College of Engineering and Computer Science
Research School of Computer Science

Student Computing Environment

User Guide

2013

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Contents

Chapter 1

Introduction

This is an introductory manual for the Linux-based student computing environment provided in the Computer Science and Information Technology building computer laboratories. The computing environment is primarily used to support the teaching of courses taught by the Research School of Computer Science and some other departments. Access to and use of the computing environment is subject to University rules and regulations. These are provided in the School's *Student Handbook*.

The computing environment itself provides a great deal of information and help documentation, and there is no point in duplicating that material here. Instead, this document provides the starting point from where you can read and productively use that on-line documentation. It explains the general aspects of the computing environment, in order to give you a structured way of thinking about the system and its main components. Once you understand this structure, you should be able to make sense of the details provided in the on-line documentation.

If you find errata in this document, it would be greatly appreciated if you could send an e-mail detailing it to: helpdesk@cecs.anu.edu.au

The latest version of this document will always be available online at:

http://cs.anu.edu.au/files/CompEnv2011.pdf

Chapter 2

Computing facilities

2.1 ANU student computing environment

The Information Infrastructure Services program within the Division of Information (DOI) has the responsibility of providing and maintaining the *Information Commons* which includes the undergraduate computing environment at the ANU.

In particular they provide

- Unix-based laboratories, using Linux-based PCs,
- Macintosh-based laboratories, and
- Windows-based PC laboratories.

Details of the facilities provided, and the regulations that apply to their use, are available via **tabs** and *links* on the InfoCommons web page:

http://infocommons.anu.edu.au/

The page includes links to the online DOI helpdesk, InfoPlace information and the Student IT Guide. The Student IT Guide provides access to extensive information on all campus information services for students.

The teaching labs are heavily used during normal teaching hours for supervised laboratory sessions in particular courses. The relevant bookings are posted. Outside these times the laboratories are available for general use associated with undergraduate studies. Access to laboratories is controlled by your student card, and you may have access to some facilities and not others, based on your enrolment. Most laboratories have extended availability, and some laboratories may be available on a 24-hour basis (at least for part of the academic year).

The residential halls and colleges at the ANU provide extensive facilities to access the undergraduate computing environment. Details are provided by each residence. If you have your own personal computer you may thus be able to do some of your work from your desk (either at home or at your hall or college) over the Internet.

2.2 Rules and regulations

Use of the computing environment is subject to ANU Rules. Copies of the rules are posted in each of the InfoCommons laboratories. You should read these rules carefully. Indeed, you will be asked to acknowledge that you have read them before you are given access to the undergraduate computing environment.

The rules identify what you may and may not do within this environment, and identify the penalties for unacceptable use. Put informally, the power of the computing environment allows many opportunities for unacceptable behaviour! Even if unacceptable behaviour is perpetrated by only a small number of students, it can degrade the amenity of the environment for all users. Dealing with breaches of ANU Rules of behaviour can also take a considerable amount of our time. Accordingly, offenders often find us very short of understanding and kindness.

2.2.1 Laboratory Rules

There are a number of rules relating to acceptable use of the CSIT teaching labs which are posted up on the noticeboards in each lab. In particular, food and drink is forbidden in the labs. This is mainly to protect the computer keyboards and mice from crumbs and sticky drink spills but also to help keep these shared resources more hygenic.

Also, please note that under no circumstances are any cables to be unplugged from the wall sockets or from the computer equipment. This includes power cables, network cables, monitor cables and keyboard and mice cables. The computer monitors are not there for people to use on their laptops. A number of cable connectors have been damaged or destroyed by people unplugging them and then not re-installing them correctly. Also, many times incorrectly attached cables have caused further problems for subsequent users of the labs.

Even if you are a techno-geek god, others in the lab may follow your example but not have the same geek-foo as you and so fail to reattach cables correctly, or damage wall sockets and the cable connectors (and these do get damaged far too often).

2.3 CSIT Student Computing Environment

There are four InfoCommons laboratories in the CSIT building, in rooms N112, N113, N114, and the joint room N115–N116. Although known informally as ‘CSIT Linux Labs’ they are in fact part of the integrated ANU Information Commons (IC) computing environment and are subject to the relevant ANU Rules. A copy of these rules are provided in the Research School of Computer Science *Student Handbook*.

Much of the day-to-day management and local IT support of the computer systems in these laboratories is carried out by the College’s IT Support Group. The IT Support Group is located in a variety of locations throughout the College, but the staff most able to help with CSIT lab issues are located on the second floor of the CSIT building in rooms N244 (first preference) or N211.

2.4 Computer system overview

CSIT rooms N112, N113, N114 each contain 20 and N115–N116 contains 40 Linux workstations. In 2011, the workstations are new Intel based PCs running the Ubuntu 10.04 (April, 2010) "Lucid Lynx" distribution of the GNU/Linux Operating System, which has Long Term Support (LTS).

The workstations allow the work of editing, graphic display and computation to be performed locally on the CPU and memory of the workstation. Authentication of users (see section 2.5) and the maintenance of the users files are managed by a set of central UNIX-based servers.

2.5 Password-based access

Many of the facilities of the student computing environment require you to identify yourself. An obvious case in point is access to your electronic mail. To this end you are given a 'Username' and an associated password. Your Username is the same as your University ID, and will look as follows: `u1234567`, where `1234567` is replaced by your **seven-digit** *UniID*. Also, note the lower-case 'u' - this is very important for Unix-based logins.

Your Username has to be regarded as publicly known. For example, it may be used by the computer system to label printouts that you collect from a printer in a computing laboratory. In some courses you will submit assignments electronically and your assignment will be labelled with your Username along with your full name.

In contrast, your password must be regarded as secret and you must keep it secret. Just as you are required by credit-card agreements not to divulge your PIN to anyone else, you are required by ANU Rules not to divulge your password to anyone else.

To use a workstation in one of the laboratories you need to login to that workstation. An available workstation will display a login screen in which you may enter you Username and password, see Figure 2.1. You Username will be readable, however, each character in your password will be displayed as an asterisk to prevent others from viewing your password.

2.6 Remote Access

The CSIT Student Computing Environment includes a remotely accessible compute-server for students to log into from home, residential colleges, work, other computer labs, or from anywhere else on the Internet.

The remote access compute-server for student use is called "partch.anu.edu.au" and is accessible only via Secure SHell (ssh). To access this server, you will need to have a suitable ssh client program on your computer/laptop/PDA/mobile phone etc. One common "free" ssh client program for Windows and many PDAs and mobile phones is "Putty" - search for it on the web.

More details are available in the Remote Access chapter (chapter 11 on page 36).

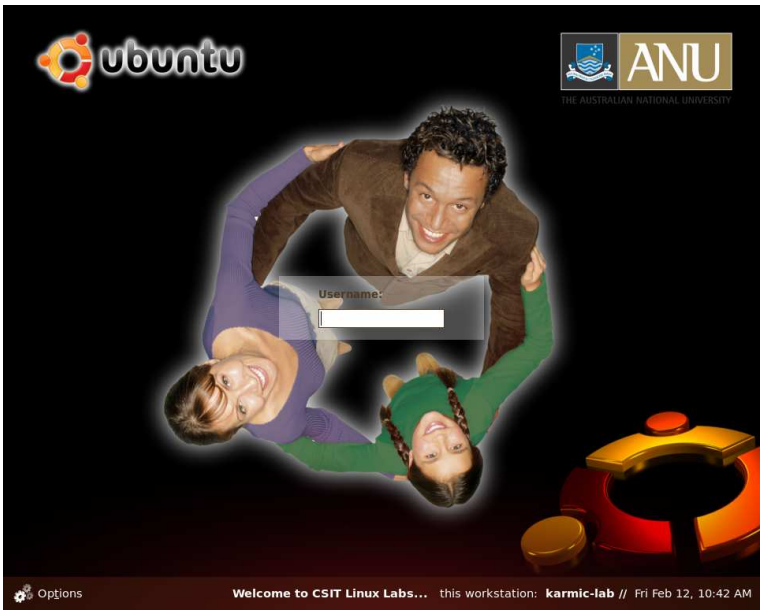


Figure 2.1: Login Screen

2.7 Troubleshooting the computing environment

2.7.1 Access to computer laboratories

If your security card will not let you into a laboratory (allow three working days after being issued for it to be activated), go to the Security Office in building 45, the John Yencken building (on Sullivans Creek Road across the creek from Fellows Oval).

2.7.2 Access to your computer account

If you have your Username and your Password, and you cannot successfully log into your Linux account on the CSIT systems then you should see the School's Student Consultant, in CSIT room N244.

If you have forgotten your password, go to `InfoPlace` for help. `InfoPlace` is located in the Chifley Library building. For more information about the services offered by `InfoPlace`, see

`http://ilp.anu.edu.au/infoplace`

To avoid the inconvenience, the message is

DON'T FORGET YOUR PASSWORD!

2.7.3 Hardware problems

Problems with the computing equipment which are clearly of a hardware nature, such as the mouse not functioning or the printer not printing, should be reported to Division of Information

Help Desk. There are notices in each laboratory giving the contact phone number (currently 59666). Alternatively, report the problem (using a working terminal) via e-mail to helpdesk@cecs.anu.edu.au. Please accurately gather and report as much information as possible.

2.7.4 Software problems

Difficulties with particular programs, applications, and so on, which are not obviously hardware problems should be reported to the Research School of Computer Science. Reports may be made via e-mail to helpdesk@cecs.anu.edu.au. Please, accurately gather and report as much information as possible.

Difficulties with the subject matter of your course or with removing errors from your programs should be referred to your tutor or lecturer or by e-mail to the help service for your course. For example, the email address comp1100@cs.anu.edu.au can be used if the course which you are seeking help with is COMP1100, *èt cetera*...

2.7.5 Quota problems

Disk quotas are intended to be adequate to complete all assignments. If you exceed your quota, you must remove excess files. Backup files (eg. files with names ending in .bak) are often produced when an editor saves a new version of a file. These are prime candidates for removal. See section 4.3 for further information.

If you are unable to remove files, send an e-mail to the School's TSG helpdesk (helpdesk@cecs.anu.edu.au) .

2.7.6 Out-of-hours problems

See the notices in the laboratories.

Chapter 3

Gnome Desktop Environment

For 2011, the Linux distribution in the labs will again be Ubuntu which uses the Gnome Desktop Environment, which provides the Graphical User Interface (GUI).

You may be familiar with the Microsoft Windows 98/NT/XP/Vista/7 user environments or the Apple Macintosh MacOS/MacOS-X user environments. Most GUIs available for UNIX and Linux are built on top of the X-Window graphic system. X-Windows provides the low level protocols and standards for graphic system interaction and is "network-extensible" by design (applications can run on remote compute-servers and display on the local desktop screen etc.).

Historically, each major UNIX vendor produced their own proprietary user environment and in 1993 a consortium was established to produce a standard GUI for UNIX-based systems, called cde. Similarly the groups within the Linux community initiated projects to develop GUIs for Linux, of which the two most significant and well developed are KDE and later GNOME.

3.1 Login and logout

GNOME manages all aspects of a computing session. Initially you are presented with a "login window", and are prompted to type your Username and Password (see section 2.5). Make sure to press the Enter key after your Username and after your Password. If you cannot login, check that you did not:

- unintentionally activate the Caps Lock key when typing in the Password (a warning message will appear on screen)
- forget to use your *full* Username which includes the first charcter 'u'
- exceed your disk quota (how to check this is discussed in Section 4.3)

After a short delay the GNOME desktop will appear. The screen will have a *top edge panel* along the top, as shown in Figure 3.1.

