

conda

Environments

Basics



ANACONDA[®]

Environments

If you are going to be sharing your work with others, you need to be aware of managing dependencies.

Dependencies are the libraries, including the *versions* of libraries that you have installed.

Environments

Why do you have to worry about dependencies?

- Libraries release new versions, which add, deprecate, or remove functions.
- Particular versions of libraries may not work well together.

Version 1.0

- What's new in 1.0.5 (June 17, 2020)
 - Fixed regressions
 - Bug fixes
 - Contributors
- What's new in 1.0.4 (May 28, 2020)
 - Fixed regressions
 - Bug fixes
 - Contributors
- What's new in 1.0.3 (March 17, 2020)
 - Fixed regressions
 - Bug fixes
 - Contributors
- What's new in 1.0.2 (March 12, 2020)
 - Fixed regressions
 - Indexing with Nullable Boolean Arrays
 - Bug fixes
 - Contributors
- What's new in 1.0.1 (February 5, 2020)
 - Fixed regressions
 - Deprecations
 - Bug fixes
 - Contributors
- What's new in 1.0.0 (January 29, 2020)
 - New Deprecation Policy
 - Enhancements
 - Experimental new features
 - Other enhancements
 - Backwards incompatible API changes
 - Deprecations

Package Managers

The two most common package managers for installing third party packages you'll use are *pip* and *conda*.

pip: The standard package manager for Python. Installs packages from the Python Package Index, aka PyPI, aka the Cheese Shop, the official third-party repository for Python.

conda: A package manager designed for use by data analysts/data scientists. Installs packages from Anaconda's repository. When installing, will analyze the current environment and ensure that there are no conflicts between package versions.

conda

It is recommended that you install packages using **conda** whenever possible and use pip only when a package is not available from conda.

See <https://www.anaconda.com/blog/using-pip-in-a-conda-environment> for more information.

conda

conda is not just a package manager, but is also an *environment* manager, meaning that you can create separate environments containing files, packages, their dependencies, and their own versions of the Python interpreter.

This serves two purposes:

1. Isolates your projects
2. Makes it easier to share your work and allows for reproducibility.

conda environments

Two ways to create a conda environment:

1. Start from scratch:

```
$ conda create -n <environment name> python=<version>
```

```
(base) michael@michael-HP-Pavilion-Laptop-15-cs3xxx ~ $ conda create -n testenv
python=3.8
Collecting package metadata (current_repodata.json): done
Solving environment: done

## Package Plan ##

  environment location: /home/michael/anaconda3/envs/testenv

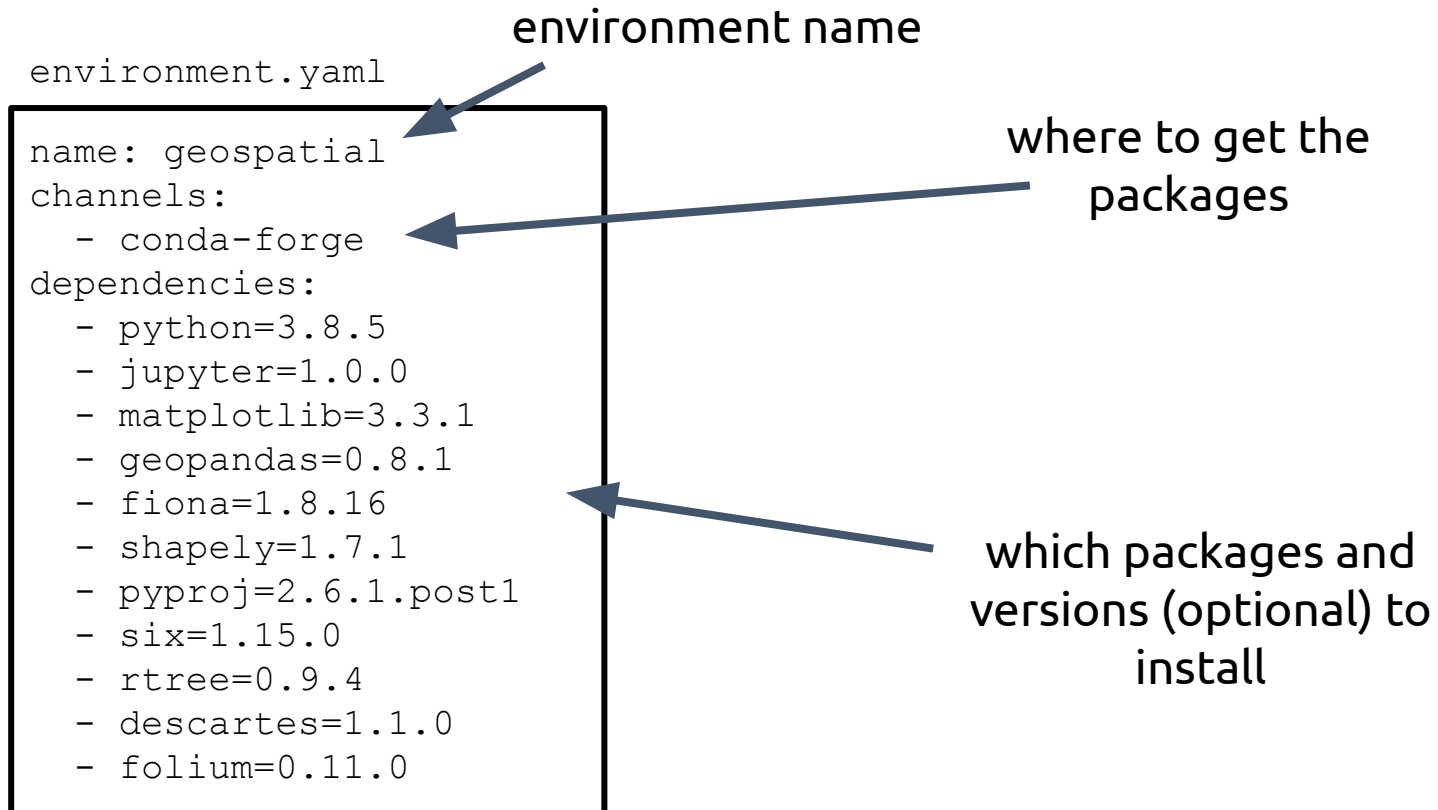
  added / updated specs:
    - python=3.8

The following NEW packages will be INSTALLED:

 _libgcc_mutex      pkgs/main/linux-64::_libgcc_mutex-0.1-main
 ca-certificates    pkgs/main/linux-64::ca-certificates-2020.6.24-0
 certifi            pkgs/main/linux-64::certifi-2020.6.20-py38_0
 ld_impl_linux-64   pkgs/main/linux-64::ld_impl_linux-64-2.33.1-h53a641e_7
```

conda Environments

2. Create from a YAML file which lists which packages and versions should be installed.



conda Environments

To create an environment from a YAML file, run this from the folder containing the environment file:

```
$ conda env create -f environment.yaml
```

```
(base) michael@michael-HP-Pavilion-Laptop-15-cs3xxx:~/Documents/temp/geo/geospatial-python-workshop
((HEAD detached at origin/package-version-update))$ conda env create -f environment.yaml
Collecting package metadata (repodata.json): done
Solving environment: done

==> WARNING: A newer version of conda exists. <==
  current version: 4.8.3
  latest version: 4.8.5

Please update conda by running

  $ conda update -n base -c defaults conda

Downloading and Extracting Packages
libnghttp2-1.41.0      | 774 KB      | ##### | 100%
libllvm10-10.0.1      | 26.4 MB     | ##### | 100%
pip-20.2.3            | 1.1 MB      | ##### | 100%
lz4-c-1.9.2           | 203 KB      | ##### | 100%
prompt_toolkit-3.0.7   | 4 KB        | ##### | 100%
libxcbcommon-0.10.0    | 475 KB      | ##### | 100%
krb5-1.17.1           | 1.5 MB      | ##### | 100%
```

conda Environments

You can see a list of all of your conda environments along with the one currently active by typing

```
$ conda env list
```

```
(base) michael@michael-HP-Pavilion-Laptop-15-cs3xxx ~ $ conda env list
# conda environments:
#
base                *  /home/michael/anaconda3
geospatial          /home/michael/anaconda3/envs/geospatial
```

