
Part I. Paper Administration Details

Quality Expectations

Part of the University's goal is preparing you for the professional world, and that includes an expectation of quality with regard to submitted work. Therefore, it is an implicit requirement that any submitted work look reasonably professional. Marks may be deducted for spelling, grammar and presentation for any work, or the work may be rejected and asked to be resubmitted.

University Policy on Plagiarism

You plagiarise when you use knowledge that has been created elsewhere without indicating the source of that knowledge. To understand the meaning of plagiarism it may be useful to ask yourself the question: 'Whose knowledge is it?' or 'Who created it?' All students have a responsibility to be aware of acceptable academic practice in relation to the use of material prepared by others and are expected to take all steps reasonably necessary to ensure no breach of acceptable academic practice occurs. You should also be aware that plagiarism is easy to detect and the University has policies in place to deal with it.

—<https://www.otago.ac.nz/study/academicintegrity/otago006307.html>

Academic Integrity and Academic Misconduct

Academic integrity means being honest in your studying and assessments. It is the basis for ethical decision-making and behaviour in an academic context. Academic integrity is informed by the values of honesty, trust, responsibility, fairness, respect and courage. Students are expected to be aware of, and act in accordance with, the University's Academic Integrity Policy [<http://www.otago.ac.nz/administration/policies/otago116838.html>].

Academic Misconduct, such as plagiarism or cheating, is a breach of Academic Integrity and is taken very seriously by the University. Types of misconduct include plagiarism, copying, unauthorised collaboration, taking unauthorised material into a test or exam, impersonation, and assisting someone else's misconduct. A more extensive list of the types of academic misconduct and associated processes and penalties is available in the University's Student Academic Misconduct Procedures [<http://www.otago.ac.nz/administration/policies/otago116850.html>].

It is your responsibility to be aware of and use acceptable academic practices when completing your assessments. To access the information in the Academic Integrity Policy and learn more, please visit the University's Academic Integrity website [<http://www.otago.ac.nz/study/academicintegrity>] or ask at the Student Learning Centre or Library. If you have any questions, ask your lecturer.

About this Paper

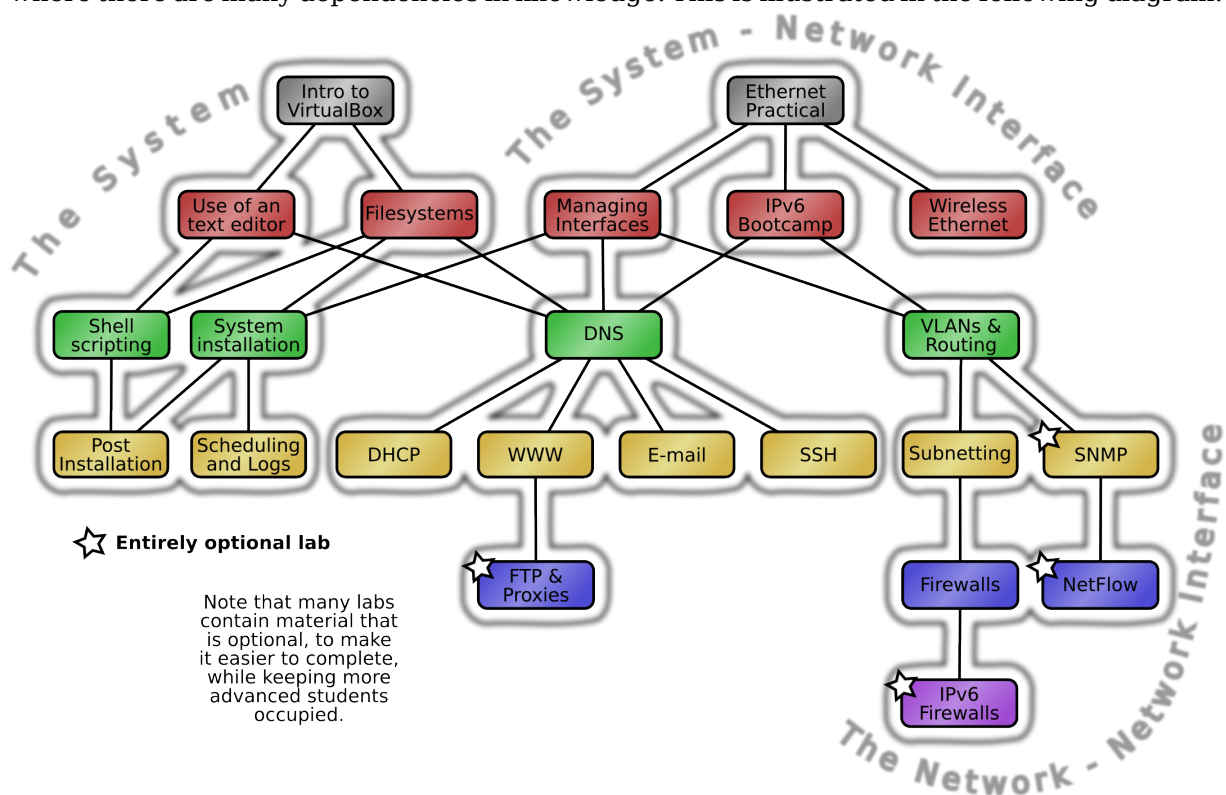
COSC301 is a paper about network management. We cover topics such as system administration using Linux, Ethernet, and network management using a typical router interface.

