Linux bootcamp exercises.

Exercise 1 – Basic BASH

Run some commands in bash

Look at some man pages

Figure out a switch to add and add it.

Exercise 2 – Filesystrem basics

Just using ls – make them work with relative and absolute paths. Make them use wildcards (preferably multiple wildcards) so they know how this works.

Exercise 3 – Manipulating files

View some existing files, small ones with cat, large ones with less

Move and Copy some files

Create a symlink

Edit the symlink target and show that it changes at both ends.

Delete some stuff

Use find to find some files from within a structure.

Exercise 4 – the PATH

Get them to look at their current PATH

Use which to find the location of some programs

Have a duplicated program on the system. Get them to call the non-default copy by a direct link.

Get them to modify their PATH so that they get the other copy by default.

Exercise 5 – Redirecting output

Get them to run a command, sending STDOUT and STDERR to separate places

Two files

One to /dev/null

Merged into a single stream

Use pipes to create a small workflow.

Exercise 6 – BASH looping

Maybe extend the pipeline they construct in exercise 5 and run this over a set of files.

Exercise 6 – Permissions

Look at the permissions on some relevant files.

Make some changes to permissions on local files.

Make sure execute permissions are one that we use. Turn a non-executable local file to be executable.

Exercise 7 – Installing through apt

Find a package

Install it

Check that it works

Exercise 8 – Pre-compiled packages

Download, extract and install a binary package.

Check dynamic links to other libraries

Modify the PATH so that it is default

Maybe symlink into /usr/local/bin/ to make it available.

Check the shebang line of a script file.

Exercise 9 – Source code compilation

Get them to install samtools

Will need to download, configure and install. Will fail multiple times due to missing libraries but should prompt them to install what they need.

Exercise 10 – Extending languages R

Install a CRAN package

Install a BioConductor package

Manually install a package via CMD INSTALL

Exercise 11 – Extending languages Perl

Install via CPAN

Install manually (maybe with Build.PL and configure.PL?)

Exercise 12 – Extending languages Python

Get them to try to use pip3 – it’ll fail and they can install it.

Get them to use pip3 to install some packages both globally and locally.

Manually install a package from github (Babraham LinkOn)

Exercise 13 – Using conda

Get them to install miniconda

Get them to install some applications into a new virtual environment

Switch to it and run the applications.

Exercise 14 – Using containers

Get them to install singularity, do 2.4.x so it works through standard configure/make

Get them to find a docker image and pull it down

Get them to run it as a shell

Get them to run it as an application

Exercise 15 – Troubleshooting

Given them various broken programs and make them fix them.

One not included in the path

One without read or execute permissions

One with a missing dependency (perl module)

Exercise 16 – SSH

Get them to remotely log into another server via SSH

Get them to set up an X11 tunnel to run remote graphical programs

Get them to set up ssh keys to do the connection seamlessly

Get them to run a remote command via SSH

Get them to copy data via SCP

Exercise 17 – Installing from scratch

Get them to install a fresh minimal linux distro into a VM

Exercise 18 – Maybe just as a demo

Create an Amazon virtual machine and log into it.