This will display a * next to the active environment.

conda Environments

To switch environments, type

```
$ conda activate <environment name>
```

```
(base) michael@michael-HP-Pavilion-Laptop-15-cs3xxx ~ $ conda activate geospatial
(geospatial) michael@michael-HP-Pavilion-Laptop-15-cs3xxx ~ $ conda env list
# conda environments:
#
base                /home/michael/anaconda3
geospatial          * /home/michael/anaconda3/envs/geospatial
```

If you need to return to the base environment, type

```
$ conda deactivate
```

conda Environments

Then (as long as your current environment includes jupyter), you can launch jupyter in the current environment by typing

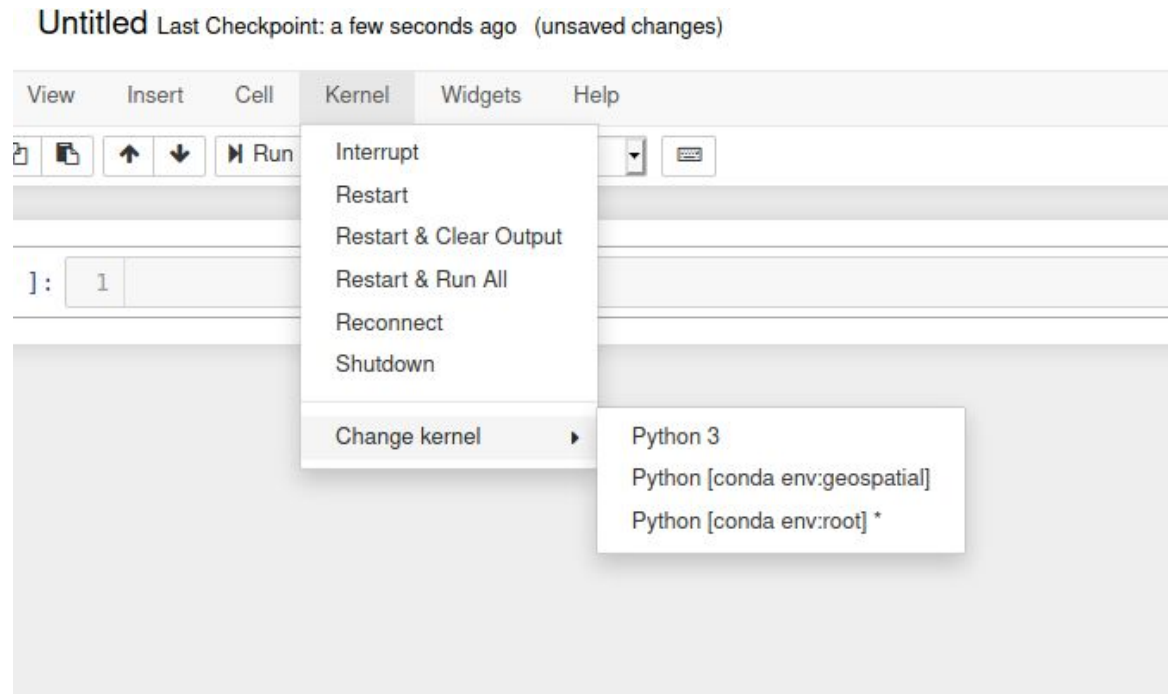
```
$ jupyter notebook
```

```
(geospatial) michael@michael-HP-Pavilion-Laptop-15-cs3xxx ~ $ jupyter notebook
[I 10:24:09.366 NotebookApp] The port 8888 is already in use, trying another port.
[I 10:24:09.371 NotebookApp] Serving notebooks from local directory: /home/michael
[I 10:24:09.371 NotebookApp] The Jupyter Notebook is running at:
[I 10:24:09.371 NotebookApp] http://localhost:8889/?token=dc72fd8e78a41802290ae2c77e5c8b143c37adab3c7ef971
[I 10:24:09.371 NotebookApp] or http://127.0.0.1:8889/?token=dc72fd8e78a41802290ae2c77e5c8b143c37adab3c7ef971
[I 10:24:09.371 NotebookApp] Use Control-C to stop this server and shut down all
```

conda Environments

You may also want to install the nb_conda_kernels package in your base environment, which lets you choose the kernel from within jupyter (as long as jupyter is installed in that environment):

```
$ conda install nb_conda_kernels
```