3.1.1 Logout

Clicking the icon on the far right of the top edge panel with your Username next to it will cause GNOME to bring up the logout menu. Click on the words "Log Out". This will pop-up a

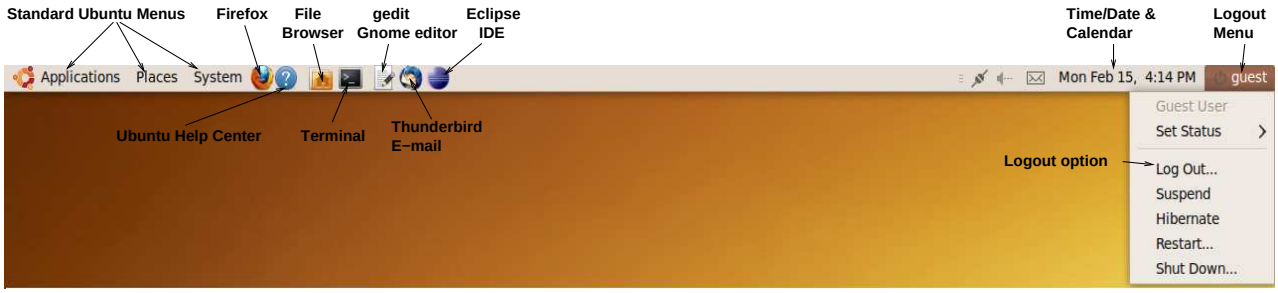


Figure 3.1: Gnome Top Edge Panel (the actual icon arrangement may be slightly different)

window in the middle of the screen, giving you 60 seconds to cancel the logout, or to continue the logout immediately. If you do nothing, your GNOME session will logout in 60 seconds.

3.2 Keyboard shortcuts

A number of keyboard shortcuts exist to allow you to change focus of windows and change workspaces without lifting your hands from the keyboard.

- to switch between windows in the same workspace: press Alt + Tab keys together
- to switch between workspaces: press Ctrl + Alt and either the ← or → keys together

3.3 The Top Edge Panel

GNOME provides a panel or task bar that provides a standard access mechanism to the resources of the computing environment. In GNOME this is the Top Edge Panel which is the rectangular box along the top edge of the screen.

You will find a few buttons on the top edge panel, such as for the Firefox Web browser, the Ubuntu Help Center, a File Manager for your home directory, a terminal (console, or commandline interface), the Gnome editor (gedit), an Email client program (Thunderbird), the Eclipse IDE, and the Printer Manager. Resting the mouse pointer above a button for a second or so will cause a small tooltip description of that button's purpose to pop up.

3.4 Workspaces

In a graphics-based user environment the screen can get very cluttered. To help manage this, GNOME provides the notion of *workspaces*.

To manage workspaces, you can add the "Workspace Switcher" applet to your top Panel by right-clicking over the panel, select "Add to Panel...", then scroll down and click on Workspace Switcher.

By default, the Workspace Switcher will give you four workspaces to use. You can change this by right-clicking on the Workspace Switcher in the Panel and then selecting "Preferences".

You can select which workspace you want displayed on the screen, and you can switch from one workspace to another by clicking on the particular workspace within the Workspace Switcher.

In a single workspace you will typically have a number of overlapping windows. One window will be 'on top of the stack' and will be *in focus*. All keystrokes from the keyboard will be directed to this window. Mouse clicks will be directed to the window that the cursor currently sits over.

If you finish up with too many windows in a workspace, you can close (that is, delete) ones that you are not using, and start them up again when you need them. An alternative to this strategy is to minimize a window to a small *icon* (see Figure 3.2). In this state they don't take up much real estate but the program is still running. Then the window can be restored to it's normal state very easily.

3.5 Help system

Rather than going into more detail about GNOME we now tell you about the *help system* that is provided.

In the Top Edge Panel there is an icon depicting a question mark on a blue circle. Clicking on this icon will open the Ubuntu Help Center window shown in Figure 3.2.

Use the Search facility near the top of the Ubuntu Help Center to search for information on particular topics.

Note that some of the links in the Ubuntu Help Center will actually be Web URLs and if you click on them, then a web browser (eg. Firefox) will be started to show the web pages being linked from the Help Center.

For new users, the link "New to Ubuntu?" under the left-hand "Topics" column may be worth a quick browse (click the left-mouse button whilst the mouse pointer is hovering over the words "New to Ubuntu?")

3.6 GNOME Problems

If your Linux based machine does not function properly (which is very rare), that is, it does not respond to mouse and keyboard inputs, then there maybe a problem with the server system.

You may use the Ctrl + Alt + Delete

If it still doesn't work, you need to get some help from your tutor, or the CSIT Student IT Consultant in Room 244 on level 2 of the CSIT building.

3.7 Virtual Consoles

In some cases, it may be possible to use a command-line interface to either complete a quick task or to solve a problem such as a "frozen" (not responding) GUI. The Linux configuration in the teaching labs, like most Linux configurations, provides up to six Virtual Consoles (VC) as well as the GUI screen. You can get to a VC from the GUI by simultaneously pressing the CTRL, ALT and a function key between 1 and 6 (F1 through F6). This will bring up a commandline interface that will ask you to login (Username and Password).

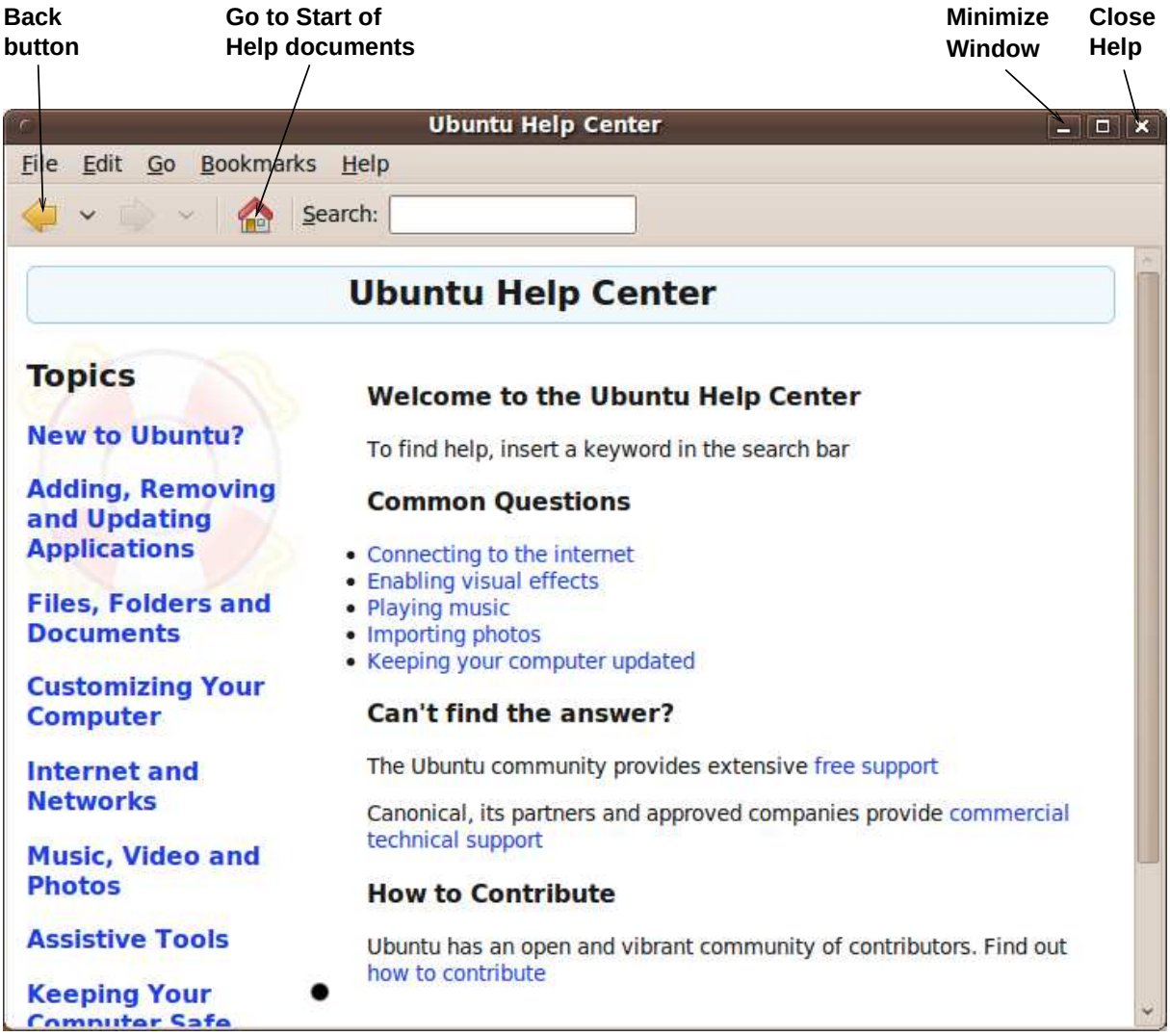


Figure 3.2: Gnome Help viewer opened at the start of the documentation collection

From here, you will need to know some basic UNIX command line commands to be able to diagnose and clear the problem.

Chapter 4

File manager

4.1 File system concepts

The Linux servers in the CSIT student computing environment have a file system that you, as a user, need to understand and interact with.

One fundamental property of the file system is that it is *stable*. If you create a file and write data to it during one computing session, then it will still be there (with the same contents) when you next log in, whether from the same workstation or any other in the CSIT Linux Labs, or even from the remote login compute-server "partch.anu.edu.au".

Another fundamental property of the file system is that it is hierarchical, or tree-structured. Basic data files may be organised by storing them in a file called a *folder* or *directory*. This folder can itself be organised by storing it in a higher-level folder, and so on. Associated with your computer account is a *home directory*. You may create data files and folders here, within certain limits (see section 4.3).

Yet another property of the file system is that it has an associated notion of protections. You may both read and change files in your home directory and its hierarchy of folders. You may read the files in large sections of the file system, but you may not change them.

Finally there are some areas of the file system that you may not even read. For example, you cannot (should not be able to) read files in the home directory of another student.

You will spend a considerable amount of your time as a computer user interacting with the file system. GNOME provides a file manager tool called Nautilus for this purpose. The associated help system provides information both about file system concepts, and about using the tool itself.

4.2 The Nautilus file manager

You can start the file manager by clicking *once* on the *Home* icon in the top edge panel which looks like..., well, a house, see Figure 3.1. This will result in Nautilus opening your `Home` directory with its contents displayed.

To access help on how to use Nautilus click on the "Help" menu in Nautilus, then select "Contents", or, alternatively, press the F1 key.

The Nautilus file manager tool allows you to perform the following range of tasks.

- Basic File Management Skills:
  - Select a Single File or Folder.
  - Select Multiple Files or Folders.
  - Drag and Drop a File or Folder.
- Working with Files and Folders:
  - Create a New File or Folder.
  - Rename a File or Folder.
  - Open a File or Folder.
  - Move a File or Folder.
  - Copy a File or Folder.
  - Execute an Action for a File or Folder.
- Navigating to other Folders:
  - View a Folder.
  - Go to Your Home Folder.
  - Change to Parent Folder.
- Deleting Files and Folders:
  - Delete a File or Folder (to the Trash Can).
  - View the Desktop folder and the Trash Can on the desktop.
  - Move a File or Folder from the Trash Can Back into File Manager.
  - Shred a File or Folder Permanently.
- Changing Permissions:
  - Change the Permissions on a File or Folder.
- Using Different File Manager Views:
  - Show Hidden Objects.

4.3 Quotas and Trash

Each user of the CSIT student computing environment has a quota of the available disk space on the CSIT Linux Labs file server. In 2011, this disk quota will be 1Gb (1000 megabytes) per user with some exceptions for latter-year special project students.

The disk quota limits the amount of disk space you are allowed to use, as well as protecting all other users if a “runaway” program attempts to fill the file-server disk with data. If you experience difficulties when trying to save or copy a file, it may be that you have exceeded your disk quota. Certain programs will inform you when you try to exceed your quota.

You can check your quota by entering the command `quota -v` on a command line (see section 9.3). You will probably not exceed your *files* quota, which limits the number of files you can have at anytime. Sometimes you may exceed your *usage* quota, which limits the number of

disk blocks you can use. If you have used an amount of space which is between your *quota* and your *limit* then you will have a limited amount of time to remedy the situation before drastic action occurs. Drastic action usually means disabling your account.

To reduce the amount of disk space you are using you need to remove files. This means putting them into the trash (in GNOME the Trash is also, inconsistently, called "Garbage") *and* you must then empty the Trash can (permanently removing the files). *If you put files into the Trash and forget to empty the trash they will still consume some of your disk quota.*

You can move files into the Trash by dragging them from Nautilus to the Trash can icon in the bottom right corner of the display. You can empty the Trash (or Garbage) by clicking the right mouse button on the Trash can icon on your desktop and selecting the `Empty Garbage bin` menu item.

