
The Australian National University, School of Computing
COMP2400/6240 (Relational Databases)
Semester 2, 2023

Lab 1, Week 2 Lab Environment

By the end of this week's lab session, you should be familiar with the basics of the student computing environment.

We have a wide range of skill levels in the class, so some of these exercises are very basic. If you have done an exercise many times before, using the School of Computing lab computers, then feel free to skip to the next exercise. On the other hand, make sure you understand these basics, because you need these skills to succeed in the course.

The ANU School of Computing has a great resource for the basics of using the *Student Computing Environment*. The website is available from <https://cs.anu.edu.au/docs/student-computing-environment/>.

Each activity will be shown in the following format.

(1). *Notice what the exercises look like.*

When you see an item like this, it means you need to do something. Sometimes further explanation of the task will follow. In most cases, you should keep some record of what you did, for example if the instruction asks you to do a database query, you should save the SQL in a file so you can show your tutor.

1 Log in, view important web pages using the lab computers

(1) *Activate your account in CSIT lab environment*

If you haven't done so, you must log in to STREAMS at <https://cs.anu.edu.au/streams/> to activate your account in the CSIT computing environment. Log in with your ANU ID and password. You only need to first log in and then log out, and no other action is required.

(2) *Log in.*

Sit down at a computer and enter your username and password. If, for example, your student number is 1234567 then your username is u1234567. Your password is initially set to your Personal Access Code (PAC) which is issued with your student card. If you wish to change your password (and I strongly recommend that you do), do so on-line at <https://identity.anu.edu.au>. If you have forgotten it, go to InfoPlace (located on the 3rd level of the Chifley Library) for help.

A laboratory machine that is available for use will present you with a login screen. Type in your username, followed by the Enter key, then your password, again followed by the Enter key.

When you are finished in the lab, remember that you must ALWAYS terminate your session by logging out. Do this by clicking the top-right button on the top edge panel and select your name and click “Log Out”. This closes down your session so that the next user cannot access your account, and leaves the machine in an appropriate state for the next user.

(3) *Look for the following features on your desktop:*

- The bottom-left button on the screen. You can select to lock, restart and shut down the computer, or log out your account (select your name and click “Log Out”).
- Click the bottom-left button to show a range of applications.

(4) *Start a web-browser (preferably Firefox).*

Clicking the bottom-left button → Find **Firefox Web Browser** and click on “Firefox Web Browser”, it may take a while for the web browser to open up. Some useful links to check out.

- <http://www.anu.edu.au/students/> has lots of useful information for students, in particular, timetabling information.
- <http://wattlecourses.anu.edu.au/> for the course information.

2 Organise directories, download and edit files using the lab computers

Summary for the impatient: *Create a directory for this course in your home directory (eg `comp2400` or `comp6240`), and a subdirectory in there for labs (eg `labs`), and a subdirectory of that for this week's lab (eg `week02`). Download `ANU.txt` from the course's Wattle site into this week's directory, open it with a text editor and fix the typos in the first paragraph.*

File Manager and Directories

(5) Start File Manager

You need to become familiar with the Unix file system and the Gnome utilities that let you interact with the files and directories in the file system. Directories are also referred to as folders.

Start the default file manager by clicking **Files** button on the left-edge panel. This will display your `home` directory. Your `home` directory contains a number of default directories.

You can store files in your `home` directory and you can create directories in your `home` directory. Each of those directories can in turn contain files and further directories, each of which can contain further files and directories, and so on. Your home area (the `home` directory and its internal directories) is the only place where you are allowed to store files. Over the semester you will work on many files in COMP2400/COMP6240 so you will need to organise them in some logical way to keep track. for more information on the file manager.

(6) *Create a directory structure for COMP2400/COMP6240 lab work, make sure you have a folder to keep this week's exercises in.*

You should create a new directory for yourself whenever it is convenient, in order to organise your work, just as you organise your paperwork into folders and then organise the folders into binders. If you do not already have a `comp2400` (or `comp6240`) directory in your `home` directory, create it and then display its contents (it will be empty).

