

# Practise Exercises

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October 2011

Here are some exercises to make sure you understand the material. Feel free to invent your own.

## 1 Using ADS, NED, Simbad and SkyView

1. Search for Pettini et al (1999). What journal was it in?
2. Print the 1st page of Kennicutt (1998), ApJ, 498, 541
3. Find all papers with Carswell as the first author between 1990 and 2000
4. Find papers authored by Andy Fabian on the Abell 1795 cluster, after 2000
5. Find all the papers which cite Navarro, Frenk & White, 1997, ApJ, 490, 493
6. What is the redshift of the Coma cluster?
7. What is the position of NGC 1000 in B1950 coordinates?
8. Use SkyView to make a simple X-ray map of the Centaurus cluster. Save this image to disk as a fits file, get another image of the cluster in optical (DSS) for a similar area of sky. Use ds9 to make a contour map of the optical on the X-ray map.

## 2 Simple shell usage

1. Make a file called `me.txt` containing your name. Can you keep emacs running while you continue typing in your shell?
2. Make a new subdirectory in you home directory, `test1`.
3. Copy the file `me.txt` into the subdirectory as `me_copy.txt`.
4. Make sure you can use `cd` to move between your home directory and that subdirectory.
5. Rename the copy to `me_renamed.txt`. Can you rename it when you are still in your home directory?
6. Using `echo` and a shell redirection, add your date of birth to the copy.
7. Using `ls` compare the size of the two files and understand why the size difference is what it is.
8. Try using the `diff` command to compare the files.
9. Delete the subdirectory and the copy of `me.txt`.
10. Modify the permissions of `me.txt` so that no other users besides yourself can read it.
11. Using `pine` send `me.txt` to one of the group (or your favourite email program).

12. Try using `date` to add the date to the end of `me.txt`.
13. Put two copies of `me.txt` (choose your own file names) into a new subdirectory (`test2`). Use `gtar` or `tar` to backup that directory to `test2.tar.gz`.
14. Use `tar` or `gtar` to restore the contents into a directory `test3`.
15. Type `sleep 2000 &`. Use `ps` to identify the process. Use `kill` to get rid of it. Try using `top` as well.
16. How much disk space are you using in your home directory?

### 3 More complex shell usage

1. Make two files, `test.txt` containing some text, and `test.dat` containing the text ‘test.txt’. What command line is required to use `test.dat` to print the contents of `test.txt`?
2. Make a file containing two columns of numbers. Use `awk` to print out the average of each row and their sum. Use `awk` to print the sum of each column.
3. Sort the output of the previous exercise on the first and then the second columns.
4. Make a file containing text including the word `red`. Use `sed` to substitute `green` for `red`.
5. Use the `find` command to find all files called `*.txt` in your home directory and subdirectories.
6. Count the lines of the files listed from the above `find` command.
7. Add `/home/username/testdir` to your `PATH` environment variable.
8. Show the text ‘() <> &’ using the `echo` command.

### 4 Basic L<sup>A</sup>T<sub>E</sub>X usage

1. Write a simple L<sup>A</sup>T<sub>E</sub>X document to print out your name and your previous university.
2. Add a title, author and date to the document.
3. Add a second paragraph containing the equations  $V = IR$ ,  $\alpha = \beta + \gamma$ ,  $a = \frac{b}{c}$ ,  $N_H = 10^{22} \text{ cm}^{-2}$ ,  $a = \int_0^8 x^2 dx$ .
4. Add section heading before the first paragraph ‘Introduction’, and add a subsection heading before the second, ‘Equations’.
5. Use `emacs` to spell check the document.
6. Use `emacs` to search and replace 22 with 23.
7. Use `emacs` to switch round the first and second paragraphs.
8. Can you use *emphasised*, SMALL CAPS, `typewriter`, and `sans-serif`?
9. Make a table with two columns, e.g. ‘animal’ and ‘can it fly?’. Add some data entries to the table. Change the alignment of the columns in the table.
10. Add an equation environment to your document (`\begin{equation} ... \end{equation}`) containing an equation. Use a label to refer to the equation in your text.
11. Use a label to refer to your table in your text.

## 5 Plotting

1. Generate points in a file  $(x, y)$ , with  $y = x^2 + 1$ . Plot the points. Also plot with lines between the points.
2. Make the axis labels “The X Axis” and “The Y Axis”.
3. Generate a postscript file from the plot.
4. Add  $y$  error bars to the plot, where  $\sigma = 0.25$ .
5. Add a second data series of your own choosing.

## 6 More complex usage of L<sup>A</sup>T<sub>E</sub>X

1. Take the postscript file from the plotting exercises and insert it in your L<sup>A</sup>T<sub>E</sub>X document.
2. Make a table with three columns in the document (choose your own data). Place horizontal lines before and after the rows.
3. Take some papers from ADS and construct a BibTeX archive. Make sure that you can use it within an article.
4. For the more adventurous, take figure 6 from astro-ph/0109336, and place it in your paper.
5. Make a simple paper using the *Monthly Notices* style file (for postgraduates only).

## 7 Shell scripting

1. Write a shell script to start two xterms.
2. Write a shell script to take a list of files, and print out the sorted list of the sizes of the files.
3. Write a shell script to run latex three times on all its input files. The script should then generate postscript and pdf files for each.
4. Write a shell script to rename all files call `*.txt` to `*.txt.old`

## 8 Python programming

1. Write a script to multiply the first column of a file by 20.
2. Write a script to generate  $x$  and  $x^2$  if  $x$  goes from 0 to 10 in steps of 0.1.