Which files should you remove? Files which are unrelated to your work are an obvious choice! Compiled programs from previous laboratory sessions and assignments are other candidates for deletion. As long as you keep source files you will be able to compile them again to produce the compiled versions. Another obvious choice are media files (graphics, mp3, video) which you may have downloaded from the internet — they usually consume a large amount of the disk space, but most of them may not be very relevant for your studies.

4.4 Elements of File System Structure

Support material for courses taught by the Research School of Computer Science can be found in directories under [`/dept/dcs/`] such as [`/dept/dcs/comp1234/public`] etc.

4.5 Configuration files

The appearance and behaviour of the Gnome Desktop environment can be altered on an individual basis using the "System" then "Preferences" options from the Top Panel. The most useful changes can be made from the "Appearance" item in the drop down menu that appears.

Some other configuration options that you may choose to modify relate to the behaviour of the Command Line Interface (CLI), in particular things such as the appearance of the CLI Prompt. The standard CLI shell in use on the CSIT Teaching system is the so-called "bash" (Bourne- Again SHell). Some files that configure it's behaviour are so-called hidden *dot*-files. They are not normally shown by the file manager, or by the listing command 'ls' in terminal window.

Some of these files are

```
.bash_history
.bashrc
.ssh
.Xdefaults
```

It is worthwhile checking the web for details on how these files can be modified before experimenting too much.

4.6 Browsing and ethics

One important thing about the UNIX/Linux file system is that it handles access control on a per-user basis. This means that, in theory, you can browse the file system without being able to read, modify or run anything which you're not supposed to. Browsing the file system can be a valuable learning experience! You might finds things which you didn't know existed. Some of these things might even be useful!

While you are encouraged to browse the file system, you should still be careful. Consider these examples:

- If you discover, for whatever reason, that you can see another student's files, and you think that those files should be private, then you should probably inform them of the situation (probably using e-mail). Before you decide that it will save you a lot of work if you can find files containing other student's assignments, you should read the section in the *Student Handbook* about 'Misconduct in Examinations'.

- If you find information in the file system which you believe compromises the security of the system, then, you should send e-mail to `helpdesk@cecs.anu.edu.au` detailing your findings. Misuse of any "holes" in the system security that you may discover will result in severe penalties. If you have any doubts about this suggestion please read the 'Use of university computing resources' chapter in the *Student Handbook*.

Chapter 5

Firefox Browser

5.1 World-Wide Web and URL

The World-Wide Web, or more simply, the 'web', is a vast collection of servers linked via a world-wide network called the Internet. Most of these servers are quite happy to interact for free with a user who is somewhere else on the Internet. The Internet runs over commercial communication lines run by companies such as Telstra and Optus, and the bills have to be paid for this use (but that is another story).

The CSIT student computing environment provides a number of browser programs for accessing the World-Wide Web. The most common one is Mozilla *Firefox*, which can be started by clicking on the icon in the Top Panel that looks like a fox encircling the globe.

5.2 URLs

Everything publicly accessible on the web has a *Uniform Resource Locator*, or URL for short. The URL is an address that uniquely identifies an object across the whole web. Most businesses now have a web page, and the corresponding URL is quoted in general advertising. An example of a URL is

`http://theage.com.au/technology/`

which refers to the Technology section of the Internet edition of *The Age* newspaper.

It is not particularly important that you understand the structure of a URL (that is what we have computers for), but in brief, `http` is the delivery protocol (the language in which Firefox must speak to the computer holding the data), `theage.com.au` is the name of the computer which holds the data, and `technology/itnews/index.html` is the name of some data (probably a file) residing on that computer.

Often you can abbreviate URLs, especially for data on local computers. For example, `http://cs/` is an abbreviation for `http://cs.anu.edu.au/index.html`.

5.3 Driving Firefox Web Browser

The display region occupying most of the window is where the data is shown.

Some of the items you see in the display region are *links* which point to different pages. Usually (but not always) you can identify links because they are underlined and/or have a different colour. If you point the mouse cursor at them, the arrow changes into a small hand. Clicking with the left mouse button will retrieve the web page to which the link points, or intuitively, take you to page that the link points at.

The words File etc. along the top of the Firefox window hide menus that drop down when you click on them with the left mouse button. Menu items marked with a small right triangle (►) lead to further cascading sub-menus when the mouse is moved over them. Many of the menu items have a keystroke equivalent which is indicated on the right of the menu. Below the menu bar are a set of buttons called the *Navigation Tool bar*. You can find out what most of these do by experiment, so we will just mention a few important ones.

File The important items in this menu that are not more easily accessed via the Tool Bar are New Window or New Tab, with which you can open an additional Firefox window or add a new Tab Window, Save As, which saves the current page to disk, and Quit, which closes Firefox, etc.

History (called Go in older versions of Firefox) This menu holds the history of recent pages you have visited without backing up. It provides an easy way to go back to a previous page. There is a small down arrow next to the Back button which also holds the backward history. To go back to the most recent page, clicking the Back button is easier.

Bookmarks Firefox lets you keep a list of URLs that you might wish to visit again. This is your *bookmark list*. To add a URL to the list, go to that place then select Bookmark This Page from the Bookmarks menu.

Back This button takes you back to the place you were last.

Forward This button undoes the action of Back.

Reload Sometimes Firefox will show you an old version of a page even after it has been changed. Clicking this button asks Firefox to ensure that you are seeing the most recent version.

Stop If a page is taking too long to fetch, or you change your mind about wanting to see it, Stop will abort your request.

Home This takes you to your home URL (the one that first displays when you start Firefox).

More buttons (*eg*, Print or New Tab) can be added (or removed) to the Toolbar using Customize option in View ► Toolbars menu.

5.4 Finding things on the Internet

The most common way to search the Internet for something is to use a *search engine*. The Search Window defaults to our recommended search engine Google, which is located at

http://www.google.com.au/

To use the search engine, type in the subject you are interested in the search window on the web page and click on the Google Search button (which looks like a little magnifying glass). You will be returned a list of links that Google knows about that refer to your subject. To compose efficient queries you should click on Advanced Search and read the help pages.

5.5 Downloading things from the Internet

There are several ways you can take local copies of things you find on the Internet.

- To copy the whole page you are viewing, use Save Page As... from either the File menu or the pop up menu obtained by clicking the right mouse button anywhere on the page.
- To copy the page that a link refers to, point your cursor at the link then click the right mouse button. A little menu will pop up; select Save Link Target As....
- To take a copy of an image (preferably not a rude one), point your cursor at the image then click the right mouse button and select Save Image As....

5.6 StReaMS

An important part of the CSIT student computing environment is the Student Registration and Mark System (**StReaMS**). This is where you register for tutorials and practical classes, check your assignment submissions and marks, and access the bulletin boards (forums) for your courses. The URL for StReaMS is:

https://cs.anu.edu.au/streams/

Unless you have registered for a tutorial or practical class, you may not have an account on the CSIT student computing environment. When you log into StReaMS with your usual user name (the UniID) and password, the browser window will look something like Figure 5.1. Under the Small Groups heading there will be links to allow you to manage your tutorial and practical class enrolment for each course. Under the Marks heading there may be links to allow you to access the marks you have accumulated in assignments and other continuous assessments.

Note: The StReaMS and Forums web pages are being accessed through the secure HTTP protocol (`https`), therefore providing your password does not expose it to an unauthorized third party, and it will be quite safe.

If you have submitted any files for assessment (see Chapter 9), summary information about them will also be displayed.

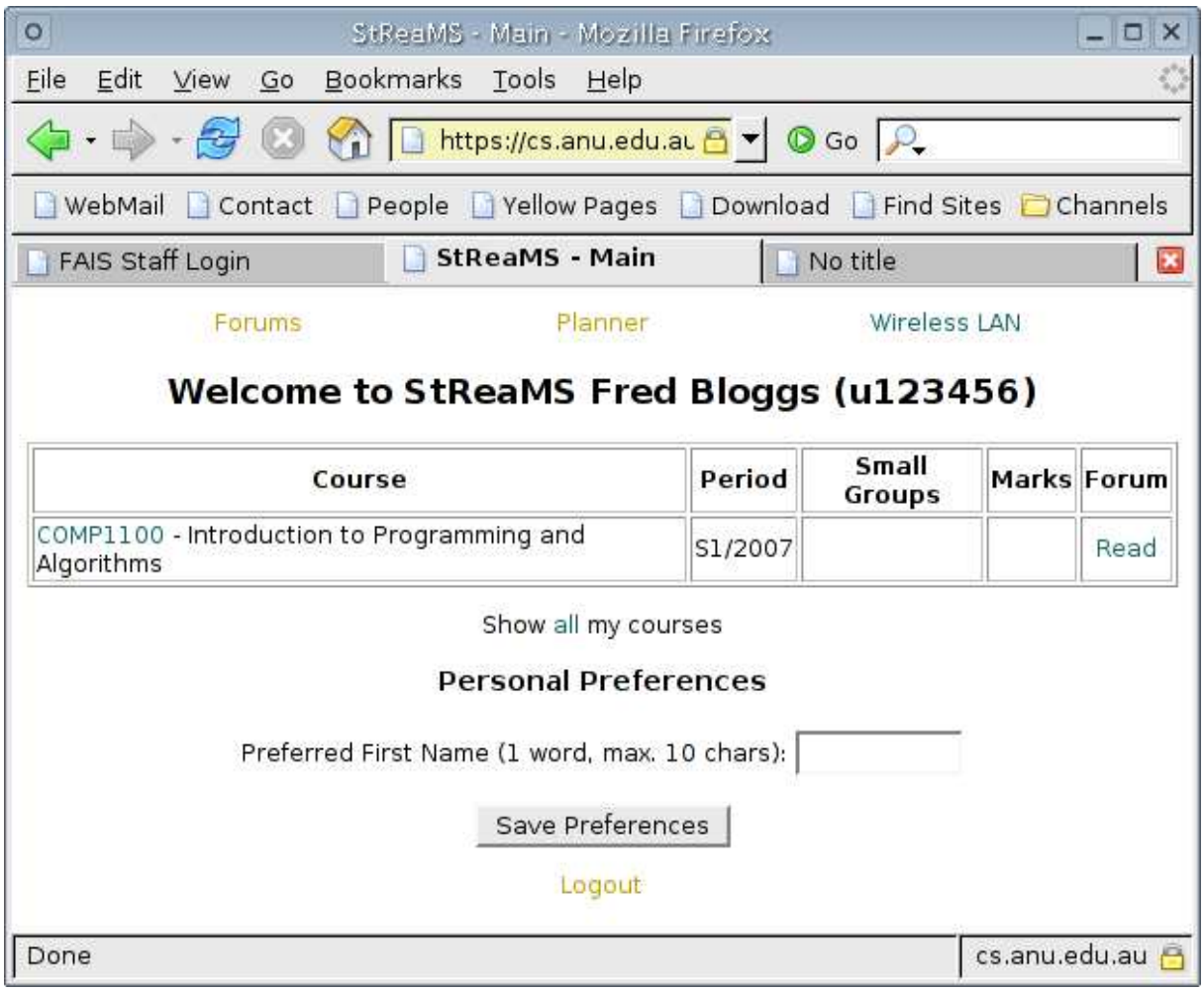


Figure 5.1: The StReaMS Window

5.7 Forums

Many of the courses offered by the School utilise announcements and discussion groups which are maintained using a web-based bulletin board integrated with StReaMS. Each course will usually have a general discussion board, e.g. `COMP1100 Discussion` and an announcement board, e.g. `COMP1100 Announce`. To access the discussion groups for your courses, follow the Forums link in the StReaMS web page. See Figure 5.2 and Figure 5.3.