In `comp2400` (or `comp6240`) you will generate and work on many files. There will usually be several files associated with practical exercises each week, along with examples from lectures, your assignments and so on. Clearly you will need some way to organise all this material. As a starting point, you should create a directory called `labs` in the `comp2400`

(or `comp6240`) directory you have just created. Now, inside `labs`, make a directory called `week02` for all the files related to this week's practical exercises. Each week you should make another directory with a sensible name like `week03`, `week04` and so on. When you start working on assignments, organise them in a similar fashion. When you collect and experiment with examples from lectures, keep them organised. Start out with good habits and you won't regret it.

Download a File

(7) *Download the file ANU.txt*

Using the web-browser, download the file `ANU.txt` from the link on Wattle (close to where you found this lab-sheet). Save it into your directory for this week's lab. An easy way to do this is to right-click on the link and choose **Save Link As** (choose the location as you wish) or to left-click on the link and select "Save File" (the default location will be the "Downloads" folder under your home directory).

Editing Files

There are several editors available on the student system (refer to Chapter 7 of the *Student Computing Environment: User Guide*). For example, **gedit** is the default text editor on the student system, and whenever you double click a text file, you will open the file in **gedit**.

(8) *Open ANU.txt in gedit.*

Open the file `ANU.txt` in **gedit**. Click on the **Files** button on the left-edge panel, try find your copy of the file and double click on it, which will open the file with the default text editor **gedit**. But, depending on the configuration of your environment, it may launch another editor. If clicking on `ANU.txt` in the file browser did not launch your preferred editor, your tutor will be able to help you to customise the file association preferences in the file browser. You can also look in the Gnome Help Centre for instructions, and you should be able to work it out for yourself.

Alternatively, you can open a **gedit** window by clicking the bottom-left button and search for **gedit** in the top panel. Then, select **Open**, and find the file you want to edit. You should try both of these methods of opening a file for editing.

When you have opened `ANU.txt` in **gedit**,

(9) *Carry out the following actions.*

- Move the cursor around using the arrow keys.
- Correct some spelling mistakes in the first paragraph of the article using the arrow keys and the **Backspace** key.
- Select a section of text by holding down the left mouse button and dragging. Use the **Edit** menu to copy that selection and to paste it somewhere else in the file.
- Save the new version of the file by clicking **Save**.
- Create a new text file by clicking the button (“**Create a new document**”) next to “**Open**” and write “Hello, World!” in this new file.
- Save this new text file as a file named `hello.txt` into your directory for this week’s lab using “**Save**” (or “**Save As**” under the menu button next to “**Save**”).

3 Unix Shell

(10) *Open a command shell.*

Launch a terminal window by clicking on the **Terminal** button on the left panel. This gives you access to the command line interface and you can type Unix commands in this terminal window. The program that processes your commands is sometimes called a *shell*. You will see the following command line interface: `u1234567@n11X1tYZ:$`

(11) *Use the `pwd` command to print the current working directory on the screen.*

Type the command `pwd` (and press Enter) in a terminal window. The `pwd` is used to print the current working directory on the screen. When you first log in, the current directory is your **home directory**.

```
u1234567@n11X1tYZ:$ pwd
```

(12) *Use the `ls` command to list directories.*

Directory listing: Type the command `ls` (and press Enter) in a terminal window. The `ls` command is used to list the files and sub-directories in the current directory. (In window interfaces like Gnome, directories are often called folders.) When you first log in, the current directory is your **home directory**. You should see the `comp2400` (or `comp6240`) directory you created earlier.

```
u1234567@n11X1tYZ:$ ls
```

Changing directory: You have already moved around the directory structure using the file manager. You can also move around using Unix commands.

