

COSC3500 Tutorial 1

3rd August 2021

Agenda

- Accessing Linux cluster via SSH
- Compiling and running a simple C program
- Thinking about your development environment
- Considering your project topic

SSH access

- Linux/Mac: `ssh` command in terminal
- Windows: PuTTY application / `ssh` command in Powershell
- For this tute, accessing:
- `getafix.smp.uq.edu.au`
- Note: if outside UQ network, either need to be on UQ VPN or hop-through via e.g. `moss.labs.eait.uq.edu.au`

Useful SSH info

- By default, `ssh` will use password authentication: gets annoying after a while
- Can use key-based authentication instead:
- - Linux/Mac: check out `ssh-keygen` and
- `ssh-copy-id` commands
- - Windows: ㄟ_(ˊ)_ ㄟ Google is your friend!

Useful SSH info II

- Can setup an SSH config file under:
- `~/.ssh/config` to register hostnames
- E.g. (my config file):

Host getafix

Hostname getafix.smp.uq.edu.au

User uqjbish3

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Host moss

Hostname moss.labs.eait.uq.edu.au

User uqjbish3

- Now I can just type: `ssh <hostname>`

Another useful program

- Q: How do I copy files to the remote Linux machine?
- A:
- - Linux/Mac: `scp` or `rsync`. Bonus points for `scp`, integrates with SSH config
- - Windows: **WinSCP**, FileZilla, or sync in an IDE...

Radioactive Decay simulation

- NetLogo -> Chemistry/Physics -> Radioactive -> Decay
- <http://netlogoweb.org/launch#http://netlogoweb.org/assets/modelslib/Sample%20Models/Chemistry%20&%20Physics/Radioactivity/Decay.nlogo>
- The model takes inputs:
 - Number of particles (randomly assign their coordinates)
 - Decay chance (At each time step, the chance of decaying)
- And outputs:
 - A movie showing the decay of particles

Radioactive Decay simulation

- `decay.c` → outputs a .h5 file of particle time series:
N is number of particles, T is number of time steps
- `decay.py` → parses .h5 file and outputs animation of the decay
- How could you parallelise the code in `decay.c` ?
- Any issues you can spot?

Acquiring needed python libraries

- Terminal:
- `python3 -m venv <venv_dir>`
- `source <venv_dir>/bin/activate`
- `pip install h5py numpy matplotlib`
- Then run the program: `python3 decay.py`

Things to think about

- What kind of development environment are you going to use? Some options:
 - - Local IDE with SCP sync: edit all code / scripts locally and only interact with command line to submit jobs
 - - Do everything on the cluster: e.g. with vim/nano/emacs (honorable mention goes to screen/tmux)
- Version control: simple local backups, git, etc...
- My suggestion for both of the above: **find something that works for you and stick with it!**
- (Talking from experience, you can waste a silly amount of time trying to optimise your workflow!)

Things to think about II

- Project topic!
- I'm going to add one to the list already that I (Jordan) can give some specific direction on: **genetic algorithm**. Will create a thread on Ed discussion board about this :)