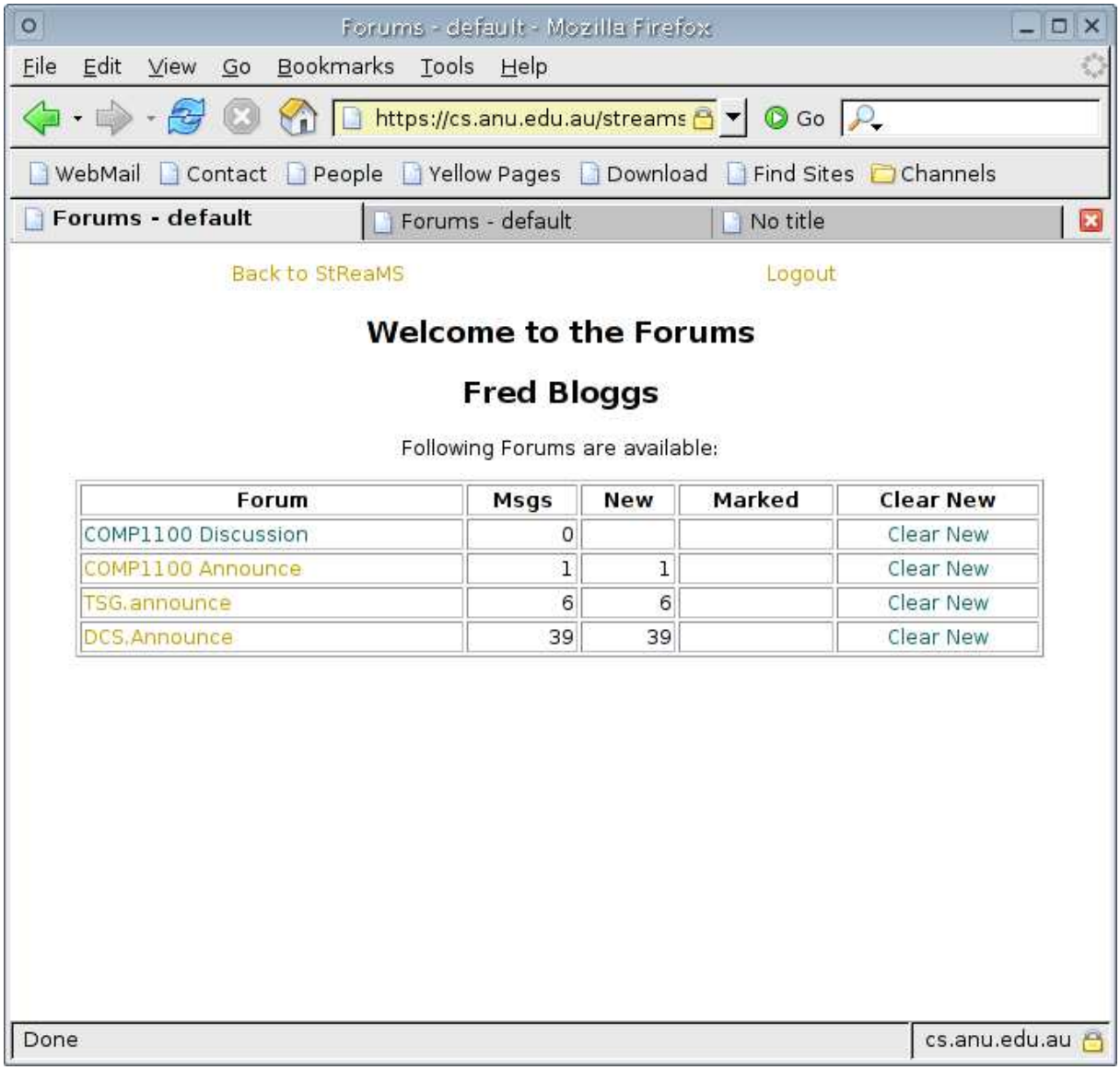


Figure 5.2: The Forums Window

Course announcement forums provide a central place for lecturers and tutors to provide information about your courses and should be read regularly. Students are not normally permitted to post to these forums. Instead, the discussion forums provide an open and common point for enrolled students to post messages on topics of interest or concern for that course and to reply

to those posts. These forums can be a very useful part of your learning and you are encouraged to make active use of them.

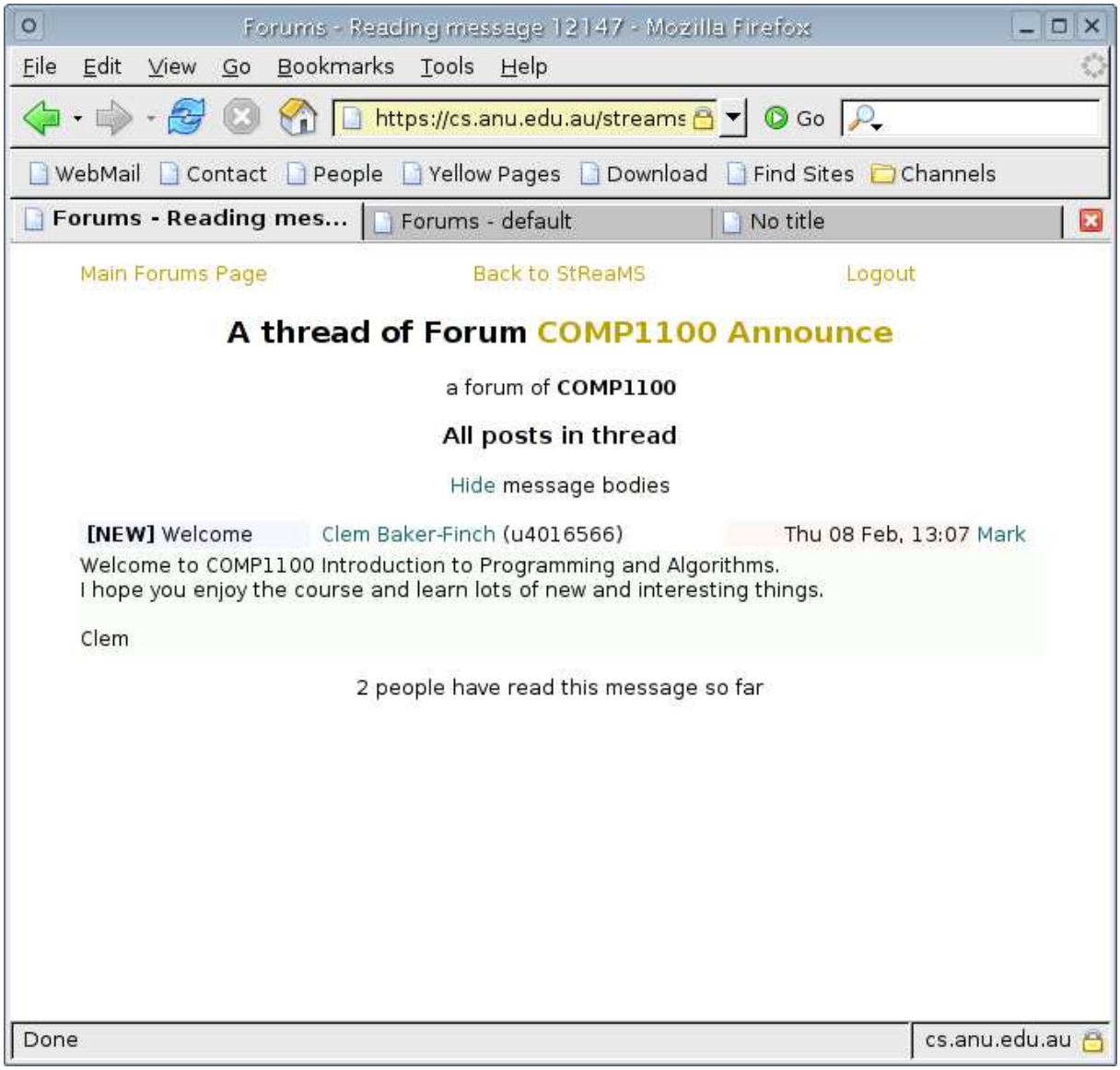


Figure 5.3: Reading Forums

Chapter 6

Electronic Mail

The e-mail client application Thunderbird is a sibling to the Firefox web browser, as both come from the Mozilla foundation. If, when browsing with Firefox, you decide to click on a e-mail link on a web page intending to send an e-mail to that address, the Thunderbird application will be launched with the new e-mail composition window opened, and the addressee e-mail address already chosen to be the one which you've clicked. Alternatively, while reading a received e-mail with an HTML link in it, you click on the link, then Firefox browser will open the corresponding web page.

6.1 Overview

Reading and sending e-mails in Linux can be achieved via the Thunderbird program. You will do this a lot. Therefore, it makes sense to be able to launch both Firefox and Thunderbird applications conveniently from the front panel, like in Figure 3.1. An example of what the Thunderbird window might look like is shown in Figure 6.1.

The default size for the Thunderbird window may be smaller than desired and somewhat cluttered. You should start by dragging a corner to make it as large as you can. Thunderbird will remember its window sizes from the last time it was used.

The left hand window pane shows the organisation of your e-mail in folders — messages sent *to* you turn up in the Inbox, messages sent *by* you are collected in the Sent, messages which you are editing with the aim to send later are grouped in the Drafts folder, etc. One of the folders will be *selected*, generally the Inbox. Any folders which have unread messages in them will be shown in bold with the number of unread messages in brackets after them, as does Inbox (106) in figure 6.1.

The right hand top window pane shows the messages that have been stored in the *selected* folder, which is the Inbox folder in figure 6.1. A message may be selected in the folder by clicking on it with the left mouse button.

The message list may be sorted by clicking on the column header by which you wish to sort: Subject, Date etc. The list may also be sorted by messages on the same topic, called *threads* by using the menu sequence View->Sort->Threaded. They are then collected together under the first message in the thread and there will be a small plus sign + which you use to open up the thread to view the individual message titles. Sorting by an individual column heading opens up all threads.

The right hand bottom window pane previews the contents of the selected message and will show a scroll bar on the right hand side if the message is longer than the size of the window

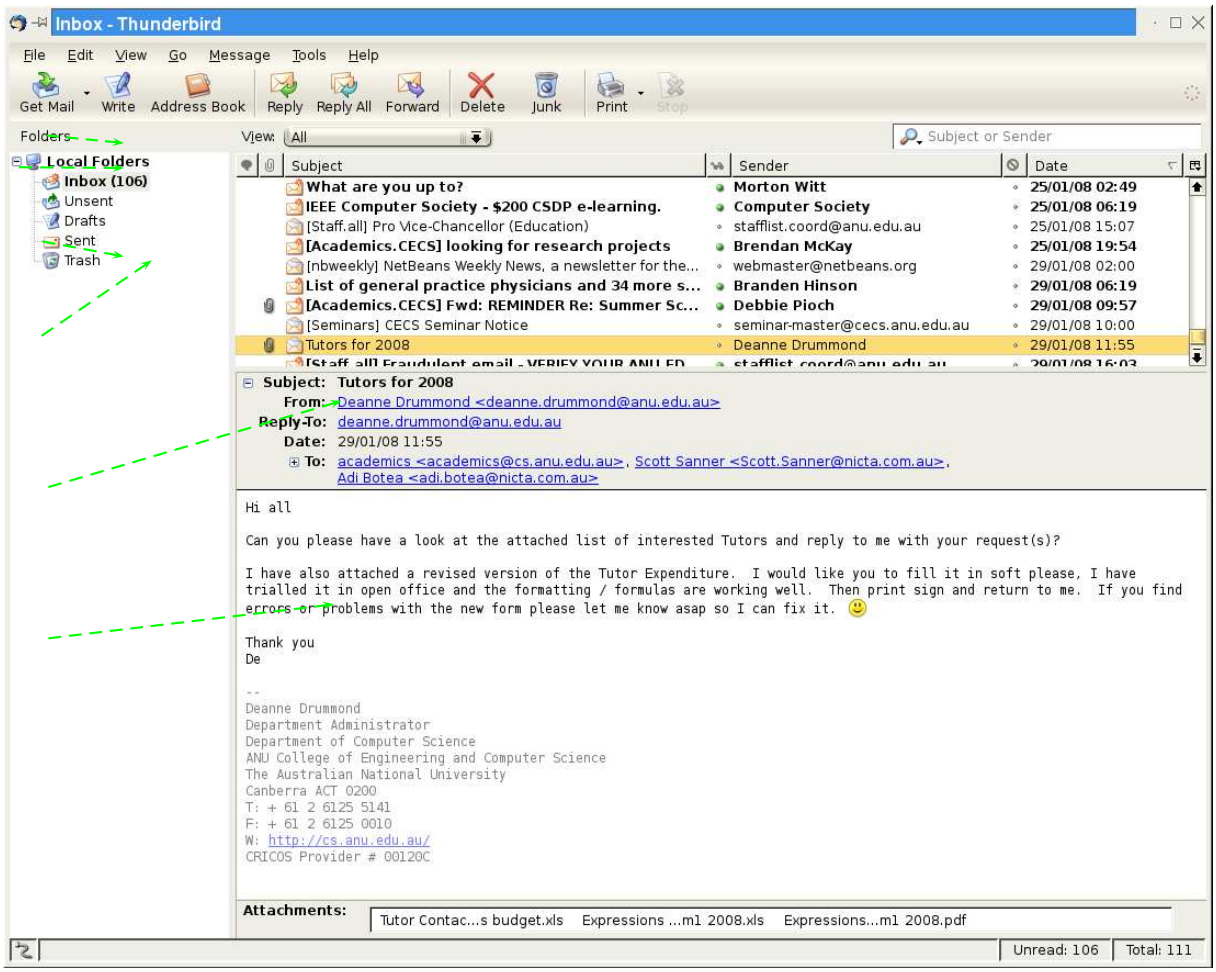


Figure 6.1: Thunderbird e-mail client application

6.2 Reading e-mail

What makes it important that you are comfortable with Thunderbird, is that it will often be *necessary* for you to read received emails and send new ones.

