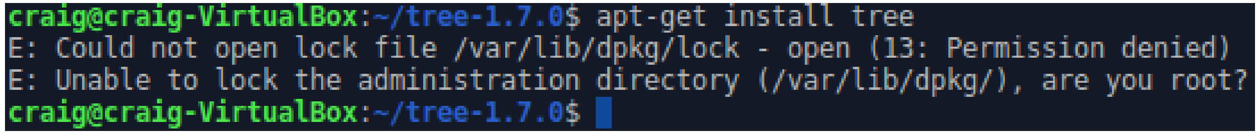
Installing Packages

- The tree package is a fun command-line tool for visualizing the directory structure.

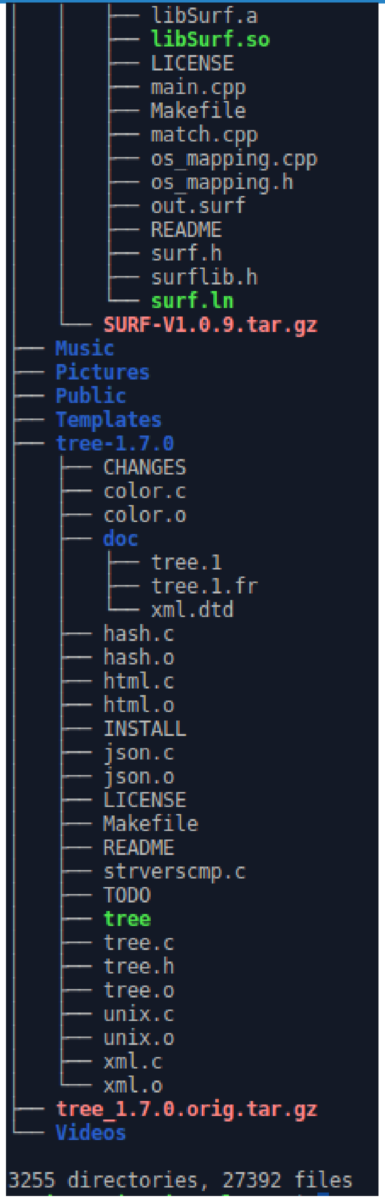
- Ordinarily you would simply install it using the package manager:

  sudo apt-get install tree



```
craig@craig-VirtualBox:~/tree-1.7.0$ apt-get install tree
E: Could not open lock file /var/lib/dpkg/lock - open (13: Permission denied)
E: Unable to lock the administration directory (/var/lib/dpkg/), are you root?
craig@craig-VirtualBox:~/tree-1.7.0$ 
```

- but you don’t have sudo privileges…



```
│   │   ├── libSurf.a
│   │   ├── libSurf.so
│   │   ├── LICENSE
│   │   ├── main.cpp
│   │   ├── Makefile
│   │   ├── match.cpp
│   │   ├── os_mapping.cpp
│   │   ├── os_mapping.h
│   │   ├── out.surf
│   │   ├── README
│   │   ├── surf.h
│   │   ├── surflib.h
│   │   └── surf.ln
│   └── SURF-V1.0.9.tar.gz
├── Music
├── Pictures
├── Public
├── Templates
├── tree-1.7.0
│   ├── CHANGES
│   ├── color.c
│   ├── color.o
│   ├── doc
│   │   ├── tree.1
│   │   ├── tree.1.fr
│   │   └── xml.dtd
│   ├── hash.c
│   ├── hash.o
│   ├── html.c
│   ├── html.o
│   ├── INSTALL
│   ├── json.c
│   ├── json.o
│   ├── LICENSE
│   ├── Makefile
│   ├── README
│   ├── strverscmp.c
│   ├── TODO
│   ├── tree
│   ├── tree.c
│   ├── tree.h
│   ├── tree.o
│   ├── unix.c
│   ├── unix.o
│   ├── xml.c
│   └── xml.o
├── tree_1.7.0.orig.tar.gz
└── Videos

3255 directories, 27392 files
```

Exercise – Compiling a package from source

- Download the source files for the tree package:

```
wget http://http.debian.net/debian/pool/main/t/tree/tree_1.7.0.orig.tar.gz
```

- If wget doesn’t work, you need to set the **http_proxy** and **https_proxy** environment variables (or just use Firefox)

```
export http_proxy="http://students\<student_number>:<password>@proxyss.wits.ac.za:80/"
export https_proxy ="https://students\<student_number>:<password>@proxyss.wits.ac.za:80/"
```

- Move the downloaded file to your home directory (if not already there):

```
mv tree_1.7.0.orig.tar.gz ~/
```

- Decompress the tar.gz file

Exercise – Compiling a package from source

- Change directory into the extracted folder:

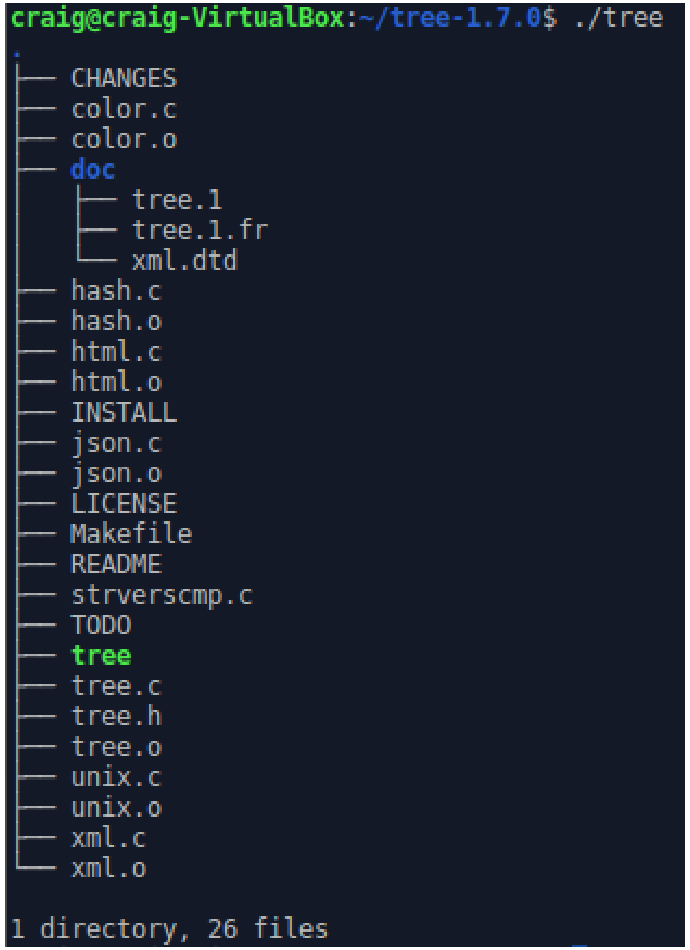
  cd tree_1.7.0

- Compile!

  make

- Run!

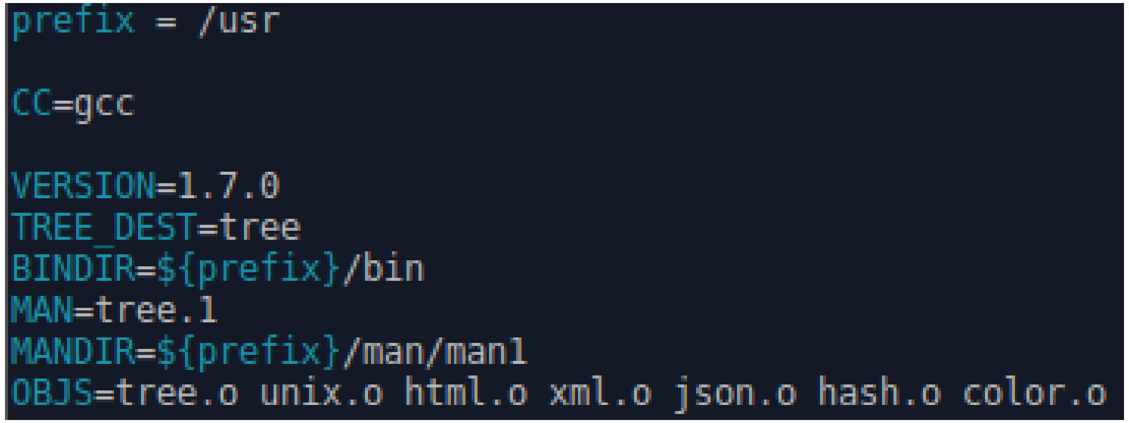
  ./tree



```
craig@craig-VirtualBox:~/tree-1.7.0$ ./tree
.
├── CHANGES
├── color.c
├── color.o
├── doc
│   ├── tree.1
│   ├── tree.1.fr
│   └── xml.dtd
├── hash.c
├── hash.o
├── html.c
├── html.o
├── INSTALL
├── json.c
├── json.o
├── LICENSE
├── Makefile
├── README
├── strverscmp.c
├── TODO
├── tree
├── tree.c
├── tree.h
├── tree.o
├── unix.c
├── unix.o
├── xml.c
└── xml.o

1 directory, 26 files
```

Exercise – Compiling a package from source

- We want to run it from anywhere, not just the tree_1.7.0 folder, by just typing tree
- The Makefile is setup to install the package in /usr (see the prefix variable)