Installing packages

To search for a package in conda, use

```
$ conda search <package name>
```

For example, to see if plotly is available through conda:

```
(base) michael@michael-HP-Pavilion-Laptop-15-cs3xxx ~ $ conda search plotly
Loading channels: done
```

#	Name	Version	Build	Channel
1	plotly	2.0.15	py27h139127e_0	pkgs/main
2	plotly	2.0.15	py35h43bf465_0	pkgs/main
3	plotly	2.0.15	py36hd032def_0	pkgs/main
4	plotly	2.1.0	py27h77e25ac_0	pkgs/main
5	plotly	2.1.0	py35hac5c16f_0	pkgs/main
6	plotly	2.1.0	py36h56a57e5_0	pkgs/main
7	plotly	2.2.2	py27hb784091_0	pkgs/main
8	plotly	2.2.2	py35h6d67e38_0	pkgs/main
9	plotly	2.2.2	py36hd7be514_0	pkgs/main
10	plotly	2.4.0	py27_0	pkgs/main
11	plotly	2.4.0	py35_0	pkgs/main
12	plotly	2.4.0	py36_0	pkgs/main
13	plotly	2.4.1	py27_0	pkgs/main
14	plotly	2.4.1	py35_0	pkgs/main
15	plotly	2.4.1	py36_0	pkgs/main
16	plotly	2.5.1	py27_0	pkgs/main

Installing packages

Then to install in the **current environment**

```
$ conda install <package name>
```

For a specific version:

```
$ conda install <package name>=<version number>
```

```
(testenv) michael@michael-HP-Pavilion-Laptop-15-cs3xxx ~ $ conda install plotly
Collecting package metadata (current_repodata.json): done
Solving environment: done

## Package Plan ##

  environment location: /home/michael/anaconda3/envs/testenv

  added / updated specs:
    - plotly

The following packages will be downloaded:



| package        | build |       |
|----------------|-------|-------|
| retrying-1.3.3 | py_2  | 14 KB |
| Total:         |       | 14 KB |



The following NEW packages will be INSTALLED:

plotly          pkgs/main/noarch::plotly-4.8.2-py_0
retrying        pkgs/main/noarch::retrying-1.3.3-py_2
six             pkgs/main/noarch::six-1.15.0-py_0

Proceed ([y]/n)? █
```

Creating an environment.yaml

If you want to share your environment so that others can recreate it, you need to create an environment.yaml file. Two ways to do this are

1. Do it by hand by creating a .yaml file and listing the packages and versions needed.
2. Create one automatically by using the conda env export command and redirecting the output into an environment.yaml file:

```
$ conda env export > environment.yaml
```


conda

Download a conda cheat sheet here:

https://docs.conda.io/projects/conda/en/4.6.0/_downloads/52a95608c49671267e40c689e0bc00ca/conda-cheatsheet.pdf

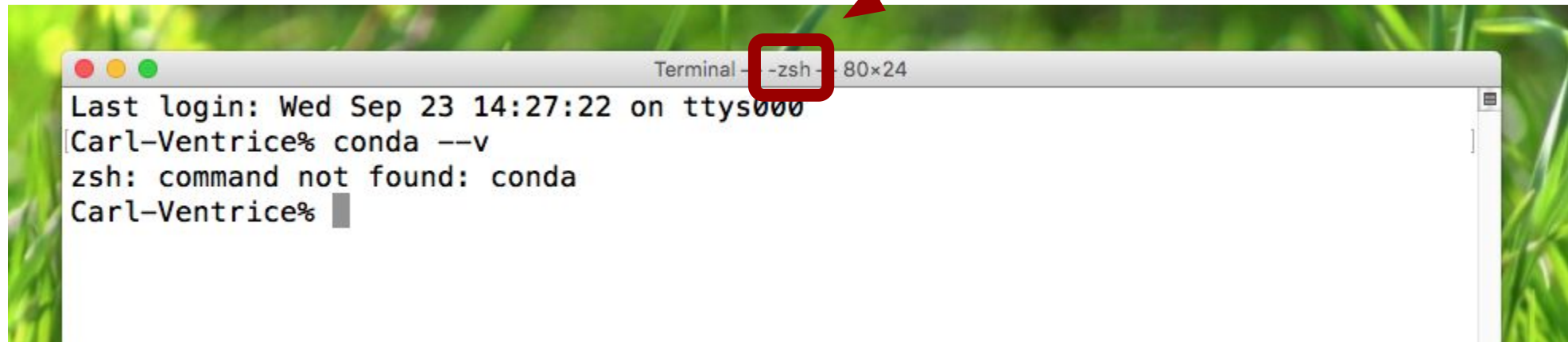
For more information, see also the DataCamp course *Conda Essentials*:

<https://learn.datacamp.com/courses/conda-essentials>

Appendix: Adding conda to PATH on Mac

Appendix

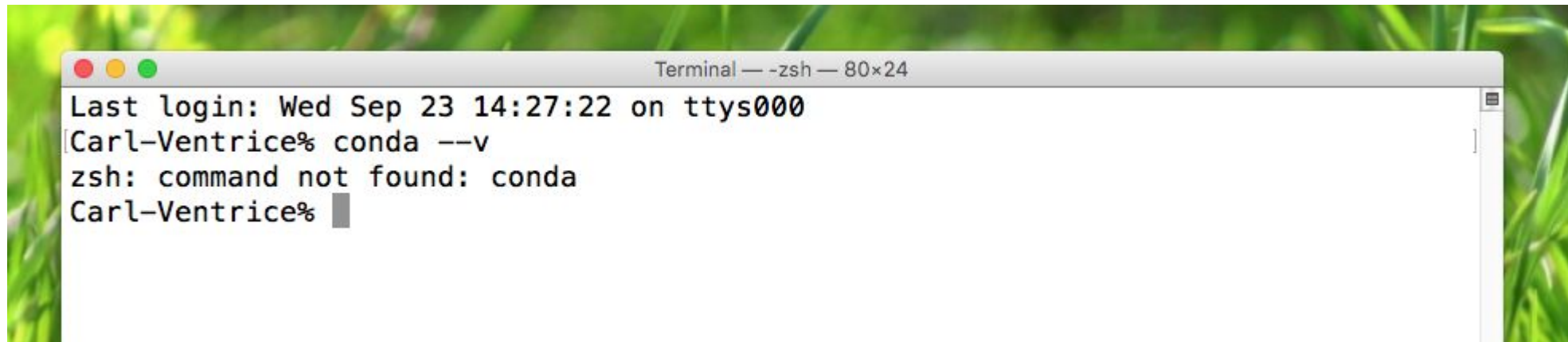
These directions will help you set up your terminal to use conda if you are using zsh. You can check this by looking at the top of your terminal window.



Note too that instead of “Carl-Ventrice”, you will see your username in the command prompt.

Appendix

If you are using a newer version of macOS, it is possible that your terminal will not recognize the conda command.