Not only will you miss out on gossip from friends if you ignore mail, but you may miss out on crucial messages from lecturers and tutors. The College and ANU deems that you have been adequately notified when you have been sent e-mail on any matter of mutual concern.

You can view your incoming mail by clicking on the Inbox folder and clicking the Get Mail button to ensure you pick up all the latest mail. Selecting a message with a single click will display the message in the preview pane underneath the message list. Selecting a message by double clicking a message in the list will open it in a separate mail reading window which shows just the selected message and has an appropriate set of buttons. An example of the separate mail window is shown at figure 6.2

In the picture above, the Go menu contains items Next and Previous which you can use to browse your mail box (or simply use the mouse to select a message). Browsing the history of

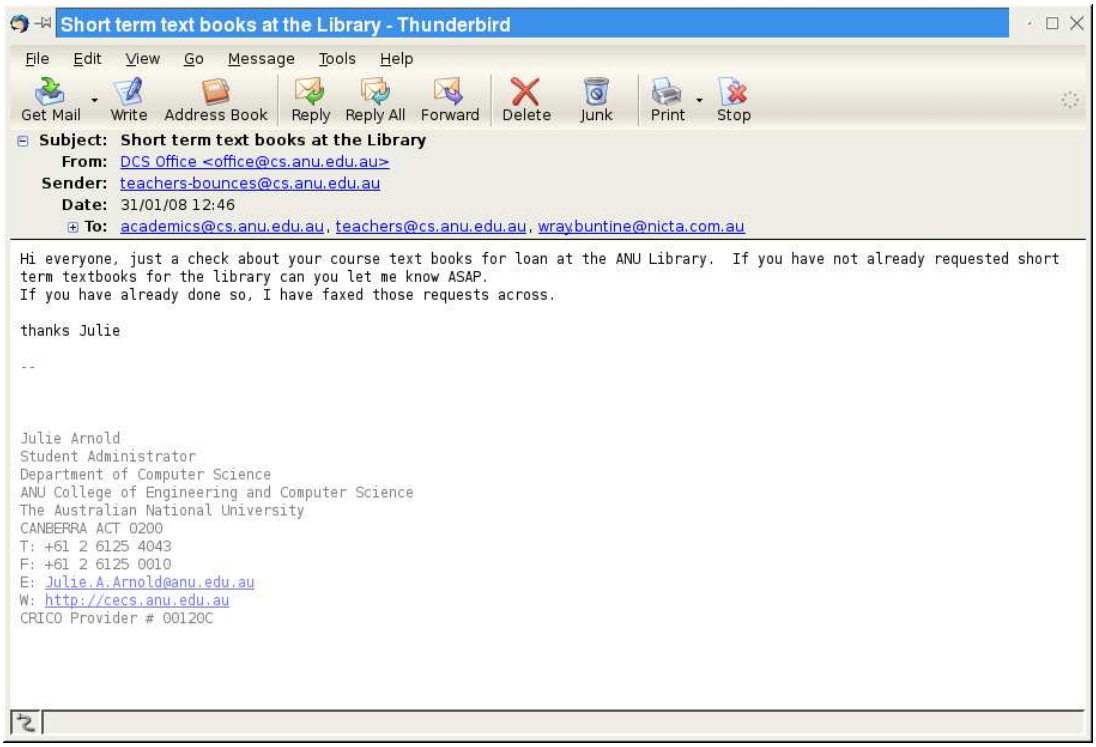


Figure 6.2: Reading e-mail with Thunderbird

seen e-mail messages (akin to the history of web-pages in Firefox) can be achieved by clicking the buttons Back and Forward. (If some of the menu buttons aren't there, you can add the by customizing the Thunderbird toolbar.) The buttons Delete, Reply and Print and other buttons do just what they claim for the message displayed.

Thunderbird should check the main ANU e-mail server for new mail approximately every 10 minutes, however you may tell it to get any new mail *now* by clicking on the Get Mail button wherever it appears.

6.3 Sending e-mail

To create a new e-mail message you need to click on the Write button in any of the mail windows. When you click this button, it will open a new mail composition window like the one below (see Figure 6.3). You must fill in at least one e-mail address and the subject line, then you can write anything you want (subject to the guidelines). You can use the menus and buttons on the tool bar to take the actions indicated. You can send your message to the person(s) whose e-mail addresses appear in To:, CC:, and Bcc: lines by clicking the button Send. Clicking the button Save places a copy of the message in the Drafts folder and the compose window may then be closed. Double clicking on a draft message opens it up for you to continue editing and/or send it.

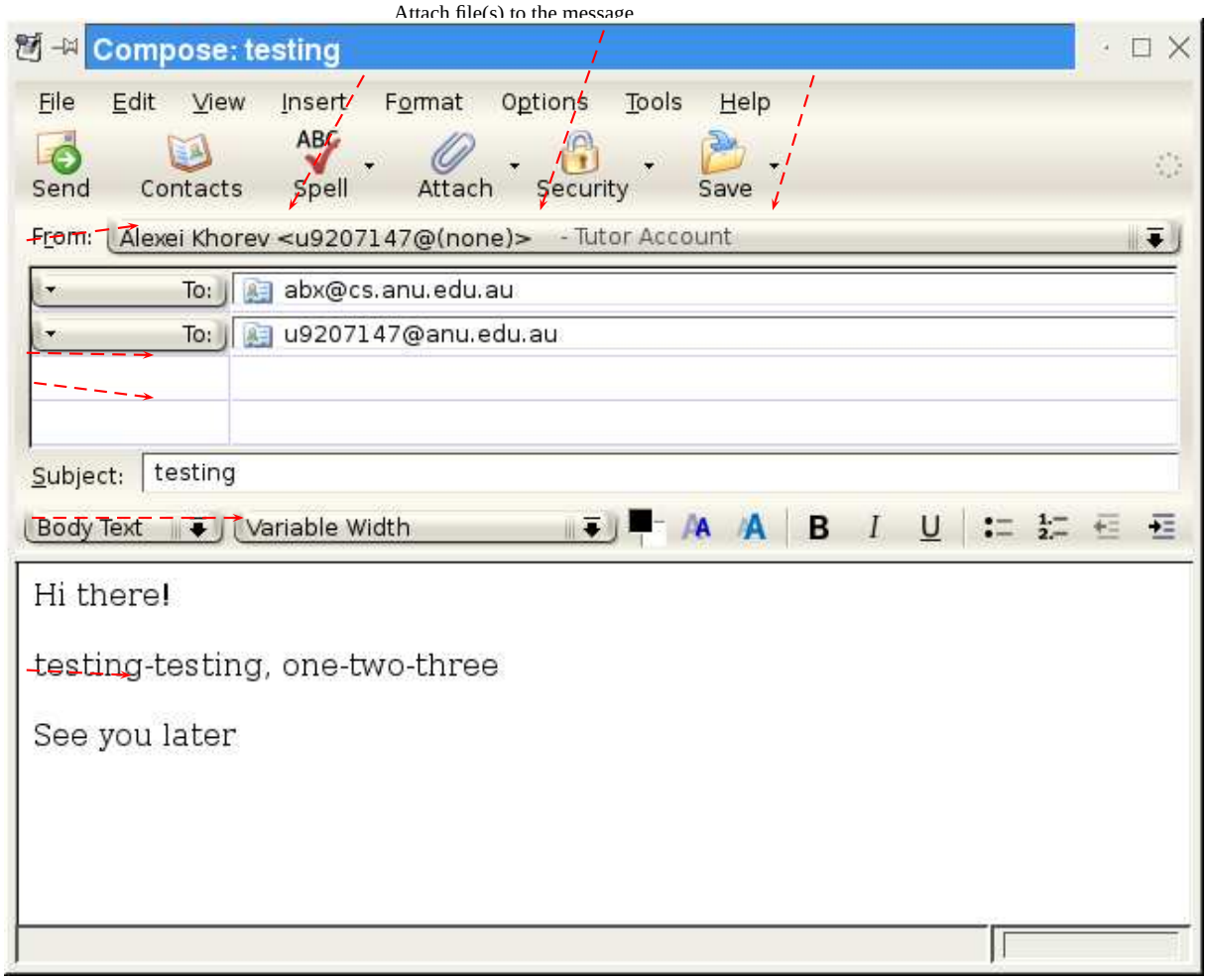


Figure 6.3: Composing a new e-mail with Thunderbird

Chapter 7

Editing text files

7.1 Introduction

A major part of the time you will spend using a computer is going to be devoted to creating and modifying files of text. These files might contain computer programs, or they might contain assignment reports. The process of creating and altering text files is called *editing*, and the programs used to help you do it are called *editors*.

This chapter contains some brief notes about some useful editors available in the CSIT Linux labs.

7.2 Editors and their Pros and Cons

The following editors are available in the CSIT Linux labs and, like almost all the other software there, they are all Free and Open Source.

- gedit is the standard GUI-based editor for GNOME and is the preferred editor for COMP1100 in 2011.

- Kate: this is the standard, GUI-based editor for KDE and is also available under the GNOME desktop.

  It is relatively easy to learn from using its menus, and has keystroke shortcuts compatible with many non-Unix editors. It has some support for the main programming languages (including Haskell and Java), such as syntax highlighting (i.e. different parts of the file are displayed in different colours, according to the `syntax` of the programming language).

- Emacs: this is a somewhat more sophisticated GUI-based editor, and is available on a variety of computing platforms. It is also reasonably easy to start using, but its keystroke shortcuts are different from most other editors.

  Emacs has strong support for wide range of programming languages. Like vi, it has a facility to assist in finding where variables or methods are defined (useful in large programs over several files), help in matching parentheses and braces etc, and a command to properly indent sections of code.

It also has a terminal-based version, which is useful if you are connecting to our system remotely.

Emacs also helps you to protect against losing your work: it will maintain a backup copy of the file (from the last save), it will periodically save your file automatically, and (in some circumstances) it will attempt to recover a file that may have been being edited if the system crashes.

- Eclipse is a full Integrated Development Environment (IDE), written in Java and originally written to help with writing large Java programs, but has since been developed to be used with many other computer languages.

- `vi` (or `vim`): this is a terminal-based editor, widely available on Unix systems. It is invoked from the Unix command line (see section 9.3), using a command like:

  ```
  vim myfile.txt
  ```

  For more information, use the Unix command `man vi`, and type `:help` when you start the editor (type `:q` to exit it).

7.3 The load-edit-save cycle

It is important to understand the relationship of a text editor with the file system. Files are not modified while they are stored in the file system. Rather, a text file is *copied* into the memory of the text editor, where it is modified as required. At this stage there are two copies of the file, namely, the original one in the file system (generally referred to as being 'on disk') and the modified one in the editors memory (generally referred to as being 'in memory'). The modified file needs to be *saved* from the editors memory to the file system.

If the editor program is closed for some reason, or if the underlying computer system crashes, before the modified file is saved, then the modifications may well be lost. You have no doubt heard of computer users who have 'lost a whole afternoon's typing' or a whole assignment this way. Perhaps it has even happened to you. So, make sure you get into a good habit of saving your file back to disk regularly whilst you are editing it, maybe every 15 minutes or so (how much you are prepared to re-type if something bad happens).

