UNIX Handout

Adapted from Dr. Toby Smith

The first thing you need to know is that UNIX is based upon the idea of a stream. Everything is a stream, or appears to be. Device drivers look like streams, terminals look like streams, processes communicate via streams, etc... The input and output of a program are streams that you can redirect into a device, a file, or another program.

`STDIN` Standard input is data going into a program
`STDOUT` Standard output is the stream of output data

Make a subdirectory for Astro192

```
% mkdir Astro192
```
Make a directory

```
% cd Astro192
```
Change directory to Astro192

```
% pwd
```
Show the current directory

1. What is the path you are currently in?

```
% ls
```
List directory

```
% cd ..
```
Back one level

```
cd = cd ~ = cd /astro/users/you
```

Lets get some files to work with

```
% wget http://www.astro.washington.edu/groups/premap/diy/po/StarData.tar.gz
```

Untar the big file

```
% tar –xzvf StarData.tar.gz
% cd StarData/
```
Move into the directory containing StarData files

Looking at files

```
% ls
% ls -l
```
List a directory in long (detailed) format

```
% cat StarHeader.txt
% more StarHeader.txt
% less StarHeader.txt
```

2. What's the difference between cat, more, and less?

```
% cp StarHeader.txt junk.dat
```
Copy files

3. Explain what happened in a sentence.

```
% mv junk.dat junque.dat
```
Rename files

4. Explain what happened in a sentence.

```
% rm junque.dat
```
Delete file (NO RECOVERY!)

5. What command would you use to tell if junque.dat exists in the current directory?

[TAB] Completion

```
% less B[TAB]
[UP] [DOWN] arrows
```
[TAB] means hit the tab button
Command history

Untar the big file

```
% less BrightStars.dat
% head BrightStars.dat
% tail BrightStars.dat
```

6. What's the difference between less, head, and tail?

```
% head -100 BrightStars.dat
```
Everything is a stream

7. What does -100 do? Try other numbers.

```
% head -100 BrightStars.dat > small.dat
```
(>) creates file, overwriting old

8. Explain the above line in a sentence.

```
% wc BrightStars.dat
```
Number of lines, words, and bytes

9. How many lines are in BrightStars? How many lines are in small.dat? Provide the command you used.

```
% wc small.dat
% tail -10 BrightStars.dat >> small.dat
% wc small.dat
```
(>>) appends data to file

10. Explain what you just did to small.dat.

Searching Streams - grep wildcards (*), (?), and (.)

```
% grep 'magnitude' *.txt
```

pipes (|)

11. Explain the each command below in its own sentence.

```
% cat small.dat | grep '5.5'
% cat small.dat | grep '5.5' | wc
% cat small.dat | grep '^B0028'
% cat small.dat | grep '1\.6$'
```

Sorting Streams - sort

```
% sort -k 5 small.dat | more
```
Alphabetical sort

```
% sort -n -k 5 small.dat | more
```
String Numerical sort

```
% sort -g -k 5 small.dat | more
```
General Numerical sort

12. What does –k 5 do? Try another number to check.

13. What are the differences in the output using k, n, and g?

```
% sort -r -g -k 5 small.dat | more
```
Reverse General Numerical sort

```
% cat BrightStars.dat | grep '5\.50' | sort -n -k 8 | more
```

14. Explain the above command in a sentence.