There are two labs per week, each two hours long. The reading for this paper is primarily to read the lab notes, which in total are large enough to constitute a good sized text-book, which you will likely find useful after the course as well.

Because of the diverse background of students coming into this paper, you should all make certain to work through the pre-lab material. This will ensure that you can log in, and have basic Linux/Unix experience; it is also important for getting everyone off to a smooth start without having login problems etc.

In order to stay up-to-date with events in the paper, you are expected to check your University email once a day also. If you are not using your University email address for your daily correspondence, it is your responsibility to have it forwarded. You can do this through the University webmail interface. If forwarding off-campus, you are required to ensure that a copy remains on-campus; that way if your off-campus email becomes unreachable for whatever reason, you still have it available locally.

You will have been used to papers previously where the structure of the paper was very linear: each lab depends on all the labs previously. That cannot be the case in a paper such as this where there are many dependencies in knowledge. This is illustrated in the following diagram.



About this Paper

Labs cannot be presented in a fully linear fashion, but there are dependencies. Students should not expect each lab to necessarily follow on from the immediately previous lab, but will use skills developed in some previous labs.

As you can see, many labs depend on DNS. This mirrors reality: many networks services, such as Web servers use DNS, but you don't need to know about FTP services in order to set up a SSH server. There are some broad themes however; you can break this paper into three parts: the first part introduces you to aspects of the individual system; the second part introduces you to network services run on servers for clients; and the third part looks at network services that run between devices such as routers, which clients have very little to do with.

So if you're feeling a bit lost, wondering how a particular lab relates to the previous lab, realise that it probably doesn't and that this mirrors real life, but that there are some labs that you will have needed to complete in order to progress onto others.

Typographical Conventions

As you find in any technical documentation, there are a number of typographical conventions you need to be familiar with to properly understand what is being presented to you.

To make computer text non-ambiguous from the surrounding prose angle quotes are used to show input text. So, for example, `localdomain.`. You can easily therefore tell that `localdomain` is to be entered with precisely one dot after it, and that the second dot is part of the surrounding text. The font is also changed to a monospace font.

The following is what you see when interacting with the shell or other program:

```
prompt$ you type this
Output from your command
A commentary about what is happening
Output from your command
prompt$ command filename
Question from running command? [y|n] y
Output from your command
```

When editing a file, you will see something similar to this. Note that when a file is being changed slightly your attention will be drawn to those areas that are highlighted.

```
... the ellipsis indicate omitted content
option wpad code 252 = string; bold indicates changes

subnet 192.168.1.0 netmask 255.255.255.0 {
  option wpad "http://webserver.example.com/wpad.dat";
}
```

The prompt may be different, depending on what you need to know. Sometimes, a directory might be shown, such as `/etc$`, in which case it is expected that the command be run from the directory `/etc`. The `$` is a common notation for **sh**-based shells (such as **bash** which you are all using by default) and means that the command is to be run as a normal user. A `#` would indicate that it is to be run as the root user, typically by using the **sudo** command.

Often you will need to enter something different than what the text is saying; the **filename** above for example. You are not expected to type in **filename**, but rather a filename, such as `/etc/resolv.conf`, as indicated by the surrounding text.

Beware though that different conventions may be used in on-line and printed documentation.