7.4 gedit

gedit is a “tabbed” editor, allowing multiple files to be opened for editing at the same time in different “tabs” (similar to the Firefox web-browser).

gedit may be started from your main GNOME Applications menu under the **Accessories** section. gedit should also be on the standard top menu panel for CSIT Linux labs users.

gedit may also be started from the Nautilus File Manager by double-clicking on a text file’s icon. When the user double-clicks on an icon in the File Managers window that represents a file, a default action is executed. In the case of a text file, it is to open it using gedit.

gedit can also be started from the Unix command line by typing the command:

```
gedit myfile.txt &
```

Whichever way you start it, it should result into a window opening which will look something

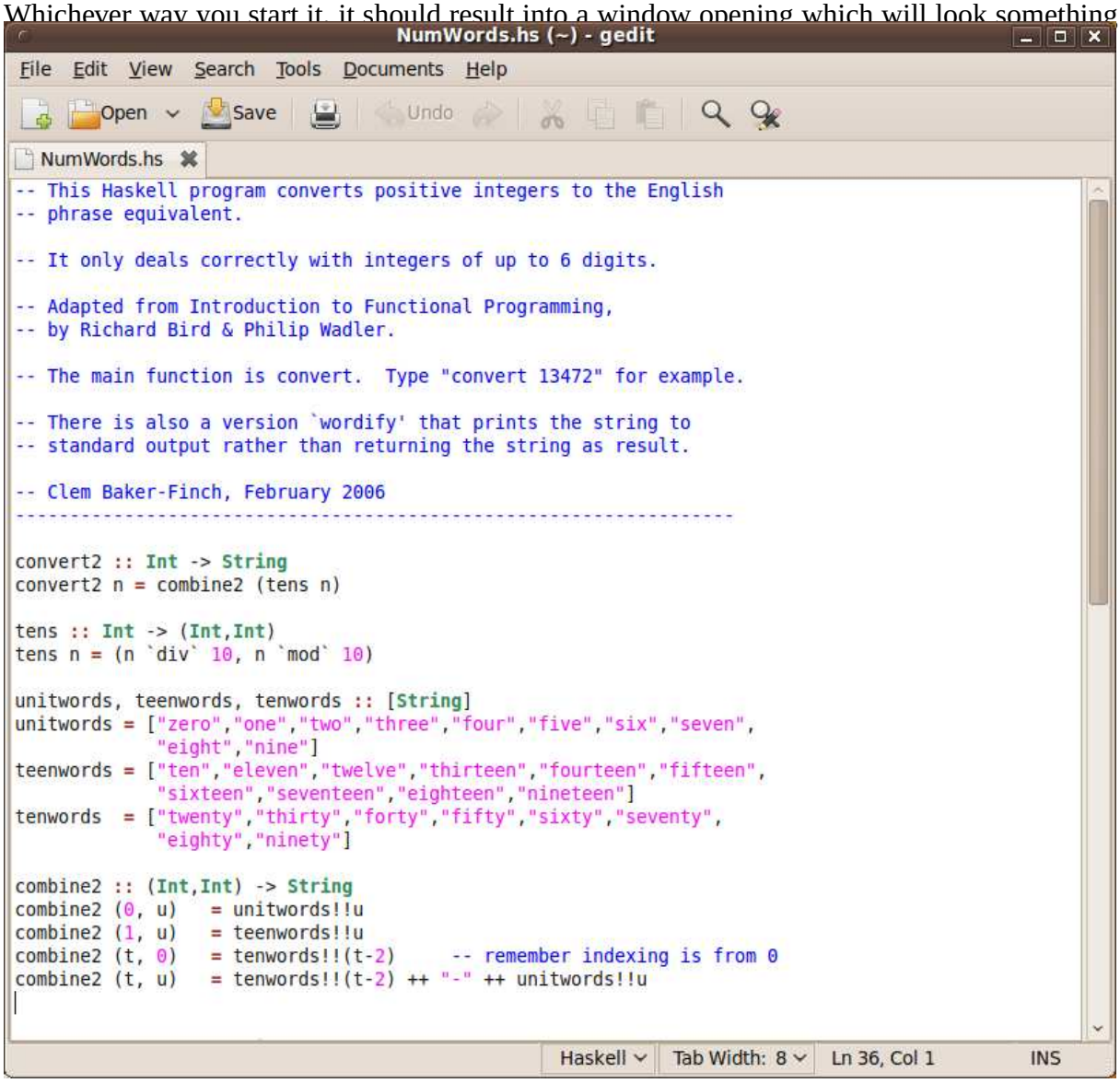


Figure 7.1: gedit editor with a Haskell file opened

Note that gedit has colourized (syntax highlighted) the different parts of the Haskell program and it understands which parts are comments, which are identifiers etc.

Also note that gedit will place an asterix ('*') in front of the file name in the tab that is opened if the copy of the file in memory has been modified from that on disk (ie. if it needs to be saved). Keep an eye open for this asterix - sometimes you can change your program code and re-run it only to find that it is behaving the same, simply because you forgot to save the changes you made before re-running.

It is reasonably easy to learn how to use gedit from its menus. Further help can be obtained via the GNOME help system (see section 3.5).

Chapter 8

Printing

8.1 Introduction

Printing in the CSIT Linux Labs is done via the two DoI InfoCommons printers installed in the Foyer area, outside of the labs on level 1. As in other InfoCommons labs at ANU, the student printing is administered centrally by the Division of Information (DoI). General information on printing quotas and so on is available at the **Information Commons** website or URL:

http://infocommons.anu.edu.au/

The printers are "named":

- `CSITFoyer01`, and
- `CSITFoyer02`

8.2 Submitting a print job

Most GNOME applications (programs) support a "Print..." option in the "File" menu. Selecting this option will bring up the "Print" dialog window (see Figure 8.1).

Select the printer you wish to have your print job sent to. Machines in labs N114 and N115/N116 will default to having `CSITFoyer02` highlighted, machines in other labs will default to `CSITFoyer01`.

If the default printer is very busy, or is currently not working, you can send your job to the other printer by selecting the appropriate printer in the Print dialog before clicking the Print button (see Selected Printer in above figure).

8.2.1 Printing from the command line

If you wish to print from the commandline, this can be done with the `lpr` (Line PRinter) command. For example, you can print a file "NumWords.hs" with:

```
lpr -P CSITFoyer01 NumWords.hs
```

You can also re-direct the output of another UNIX/Linux command to the printer (using pipes and standard input/output etc.):

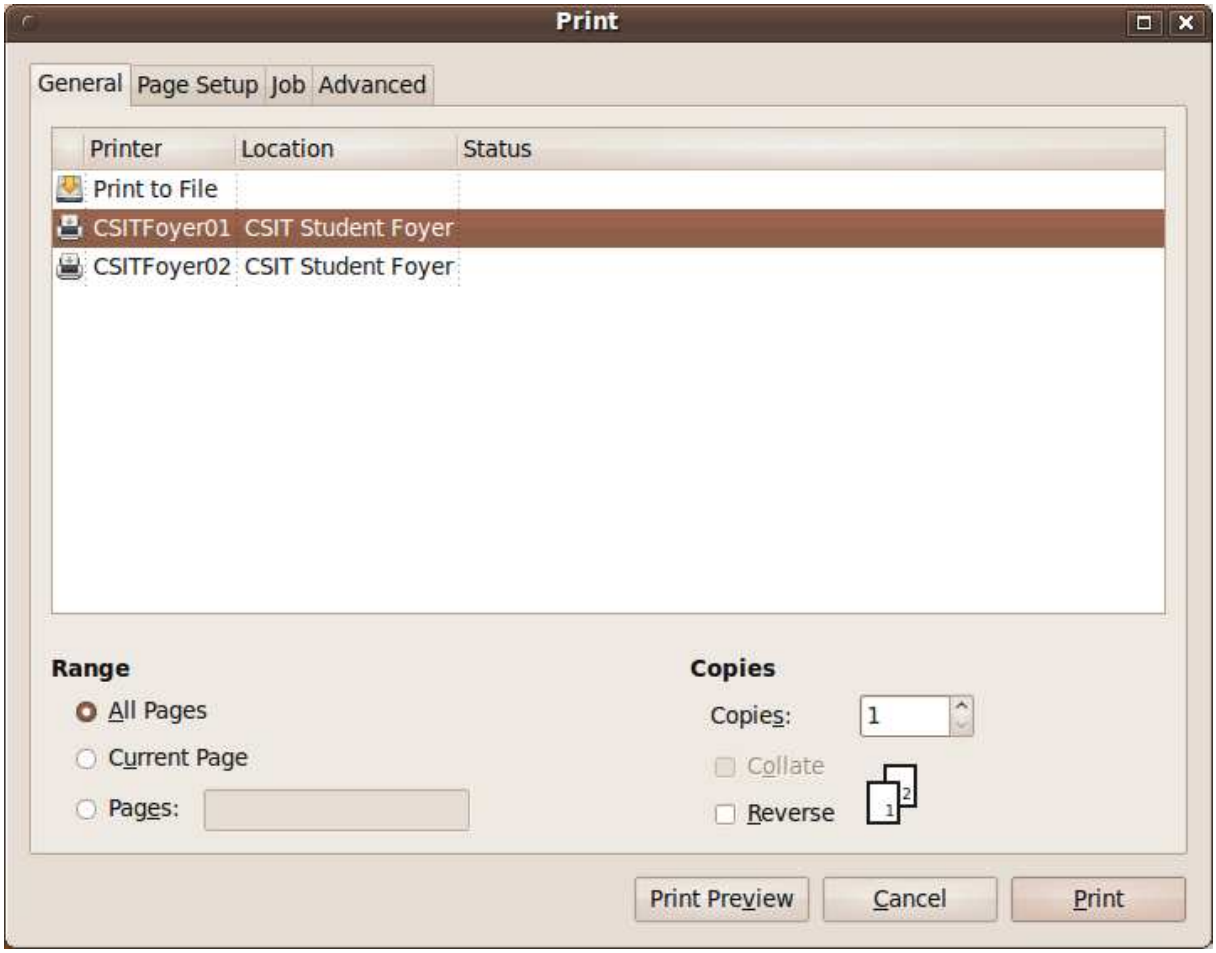


Figure 8.1: GNOME Print dialog in CSIT Linux labs

```
ls -l | lpr -P CSITFoyer01
```

Note that you don't need to specify the printer with the -P option if you are satisfied with the *default* printer.

Caution: only PDF (`.pdf`), PostScript (`.ps`) and text files are to be printed. *Do not attempt to print compiled programs.* This may result in wasting vast amounts of paper, and your print quota.

8.3 Print Release Stations

The two printers in the CSIT student foyer are centrally controlled by the Division of Information and print jobs sent to these printers will automatically be debited from your per-semester print quota administered by DoI.

At this time, print jobs can only be released to the printer that they were originally sent to. If this printer is unavailable (out of paper, jammed, very busy etc.) then the print job can be sent again to the other printer.

Either print release station can release a job for either printer. Log into the print release station using the same Username and Password you used to log into the CSIT Linux lab machine.

A list of your currently waiting print jobs will be displayed.

Click on the one you wish to print and another dialog box will appear advising you of your current remaining print quota and how printing this job will affect your quota. You can now choose to proceed with the job or to cancel it.

8.3.1 Printer problems

Because the CSIT Linux lab printers are managed by the Division of Information, any issues with them need to be reported to their helpdesk (see above). In theory, they have staff who can remotely monitor the levels of paper in the trays, toner in the printer and whether or not the printer is reporting a paper jam and send someone out to fix it accordingly. However, if this doesn't happen in a timely manner (within hours) then please contact the DoI helpdesk and report the problem.

Chapter 9

Submitting Files and the Unix Command Line

This chapter describes how to submit files via the CSIT Student Computing Environment `submit` system. The commands described below must be entered on a shell command line in a GNOME `Terminal` window. See section 9.3 for a brief description on using the shell and command line.