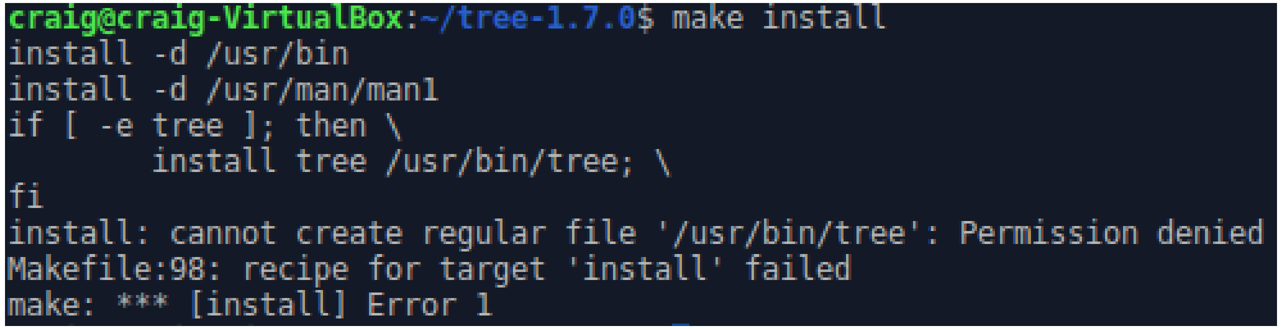
```
prefix = /usr

CC=gcc

VERSION=1.7.0
TREE_DEST=tree
BINDIR=${prefix}/bin
MAN=tree.1
MANDIR=${prefix}/man/man1
OBJS=tree.o unix.o html.o xml.o json.o hash.o color.o
```

- Install it in the default location (in this case /usr):

```
make install
```

Exercise – Compiling a package from source

- We cannot install it to the default location under /usr because we don’t have the correct permissions:



```
craig@craig-VirtualBox:~/tree-1.7.0$ make install
install -d /usr/bin
install -d /usr/man/man1
if [ -e tree ]; then \
        install tree /usr/bin/tree; \
fi
install: cannot create regular file '/usr/bin/tree': Permission denied
Makefile:98: recipe for target 'install' failed
make: *** [install] Error 1
```

- So instead of installing it for the entire system in /usr, we’re going to install it just for our current user.

Exercise – Compiling a package from source

- Edit the Makefile, change the prefix from /usr to ${HOME}/tree

- Remove the current build (important, otherwise make won’t recompile and our new prefix won’t work):

```
make clean
```

- Rebuild:

```
make
```

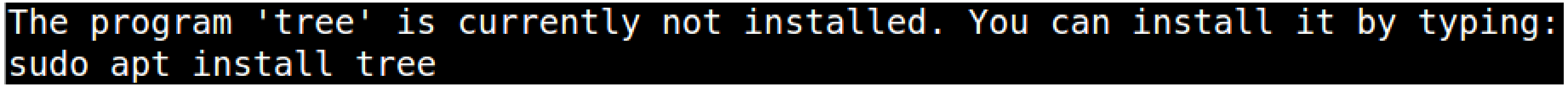
- Install:

```
make install
```

Exercise – Compiling a package from source

- Try run it without ./:

  tree



```
The program 'tree' is currently not installed. You can install it by typing:
sudo apt install tree
```

- Still no luck… why?

Exercise – Compiling a package from source

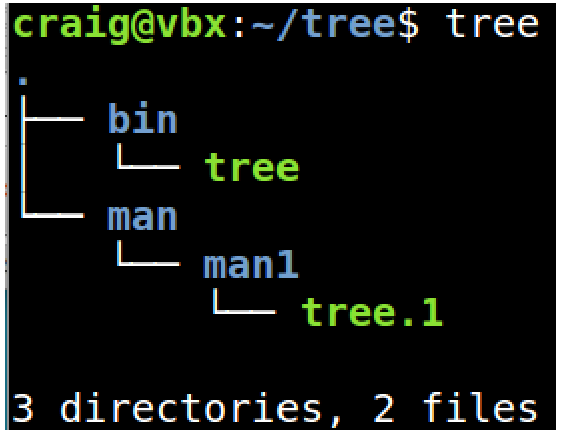
- While the tree program installed where we told it to, the Bash shell isn't looking in that location for programs when we run commands. We need to update the PATH environment variable, which is a list of locations the shell searches for executables.

- The tree executable is placed in $HOME/tree/bin, update the PATH variable to include this location:

```
export PATH=$PATH:$HOME/tree/bin
```

- Run:

```
tree
```



```
craig@vbx:~/tree$ tree
.
├── bin
│   └── tree
└── man
    └── man1
        └── tree.1

3 directories, 2 files
```

- Success!