Part II

Linux networking

ssh

- To log in to another computer, use:
  $ ssh pmb39@tycho
  pmb39@tycho's password: [*Enter password.*]
  pmb39@tycho $
  and you will get a terminal that is running on the remote machine
  (assuming you have appropriate permissions).
- Here you can run any programs that are installed on that
  computer.
- Any files you create will be on that system only (unless any
  directories are somehow shared with others).

X-forwarding

- If you try to run a GUI program via ssh:
  ```
  pmb39@apollo $ ssh pmb39@tycho
  pmb39@tycho $ gedit
  Cannot open display:
  pmb39@tycho $
  ```
- By default `ssh` only opens a text-terminal. It does not forward GUI information from the remote machine. In order to do this, use:
  ```
  ssh -X pmb39@tycho
  ```
- However, the GUI of remotely running programs will usually run slowly because all the information must be transferred to your screen across the Internet. If possible, avoid needing to use `ssh -X` by learning how to use command-line based programs.

Secure copy

- The cp command above only works for files directly accessible on the same computer, i.e. anywhere you can cd to.
- To copy files from/to remote machines, use:
  pmb39@apollo $ scp settingsFile
              pmb39@login.hpc.cam.ac.uk:~/
  pmb39@apollo $ scp -r
              pmb39@login.hpc.cam.ac.uk:~/outputData ./
  to copy a settings file across, and then recursively copy the output back. (Each command is all one line.)
- One of the computers involved in the copy must be the one you are currently logged into.
- It is usually better to run scp on your local machine (but make sure you get the from/to files the right way round).

Stopping and pausing programs

- If you want to kill a running program, press Ctrl-C.
- This will not work if the programmer has disabled it (fairly unlikely).
- To pause a running program, press Ctrl-Z.
- To allow it to continue to run in the background, while you continue to use the terminal, type `bg`.
- If you need to put a program in the foreground again, type `fg`.
- To run a program and immediately background it, run it as:
  `xclock &`

Running multiple remote terminals

- You may need to open multiple terminals on a remote machine (e.g. one to compile, one to edit source-code, one to run simulations)
- You could open multiple ssh connections, or you can use a multiplexer.
- This turns one remote terminal (over one ssh connection) into multiple that you can switch between with keyboard shortcuts.
- I tend to use `screen`, but `tmux` and `byobu` are also available.
- Helpfully, the multiplexer continues running even if the `ssh` connection fails, and you can reconnect to the session later.

Compressing files/directories

- To compress many files and directories into a single "tar-ball", use
  tar:
  `$ tar -cjf myCode.tar.bz2 ./SourceCode/`
  `./SettingsFiles/`
- To unpack a tar-ball, use:
  `$ tar -xjf myCode.tar.bz2`
- See `man tar` for what these options mean.

CSC Network Specifics

Different Linux networks have their own ways of organising things, and the following are specific to the CSC Network.

More information can be found at `www-internal.lsc.phy.cam.ac.uk`

Please read this before coming to ask for help.

Home directories

- Your home directory is of the form `/home/raid/pmb39`.
- It is available on all CSC machines.
- You initially have 1GB of disk-space, and it is backed up daily.
- This should be used for code, settings files, your dissertation, and similar things that would cause major problems if lost.
- It should not be used for large amounts of data output that can easily be regenerated.
- Large amounts of data can be stored in the `/local/data/public` folders on all computers.
- These are mounted on all other machines as `/data/apollo` for example.
- Use `df -h` to check disk usage, or the `quota-local` command.

CSC computers

- `http://www-internal.lsc.phy.cam.ac.uk/systems.shtml` for a list of computers
- This includes details such as RAM, disk-space, Processor, ...
- Remember that most of these are someone's desktop.
- If you use all its processing power or memory, they will be annoyed...
- If you need to find a free computer, use `http://www-internal.lsc.phy.cam.ac.uk/mrtg` to see current processor usage.

Laptops

- If you want your own laptop to connect to the wired network, please contact it.helpdesk@phy.cam.ac.uk. They will need the MAC address from it.
- Use the ifconfig command to find the WiFi's MAC address.
- You can just use WiFi (eduroam or UniOfCam) but that will be slower.
- If you are using a laptop, the data on it is not automatically backed-up. Either back it up yourself, or connect to your CSC home directory using SAMBA.
- Details of how to connect are at
  http:
  //www-internal.lsc.phy.cam.ac.uk/network_files.shtml

Remote Access

- If you need to access the CSC network from outside the University network, then you need to use the University VPN.
- See http://www.uis.cam.ac.uk/vpn for details.
- Once on the VPN, connect using:
  $ ssh pmb39@apollo.lsc.phy.private.cam.ac.uk
- Alternatively, you can ssh via pmb39@linux.pwf.cam.ac.uk for which you will need your Raven password.

Remote Desktop

- As well as `ssh -X` you can access a complete remote desktop environment in Linux using VNC.
- Instructions are at
  https:
  //www-internal.lsc.phy.cam.ac.uk/remote_working.shtml
- However, this will be slower than ssh'ing at the command-line.

Printing in CSC

The main printer in CSC is:

- Maxwell-3: Colour A4/A3 printer in main corridor

Access is via DS-Print.
See https://help.uis.cam.ac.uk/service/printing
Or https://www-internal.lsc.phy.cam.ac.uk/printing.shtml