9.1 Submitting files for assessment

Many of your assignments in the Research School of Computer Science will be required to be submitted for marking via the School's computer system, rather than handed in on paper. It is *your responsibility* to ensure that you have submitted the *correct* files before the deadline. There are several simple commands which allow you to electronically submit files. The main one is:

`submit <coursecode> <assignmentname> <filenames>`

to electronically submit one or more of the files required for a particular assignment in a course. Files can be resubmitted up to the deadline specified for the assignment. Files submitted this way after the deadline will be noted as LATE. Assignment sheets will specify the precise assignment name and filenames which must be submitted, and generally only those files will be accepted. For example an assignment sheet for COMP1100 may specify that you must submit files `Test.java` and `reporta1.txt` for assignment `a1`.

Use StReaMS to check the dates when you last submitted files for a particular course and assignment. (See Section 5.6.)

The way to use the submit commands is as follows:

1. Save your work and close any editor windows which have files which you are going to submit.

2. Bring up a `Terminal` or `xterm` (x-terminal) window.

3. Change to the directory which has the files you wish to submit, for example: `cd /comp1100/assigns/a1`. You should list the directory to ensure the files you are about to submit are there and you may use the `more` command to quickly display a file to check it is the right one.

4. Use the `submit` command to submit your files, for example:
   `submit comp1100 a1 reporta1.txt .`

5. Connect your web browser to StReaMS to see a list of the files you have submitted for the assignment specified.

9.2 Finding out your marks

This can be done via StReaMS. (See Section 5.6.)

9.3 Using the Command Line (Shell) in a `Terminal` window

This section is a mini-tutorial covering some basic material to enable new users to access and use the command line for submission of assignment files and checking course marks as described in the sections 9.1 and 9.2.

For those familiar with MS Windows systems, this is similar to using a Command window or MS-DOS Prompt window. In a separate window a 'Command Line Interpreter' prompts you for a command then reads the next line you type. When you press the Enter key it attempts to execute the command using the command line arguments you type on the same line after the command. Text output from the command is displayed in the window and a new prompt is issued.

In Linux and GNOME the window is called a `Terminal` window and the command line interpreter is called a *shell*.

To start a `Terminal` window select the Terminal icon (depicting a monitor with a sea shell in front of it on the front panel) by pressing mouse button 1 (left mouse button) while the pointer is over the icon. Alternatively, you may select from the Top Panel the menus `Applications` and menu item `Accessories` and then `Terminal`. When the shell is started up in the Terminal window it operates in a 'Working Directory' which is, by default, your HOME directory. If you use the command to list files (`ls`) the shell will list the files in the working directory. If you enter a command to do something with a file (e.g. `less Test.java`) the shell will launch the program and send it the filename, and the program will look in the working directory for the file.

To list files in the Working Directory, use the command `ls`. To list more detail including read/write status and file date, tell ls to give a long listing by including command switch `-l`, ie: enter `ls -l`. Note the space between the command and the dash and no spaces between the dash and ell.

To change and display the Working Directory you use the `cd` command. `cd` by itself returns you to your home directory (NB: different from MS-DOS). To change to a subdirectory you simply specify that directory name, e.g. `cd assignments`. You may jump down more than one level at time using the *forward slash* (NB: this would be a back slash in MS-DOS), e.g. `cd assignments/a3`. You can go one step up the directory tree using `cd ..` If a directory name has a space in it (*strongly discouraged*) you have to surround the directory name in double quotes (e.g. `cd "my projects"`). To display the Working Directory at any time use the Print Working Directory command `pwd`.

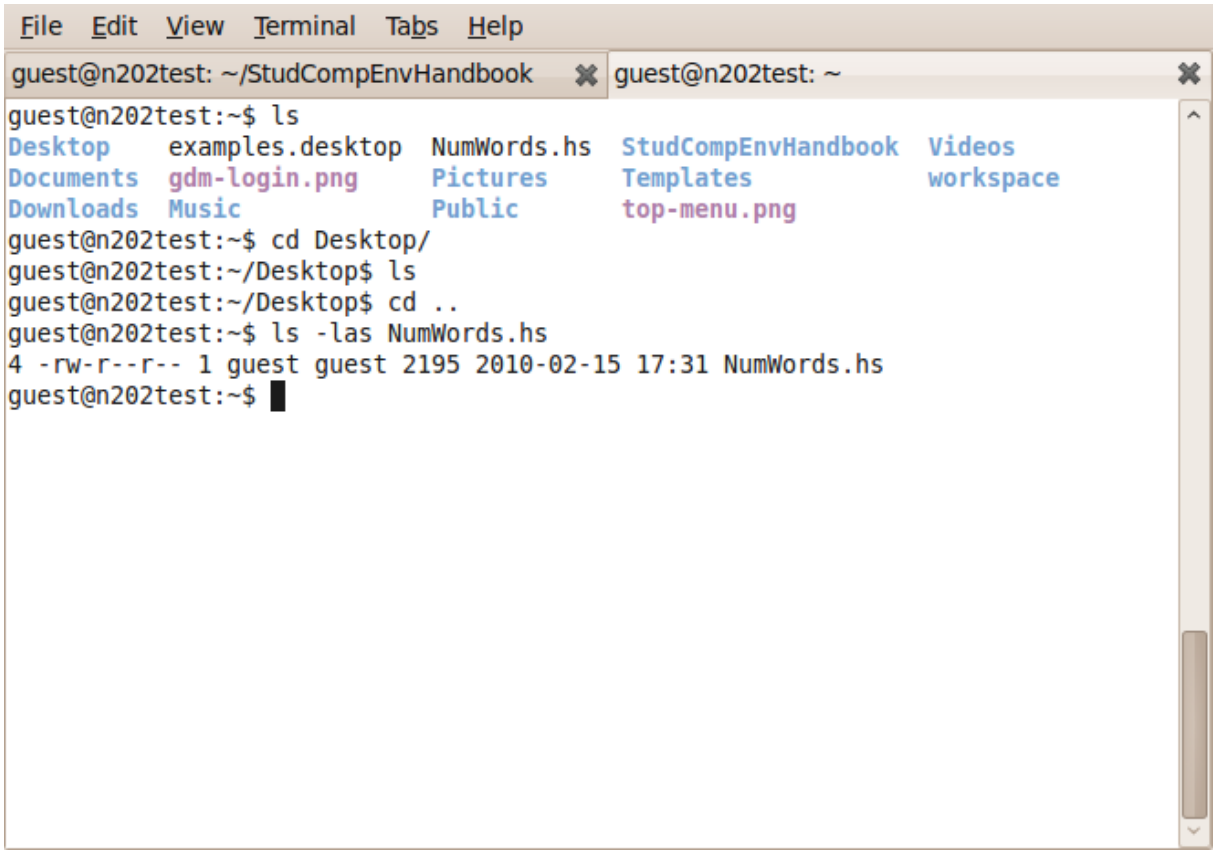


Figure 9.1: Sample Terminal window with simple commands

To view a text file in a Terminal window, use the `less` command, e.g. `less game.java`. The `more` program scrolls the text in the document one Terminal window at a time. Press space-bar for the next screen full, `b` to go back a screen full, `q` to quit back to shell prompt or `?` for help on other commands while `less` is running.

To edit a text file, see the earlier chapter on Editing text files.

For online help with most Linux/Unix commands you should become familiar with the `man` (manual) command. For example, to find out more about the `less` command, you can type: `man less`
To find out more about the `man` command, type: `man man`
etcetra.

This is a VERY MINIMAL description which might help new command line users get to the desired directory, and enter simple commands to submit and check files and to check your marks. See figure 9.1 for an example `Terminal` session with some simple commands.

Use a web search engine to find plenty of good online tutorials on using the Unix/Linux command line and commands. Eg. searching for 'beginners guide to unix commandline' will turn up lots of useful tutorials.

Chapter 10

CD burning and USB memory sticks

It is a common knowledge that the longer a user guide manual, the less people tend to make use of it. This manual is already long enough to be useful. Therefore, we will provide only references to two remaining topics of interest: how to use KDE to burn your own copy of a CD, and how to use a USB portable memory device (aka USB stick). After all, whence you do need to do those sort of things, you must already be logged-in into the system, and therefore you will be able to access the following web pages and find the information required.

10.1 Burning your own CD

http://cs.anu.edu.au/students/Documentation/CDWriting

10.2 Copying to and from USB memory sticks

http://cs.anu.edu.au/students/Documentation/USBMemory

Happy burning!

Chapter 11

Remote Access

Being able to access files stored on the CSIT Student Computing server is a convenience many students take advantage of. Whether it is the library, home, residential colleges, or anywhere with access to the Internet, the CSIT Student Computing server can be accessed remotely through many (free and open source) applications. This section provides the basics to getting started with working remotely for the three common operating systems.

A warning: there are a lot of features within the programs listed below. Take your time, browse and try, or search for answers. Build familiarity through use.

Your files on the CSIT Student system can be accessed from the 'partch' server:

partch.anu.edu.au

You will need to provide your UniID (u1234567) and password.

11.1 Accessing from Linux

Two methods of accessing files on the partch server are from a terminal and from the file explorer.

11.1.1 SSH and SCP

From a terminal (find the *Terminal* application in *Applications*), to access and browse the server, use

```
$ ssh u1234567@partch.anu.edu.au
$ ssh -X u1234567@partch.anu.edu.au
```

The '-X' option is for running graphical programs (such as Firefox or a word processor) remotely.

First time access may have the following message:

```
The authenticity of host partch.anu.edu.au (150.203.24.13) cant be established.
RSA key fingerprint is c8:ad:18:32:da:37:6f:d5:72:ab:c9:8b:8e:e7:f2:59.
Are you sure you want to continue connecting (yes/no)?
```

Type yes and press enter. You will then be prompted for your password. Type your password and press enter.

Files can be edited using terminal text editors such as `nano` (best for first timers), `vim` (very small and a bit weird to use), or `emacs` (seriously extensible and feature packed).

```
$ nano myfile.txt
$ nano foobar.c
```

To transfer files between computers, use

```
$ scp <source> <destination>
$ scp <stuff> u1234567@partch.anu.edu.au:~/folder
$ scp mystuffonpartch/ /home/u1234567/myhomedrive
$ scp -r mystuffonpartch/ me@255.255.255.255:~/mydriveathome
```

The '-r' option is for copying folders (i.e. recursively copy).

11.1.2 Explorer-like Interface

To access the files using an explorer-like interface (in Ubuntu):

1. Select 'Places' in the main panel (default is top of screen).
2. Select 'Connect to Server...'.
   (a) Service type: SSH
   (b) Server: partch.anu.edu.au
   (c) Ignore Port (it is 22 if needed)
   (d) Ignore Folder (it is /students/u1234567 if needed)
   (e) User Name: u1234567
   (f) Bookmark means to save the configuration for quick access next time.

The files on the server can be edited using a text editor and saving will update the server copy.

11.1.3 Notes

Each linux distribution will have small variation on connecting to the partch server, especially the explorer-like interface. The '-X' option requires fast Internet speeds and also places extra strain on the server, so please use it sparingly and only when necessary.

11.2 Accessing from Windows

11.2.1 Swish

For a Windows Explorer style of browsing your files on the partch server, you will need to map to a network drive using Swish (Windows does not support SFTP). Instructions from the Swish Website:

1. Download and Install Swish
   (a) http://www.swish-sftp.org/
   (b) http://en.wikipedia.org/wiki/Swish_%28SFTP_client%29
2. Open *Computer* (XP - open *My Computer*) and double click on the Swish icon.
3. (XP - Select *Tools* then) Click *Add SFTP Connection*.
4. 'Host' is the partch server (see above) and 'User' is your UniID (u1234567).
5. The Path is /students/u1234567.

You should be able to explore your files on partch as if they were on your computer. Copying files to and from the server is done through dragging/dropping between two explorer windows. Cutting and copying does not always work consistently. To move files, copy then delete. Files can only be viewed or edited using a text editor (such as Notepad++). You cannot open PDFs or play music on your PC using data from the server. This is because the server only supports text/binary data transfer.

11.2.2 WinSCP

An alternative to Swish is WinSCP. WinSCP provides basic services to access remote file systems through FTP and SFTP. WinSCP has a file transfer manager that supports drag and drop between two file lists (your computer and the server). WinSCP has a remote editor feature, which means an inbuilt text editor to edit files and automatic update of those files on the remote server when saved. You can provide your own editor with syntax highlighting such as NotePad++. WinSCP has an inbuilt terminal, but for the same feel as linux terminals, use PuTTY - WinSCP can open PuTTY terminals.

