute for all

chmod 755 - rwx for owner, rx for group and world For more options, see **man chmod**.

SSH

ssh user@host - connect to host as user

ssh -p port user@host - connect to host on port
port as user

ssh-copy-id user@host - add your key to host for
user to enable a keyed or passwordless login

Searching

grep pattern files - search for pattern in files
grep -r pattern dir - search recursively for
pattern in dir

command | grep pattern - search for pattern in the
output of command

locate *file* - find all instances of *file*

System Info

date - show the current date and time

cal - show this month's calendar

uptime - show current uptime

w - display who is online

whoami - who you are logged in as

finger *user* - display information about *user*

uname -a - show kernel information

cat /proc/cpuinfo - cpu information

cat /proc/meminfo - memory information

man *command* - show the manual for *command*

df - show disk usage

du - show directory space usage

free - show memory and swap usage

whereis app - show possible locations of app which app - show which app will be run by default

Compression

tar cf file.tar files - create a tar named file.tar containing files

tar xf file.tar - extract the files from file.tar
tar czf file.tar.gz files - create a tar with
Gzip compression

tar xzf file.tar.gz - extract a tar using Gzip
tar cjf file.tar.bz2 - create a tar with Bzip2
compression

tar xjf file.tar.bz2 - extract a tar using Bzip2
gzip file - compresses file and renames it to
file.gz

gzip -d file.gz - decompresses file.gz back to file

Network

ping host - ping host and output results

whois domain - get whois information for domain
dig domain - get DNS information for domain

dig -x host - reverse lookup host

wget file - download file

wget -c file - continue a stopped download

Installation

Install from source:

./configure

make

make install

dpkg -i *pkg.deb* - install a package (Debian)

rpm -Uvh pkg.rpm - install a package (RPM)

Shortcuts

Ctrl+C - halts the current command

Ctrl+Z - stops the current command, resume with

fg in the foreground or bg in the background

Ctrl+D - log out of current session, similar to exit

Ctrl+W - erases one word in the current line

Ctrl+U - erases the whole line

Ctrl+R - type to bring up a recent command

!! - repeats the last command

exit - log out of current session

* use with extreme caution.

