THE UNIVERSITY OF WESTERN AUSTRALIA

CITS2003/CITS4407 Open Source Tools and Scripting

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THE UNIVERSITY OF WESTERN AUSTRALIA

Lecture 0
Introduction

Who we are

- Assoc Prof Michael Wise – Coordinator, lecturer
- Daniel Smith – Senior Lab Facilitator
- Isaac Bergl – Lab Facilitator
- Arya Gerami Zadegan – Lab Facilitator

What is CITS2003/CITS4407 About?

- The unit is being offered in undergrad (CITS2003) and postgrad (CITS4407) versions. Some differences in Assignment 2 and the final exam.
  - *Will refer to OSTS for simplicity*
- Open Source philosophy/Unix philosophy
  - *Open source tools, and tool ensembles (pipelines), power much of the world*
- Creating and using shell scripting to combine software tools

Advisable Prior Study

- There are no formal perquisites for CITS2003/CITS4407 OSTS
- You will learn lots of useful things in OSTS, but if you have not done a prior programming unit before, such as CITS1401, the unit may be a stretch
  - *Computational Thinking*

Why Bother?

- Automate repetitive tasks
  - *Print 1 file using the GUI, no problem*
  - *Print 200 files ….*
- Rapid prototyping
  - *A quick and dirty solution right now may be all you need*

Demo

- I have a text file, called `Alice_in_Wonderland.txt` that contains the text of the book "Alice in Wonderland", Lewis Carrol. (Guttenberg Project)

http://teaching.csse.uwa.edu.au/units/CITS4407/L0_demo/Alice_in_Wonderland.txt

- I want to extract all the words (just sequences of letters), count the number of times each unique word appears, and then list the words in descending order of occurrence.
- Get together with others and come up with an estimate how long it would take to code up a solution.

Course Outcomes

- Understand the Open Source, and in particular Unix, philosophy
- Understand what shell scripting is suited for, and what it's not that well suited for
- Confidently use a number of the common Unix/Linux tools
- Be able to write Bash/Shell Tools scripts to:
  - *Solve small problems*
  - *Automate repetitive computational tasks*

Bash as a Programming Language

- We don't assume you know a programming language coming into this unit, but knowing something of Python, Java, C, etc, will help
- Bash is arguably the most used of the Unix shells, found on all Linux machines, Mac OSX (zsh is largely Bash, but not the same).
- Why Shell rather than, say, Python/Java/C?
  - *Shell scripting very good for quickly writing "glueware"*

Textbook, Web page and Resources

- There is no set text for this unit. One useful free (creative commons license) ebook is, "The Linux Command Line: A Complete Introduction" (5e), William E. Shotts Jr, 2019 http://linuxcommand.org/tlcl.php
- The Awk material is covered by "The GNU Awk User's Guide (5e)", https://www.gnu.org/software/gawk/manual/gawk.html
- The web pages for the units are:

  http://teaching.csse.uwa.edu.au/units/CITS2003

  http://teaching.csse.uwa.edu.au/units/CITS4407/
- There is a Resources tab on the unit web page

Implementations

- Laptop only, not tablets (or phones)
- Linux
  - *Ubuntu preferred, V 22.04. Bash is generally the default shell*
- Mac OSX
  - *Terminal.app gives you zsh, which is close to Bash, but not identical. Some Unix commands also slightly different*
    - FreeBSD versus GNU
  - *Better to install and use Docker.*
- Windows
  - *Install and use Docker on top of Windows Subsystem for Linux (WSL)*

Organisation

- 2 x 1hr lectures a week
  - *A Lecture may take more than 1 slot*
  - *Slots are, in fact 45 mins, starting on the hour*
  - *If you can, bring your laptop*
- 1 programming lab per week (2 hrs)
  - *Lab demonstrators available*
  - *Starts Week 2 (watch out for public holidays)*
  - *Check your Timetable; multiple time slots across the week*

Labs - Expectations

- Labs are not assessed, but if you want to do well in the unit you should attend at least one lab session per week starting in Week 2
  - *Some learning in the unit will only take place in labs*
- You are welcome to attend as many lab sessions as you want
  - *preference to those timetabled to be there*
- You are welcome to bring your own laptop with Bash/Unix Tools/Docker installed
- **This is your time to work on relevant exercises from worksheets with help at hand**

Assessment

- Assessment is based on both
  - *Understanding of fundamental concepts*
  - *Practical problem-solving and programming skills*
- Two programming projects
  - *Assignment 1 due at the Mon. of Week 8 (worth 20%)*
  - *Project 2 due at the Mon. of Week 12 (worth 20%)*
- Two Tests
  - *1hr online, open book in-semester test Week 7 during Mon. lecture slot (10%)*
  - *2hr face-to-face, open book (BYO notes) test in the exams period (50%)*

Getting Help

- HelpOSTS (link on unit web page)
- Labs
- Textbook (see Resources)

- Above all, seek help early.

Svengraph, WikiMedia

Do Something Useful in Week 1

- If you are new to UWA
  - *Get your computer account name and password*
  - *Organize your UWA email account*
  - *Find out which lab you're in*
- Check that you have Ubuntu 22.04 (Linux), or install Docker(OSX), WSL + Docker (Windows)
  - *Ubuntu 20.04 also fine. Make sure it includes gawk*
  - *Will happen in Lab 1 in Week 2*

Other Stuff

- Interesting Things Page! (Prize every so often for best contribution – as judged by me 😉)
- Prize for any errors detected!
- I have set slides in Century Schoolbook font (with some Courier and Arial for computer code and meta-language). If you have trouble reading it, please let me know
  - *Accessibility is important*

Other Stuff

- "10 Signs You Will Suck at Programming"
  - *Article linked to Interesting Things page*
  - *Has really great advice about what you need to succeed at programming*
  - *READ IT*
- Engage with the unit!!!
  - *Good data to show that if you turn up to lectures and generally engage with the unit, you will do better (Drouin, 2014, Edwards &Clinton 2018) – see Interesting Things.*
- Have fun!!!

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PheobeA - Redbubble