- WinSCP
  - http://winscp.net/
  - http://en.wikipedia.org/wiki/WinSCP
- NotePad++
  - http://notepad-plus-plus.org/
  - http://en.wikipedia.org/wiki/Notepad%2B%2B
- PuTTY

  - http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html
  - Download putty.exe
  - http://en.wikipedia.org/wiki/PuTTY

11.2.3 Notes

For support of many other protocols such as WebDAV, Amazon S3, Google Storage, Google Docs, Windows Azure and Rackspace Cloud Files, use Cyberduck described below. The user interface requires login information as described above in this section. The interface is explorer-like, so downloading and uploading files requires explicit click commands.

11.3 Accessing from Apple Mac OS X

Apple Mac computers have interfaces like both Linux and Windows described above. Open a Mac terminal (the *Terminal* application in the *Utilities* folder under *Applications*) and connect in the same way as the Linux section above. For an explorer-like interface, Cyberduck and Transmit are shown here, which are similar to WinSCP and Swish in the Windows section above.

- Cyberduck
  - http://cyberduck.ch/
  - http://en.wikipedia.org/wiki/Cyberduck
- Transmit
  - http://www.panic.com/transmit/
  - http://en.wikipedia.org/wiki/Transmit_(FTP_client)

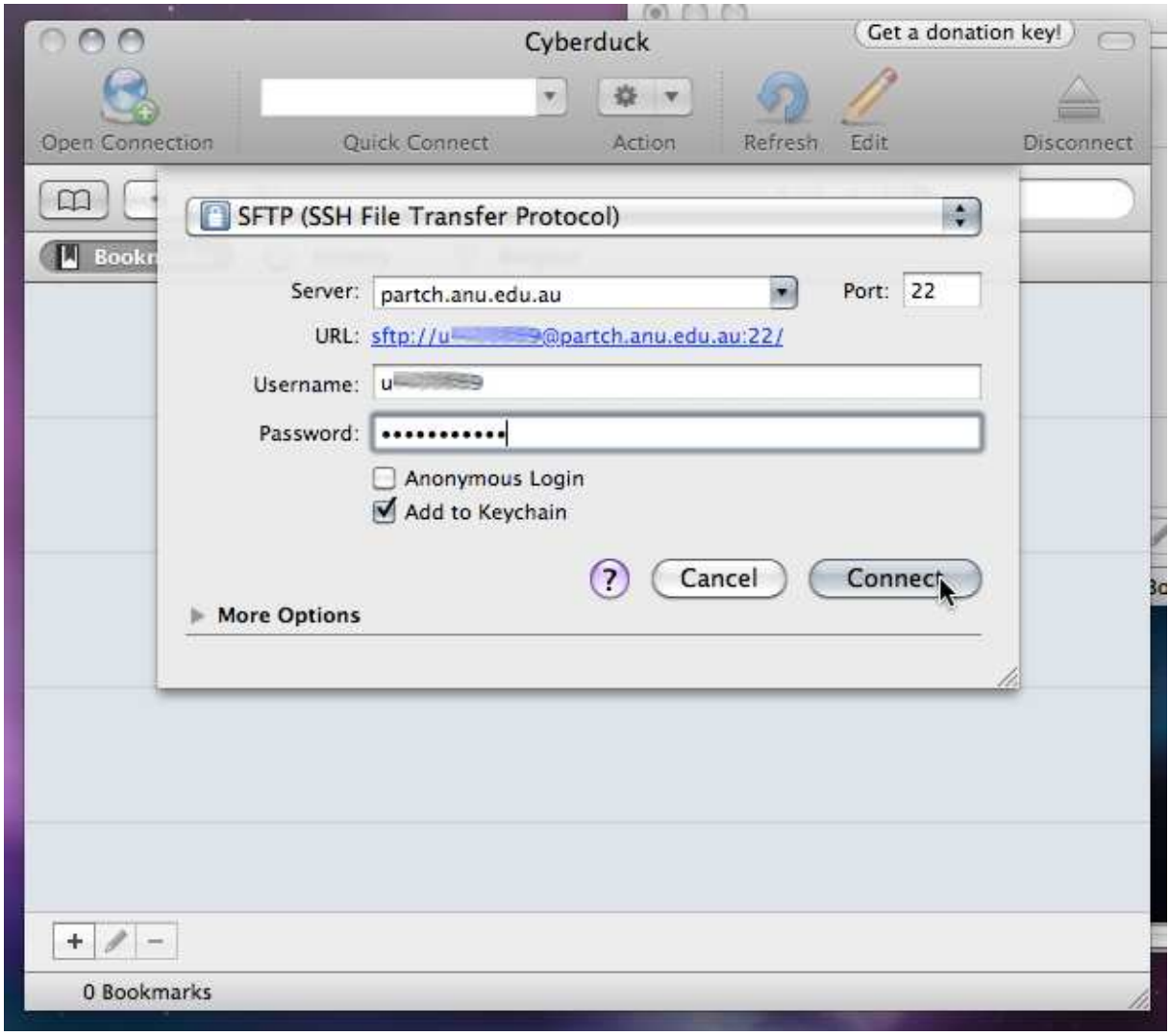
11.3.1 Cyberduck

Cyberduck is a free and open source application that can be used to transfer files to and from partch using an Explorer-like interface.

To connect to partch using Cyberduck:

1. Open Cyberduck
2. Click open connection
3. Select SFTP from the drop-down menu at the top of the dialog
4. Set server to partch.anu.edu.au
5. Set username to your username
6. Enter your password in the password field

7. Leave anonymous login unchecked
8. Leave port set to 22
9. Click connect

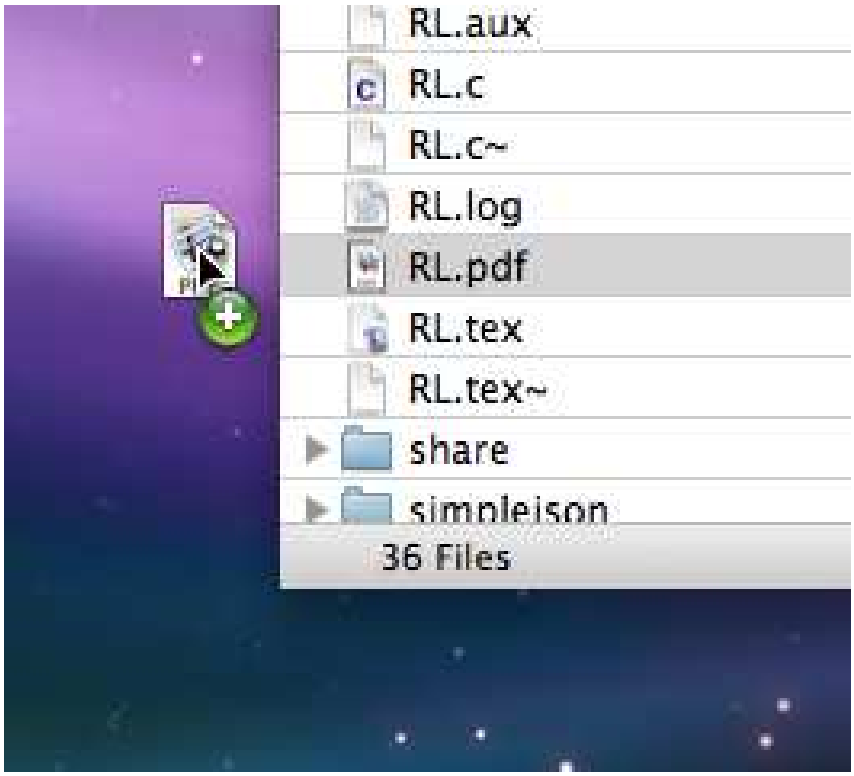


After a few seconds, Cyberduck will have connected to partch. To transfer files to partch, drag-and-drop files from a Finder folder to the Cyberduck window. To transfer files from partch, drag-and-drop files from Cyberduck to a folder in Finder.

11.3.2 Transmit

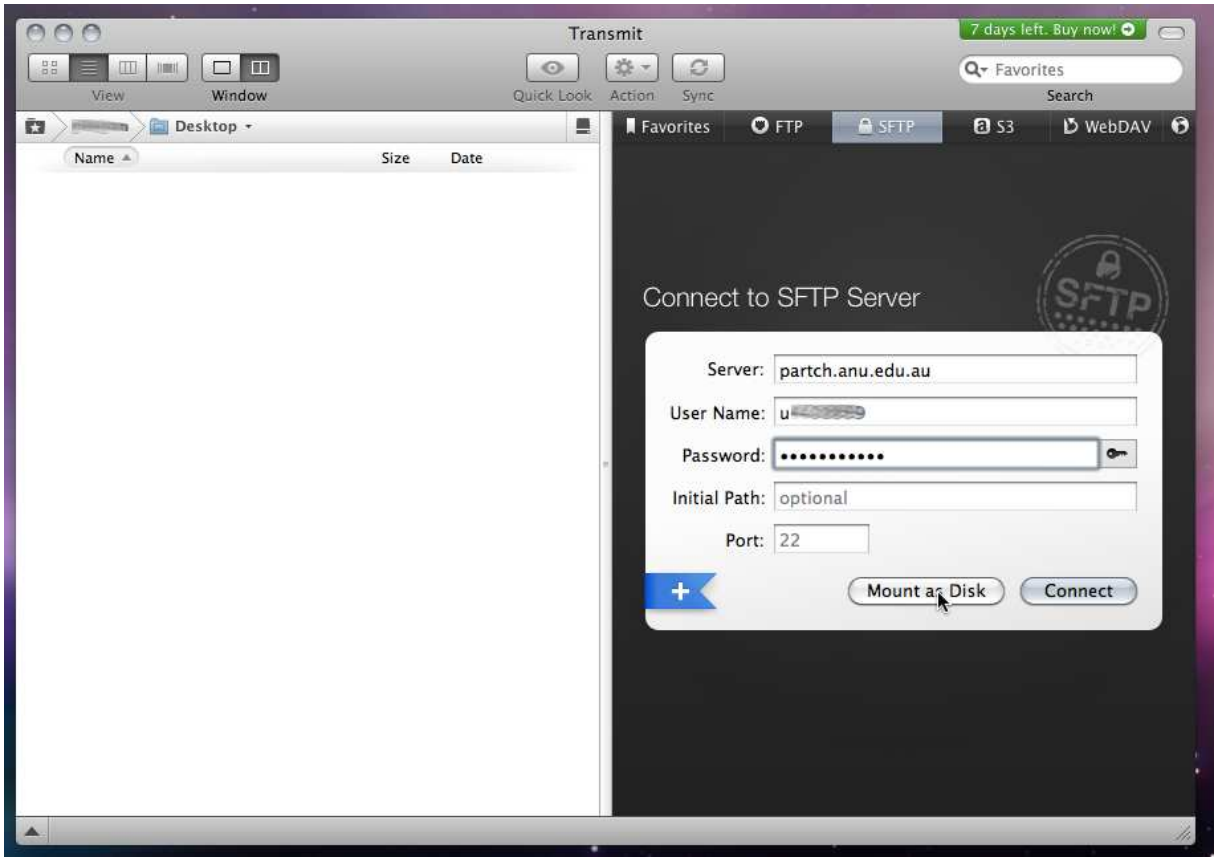
Trasmit is a proprietary alternative to Cyberduck. Unlike Cyberduck, Transmit offers Finder integration, allowing partch to be used as if it were just another folder on your local machine.

To connect to partch using Transmit:



1. Open Transmit
2. Switch to the SFTP tab in the right-hand pane
3. Set server to partch.anu.edu.au
4. Set username to your username
5. Enter your password in the password field
6. Leave initial path as empty (optional)
7. Leave port set to 22
8. Click Mount as Disk

Transmit will take a few seconds to mount partch as a disk. After this has completed, partch should show up on the desktop just like any other hard disk. partch can now be opened in Finder and files can be transferred between partch and the local machine just as files between two different folders.


Transmit
7 days left. Buy now!
View
Window
Quick Look
Action
Sync
Favorites
Search
Desktop
Name
Size
Date
Favorites
FTP
SFTP
S3
WebDAV
Connect to SFTP Server
Server: partch.anu.edu.au
User Name:
Password:
Initial Path: optional
Port: 22
Mount as Disk
Connect