Exercise

To complete the lab work, you are reminded the important tasks as an exercise in order to make sure the system has worked. They will be indicated like this paragraph. Make sure you have completed them successfully!

We also want to draw your attention to different things in a variety of ways. For example:

Tip

This is used for a useful tid-bit to make your life easier.

Note

This is important as you may or may not need to take action.

Important

This is something that you ought to know or do.

Caution

This is something will cause you to make mistakes. Care should be taken.

Warning

HERE BE DRAGONS!

Pre-lab Material

Important

If you do nothing else in this lab, make sure you can at least log on to the lab machines at Lab F or E at the Computer Science department and familiarise yourself with the course website.

To prevent having to teach a large swath of introductory material in the first couple of weeks of the course, we have elected to create this pre-lab. You should do this (or at least ensure you are comfortable with the skills) before you come to the first lab, and make sure you are up to speed on the basics, such as Unix command-line basics. As many of the students in this course are Computer Science majors, many will already have the requisite knowledge covered in this pre-lab material. But please take the time to ensure you know what is covered here.

1. Logging in

You should be able to log in to the departmental lab machines using the same username and password as elsewhere in the University since we use the Student Desktop. There are some differences however, which will be pointed out when needed.

Once you have completed logging in, start up a web browser and navigate to the course homepage [<http://www.cs.otago.ac.nz/cosc301/>]. Here you will find news, lab errata, and other class resources. It would be a good idea to bookmark it for quick access.

2. Accessing a Unix prompt

With the recent shift from Unix based Operating Systems in the department there is a little more involved in getting access to a Unix terminal than previously

Open up **Powershell** or the **Command Prompt** (but don't use **Git Bash**) and follow the steps below:

```
$ wsl --status
It should report that the WSL 2 kernel is not found and that it is possible to run an
update. Please do so now:
$ wsl --update
A User Account Control window will pop up asking you to enter some details. Just click
cancel and go back to the Command Prompt. Running
$ wsl --status
should now print "Default version 2" so we're ready to install.
$ wsl --install -d ubuntu
It will download and install the Ubuntu Linux distribution. This will take a while.
Once it's done, it will prompt you for a username in the window it opened.
Just use 'csuser' as both the username and password (which you have to type twice.
Enter new Unix username: csuser
New password:
Retype new password:
Note, that your password will not be visible as you type it. You should now be logged
into your new Linux distro. The following commands should be run in the WSL terminal.
```


3. Reading Documentation

There is much documentation to be found on most Unix-like systems, such as Linux or Mac OS X. Most commands have a manual page, which you can get from the terminal prompt.

Lets say we want to know about a command called **ls**, which is a command for listing files (much like the **dir** command under DOS). Though there are **GUI** tools for this, where we're going in this course, there is no **GUI**. Manual pages are sorted under a number of sections, as described under the manual page for **man** manual page. If you see a notation like `man(1)`, then that means to look under section 1. Most of the time you don't need to specify a section, it will take the first match it finds.

```
$ man 1 ls
The section is optional
$ man ls
```

You can use the arrow keys, space, page up/down to navigate. When you're done, type **q** to exit. Notice how each manual page describes a brief synopsis about what the command does, its options with their meanings, various notes and other bits and pieces.

Have a look at the `man(1)` manual page and have a quick look at what sections there are. Most of what you'll need will be found in sections 1, 5 and 8.

4. Basic Unix Skills

If you don't have any experience working with Unix systems (as a user), then please work through a basic Unix tutorial, for example the first few sections of the Unix Shell [<https://oucs-teaching.github.io/2022-cosc202-shell-novice/>]module which was introduced in COSC202 last year.

There are many Unix tutorials available online, but the one linked above is a good starting point.

If you want to you can also look at the next lesson, Shell Extras, which will introduce you to some more advanced Unix skills.

5. Password stuff

You may have noticed that the password setup we used when creating our WSL user (`csuser`) is very insecure. This will be fine for our purposes as we are only using the WSL distro as a quick way to get a Unix terminal that we can play around with.

Industry-respected security expert Bruce Schneier has a good write-up on Real-World Passwords [http://www.schneier.com/blog/archives/2006/12/realworld_passw.html] and another on Choosing Secure Passwords [http://www.schneier.com/blog/archives/2007/01/choosing_secure.html] that you should read.