(13) *Try each of the following commands:*

- Type the command `cd comp2400` to change into your `comp2400` directory.
- Type `pwd` (path of the current working directory) to find out what the current directory is.
- Type the command `cd ..`
- Use the `pwd` command to find out where you have gone.
- Use `cd` to change the current working directory to your `home` directory as you first log in.

Your working directory is always the one containing the files you are working on at that time. You should always change to that directory at the beginning of a session.

4 Login to the partch server and start PostgreSQL on the partch server

In this course, we will use the open source relational DBMS PostgreSQL. We have installed a PostgreSQL database management system on a server called `partch`, which is maintained by IT support at the ANU College of Engineering, Computing & Cybernetics (CECC). In order to practice the lab exercises of this course, you need to access the server `partch` from your lab computer. To do this, we use the “secure shell” program `ssh`.

(14) *Open a command shell and log in to `partch` by typing `ssh u123456@partch.anu.edu.au` (and press Enter) at the command line in the terminal window*

```
u1234567@n11X1tYZ:$ ssh u1234567@partch.anu.edu.au
```

Although `partch` is a different server to the lab computer in front of you, they share the same file system that has been linked to your personal account, so all your files will be available on whichever machine you use.

(15) *Use the `pwd` command to print the current working directory on the screen.*

Printing the current working directory: Enter the command `pwd` in a terminal window. The `pwd` command is used to print the current working directory on the

screen. When you first log in, the current directory is your **home directory** on the **partch** server. `u1234567@partch:$ pwd`

(16) *Practice the previous Unix Shell commands on the **partch** server*

You will find out that the lab computer and the **partch** server share the same files and directories under your **home directory**.

Now we will begin to use the database management system (DBMS) PostgreSQL. Documentation for PostgreSQL, including a great tutorial, can be found at <https://www.postgresql.org/docs/14/index.html>.

The main interface for the DBMS works similarly to the UNIX shell, and is entered from the shell by typing the command **psql**.

(17) *Start the PostgreSQL interface by entering **psql** in your terminal.*

```
u1234567@partch:$ psql
```

There are two kinds of commands that the PostgreSQL interface can handle, SQL queries and commands, and PostgreSQL commands. The PostgreSQL commands always begin with ****.

(18) *Type **\q** to quit **psql** and return to the Unix shell on the **partch** server.*

```
u1234567=> \q
```

(19) *Type **logout** to logout from the **partch** server and return to the Unix shell on the lab computer.*

```
u1234567@partch:$ logout
```

5 Start PostgreSQL on the local computer without logging to the **partch** server

Note that **psql** has also been installed locally on each lab computer, but you are recommended to use the **psql** installed on the **partch** server. The information (e.g., tables) stored through the local **psql** on each lab computer is not linked to your personal account and you can not retrieve it next time you login. The information stored through the **psql** on the **partch** server is linked to your personal account and you can retrieve that next time you login to the **partch** server (from the same or different lab computer, or access the **partch** server remotely from your personal computer).

(20) Start the PostgreSQL interface by entering `psql` in your terminal.

```
u1234567@n11X1tYZ:$ psql
```

(21) Type `\q` to quit `psql` and return to the Unix shell on the lab computer.

```
u1234567=> \q
```

Students may mix up commands for the shell and DBMS, try to always remember which one you are in. The prompts are different:

- The shell on your lab computer shows you

```
u1234567@n11X1tYZ:$
```

- The shell on the partch server shows you

```
u1234567@partch:$
```

- The `psql` on the partch server or on the local lab computer shows you

```
u1234567=>
```

That's all for this week's lab.

Remember to log off before you leave (Click the top-right button, select your name and click "Log Out").

Appendix

(22) Log into your account on the `partch` server from your own computer.

Some of you might want to access the `partch` server from your own personal computer. To do this, you need to set up the remote interaction in your personal computer following the instructions given in "Setup Your Lab Environment (Remote Access)" on the course Wattle site.