Newcastle University #nclswc

Agenda

Monday October 22nd
09:15 - 09:45 What we actually know about developing software, and why we believe it's true - Mike
09:45 - 12:30 The Unix shell - Steve
12:30 - 13:30 Lunch
13:30 - 15:30 Version control - Mike
15:30 - 17:00 The basics of Python - Steve
17:00 - 19:00 Gathering at the Crows Nest - All!

Tuesday October 23rd
08:30 Room opens
09:00 - 12:30 Continuing Python programming
- Round 1 (Functions) Steve
- Round 2 (Testing) Mike

12:30 - 13:30 Lunch
13:30 - 15:30 Using relational databases - Steve
15:30 - 17:00 Putting it all together - Mike

Introduction to the Shell

…simple commands

Quick Test – who knows what these do

1. cd .., mkdir tmp, cp -r a b
2. cat file | head -2, sort file > sorted
3. chmod g+wx myProgram
4. grep -w ‘the’ myDocument.txt, find . -name next.txt
5. ps, top, fg, bg
6. echo $HOME, set, export $MYVAR
7. ssh me@mycomputer.com
8. for i in `cat textfile`; do echo $i; done | sort | uniq

Grab files

Download file from:
http://tinyurl.com/8aqwhea

Unzip file, open terminal window and navigate to the root directory of the files downloaded

What is The Shell?

- A powerful way to perform work on a computer through a text interface
  - Run programs
  - Control how the programs work
- Ability to move around between different directories folders on a computer
  - Create folders
- Perform sequences of commands to achieve even more complex work
- There are many choices for which shell to use
- The most popular shell is bash (bourne again shell)

File and directory commands

who / who am i – tell me who I'm logged in as
pwd – where am I (currently) in the directory structure
ls – list the current directory (*, -F, -a, -s)
cd – change directory

Directory = folder

mkdir – make a new directory
nano – easy text editor

emacs, vi

rm – delete file

gone forever

rmdir – delete directory
mv – move something
cp – copy something (-r)
cat – display contents of a file
sort – sorts the contents of a file
head – show first lines of a file / tail – shows end

File Access

Who can read my files? Who can write to them?

ls -l – list files and attributes (-h)
chmod – change access rights on file
(u – user, g – group, o – other, a – all)
(+ give right, - remove right, = set right)
(r – read, w – write, x – execute)

	user	group	other
read	✔	✔	✗
write	✔	✗	✗
execute	✗	✗	✗

ls -l myfile.txt
-rw-r----- 1 nasm3 staff 342041 9 May 16:27 myfile.txt

Pipes and Filters

All shell commands produce text output
All shell commands can take text input

We can connect the output from one command to the input of the next command. This is called a pipe
{first command} | {second command}

; - run one command after another

Redirecting to files:
{command} > {output file}
{command} < {input file}
{command} >> {output file} # append

Other useful commands: split, cut, uniq, wc, …

Finding Things

grep – find sequence of characters
- -w – word boundaries
- -n – which lines is the sequence on?
- -i – case insensitive
- -v – which lines don't contain…

find – find files in the directory structure
(-type, -maxdepth, -empty, -perm, -name, -exec)

Job Control

ps – list what I'm running
^z – Temporary escape from the current command
fg – foreground a running task
bg – background a running task
kill – kill off a running task
jobs – list current tasks
top – live task information
& - start job in the background
nohup – run job in background even if I disconnect from computer

Variables

set – what are the currently known variables
echo – echo some text back to you
{name}={value}
export {name} – persist variable beyond this shell

Secure shell

ssh – secure connection to remote computer
scp – secure copy file

ssh {user}@{computer} '{command}'