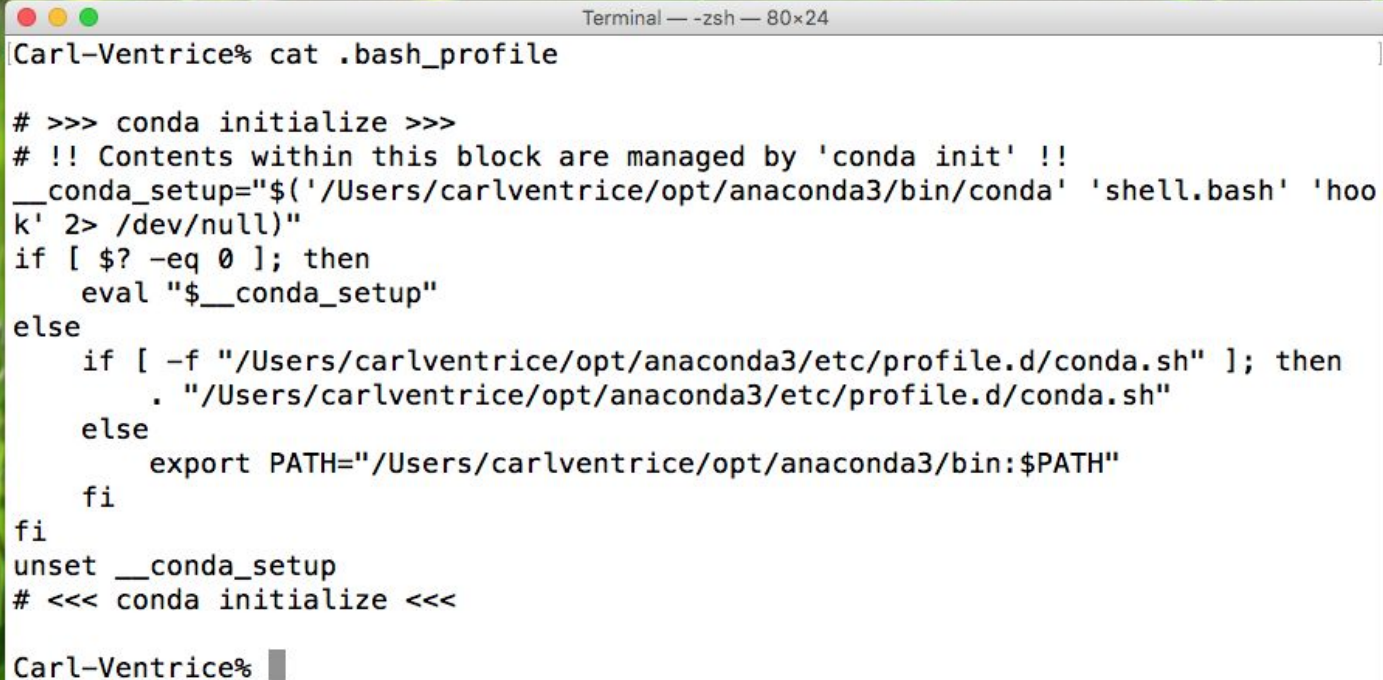
A screenshot of a macOS Terminal window. The title bar reads "Terminal — -zsh — 80x24". The window shows the output of a login session: "Last login: Wed Sep 23 14:27:22 on ttys000". The user prompt is "[Carl-Ventrice%". The user has entered the command "conda --v", and the terminal responds with "zsh: command not found: conda". The prompt then returns to "[Carl-Ventrice%".

```
Terminal — -zsh — 80x24
Last login: Wed Sep 23 14:27:22 on ttys000
[Carl-Ventrice% conda --v
zsh: command not found: conda
[Carl-Ventrice%
```

This means that we need to point your terminal to your Anaconda installation. Specifically, we will add an entry in the .zshrc configuration file.

Appendix

When installing Anaconda, it is likely that it made an entry in your `.bash_profile` file. You can verify this using `cat` (from your home directory):

A terminal window titled "Terminal — zsh — 80x24" showing the output of the command `cat .bash_profile`. The output is a shell script for initializing Anaconda. It includes comments and code for setting up the conda environment. The prompt is `Carl-Ventrice%`.

```
Carl-Ventrice% cat .bash_profile

# >>> conda initialize >>>
# !! Contents within this block are managed by 'conda init' !!
__conda_setup="$('/Users/carlventrice/opt/anaconda3/bin/conda' 'shell.bash' 'hook' 2> /dev/null)"
if [ $? -eq 0 ]; then
    eval "$__conda_setup"
else
    if [ -f "/Users/carlventrice/opt/anaconda3/etc/profile.d/conda.sh" ]; then
        . "/Users/carlventrice/opt/anaconda3/etc/profile.d/conda.sh"
    else
        export PATH="/Users/carlventrice/opt/anaconda3/bin:$PATH"
    fi
fi
unset __conda_setup
# <<< conda initialize <<<

Carl-Ventrice%
```

We specifically need the section between

`# >>>conda initialize>>`

and

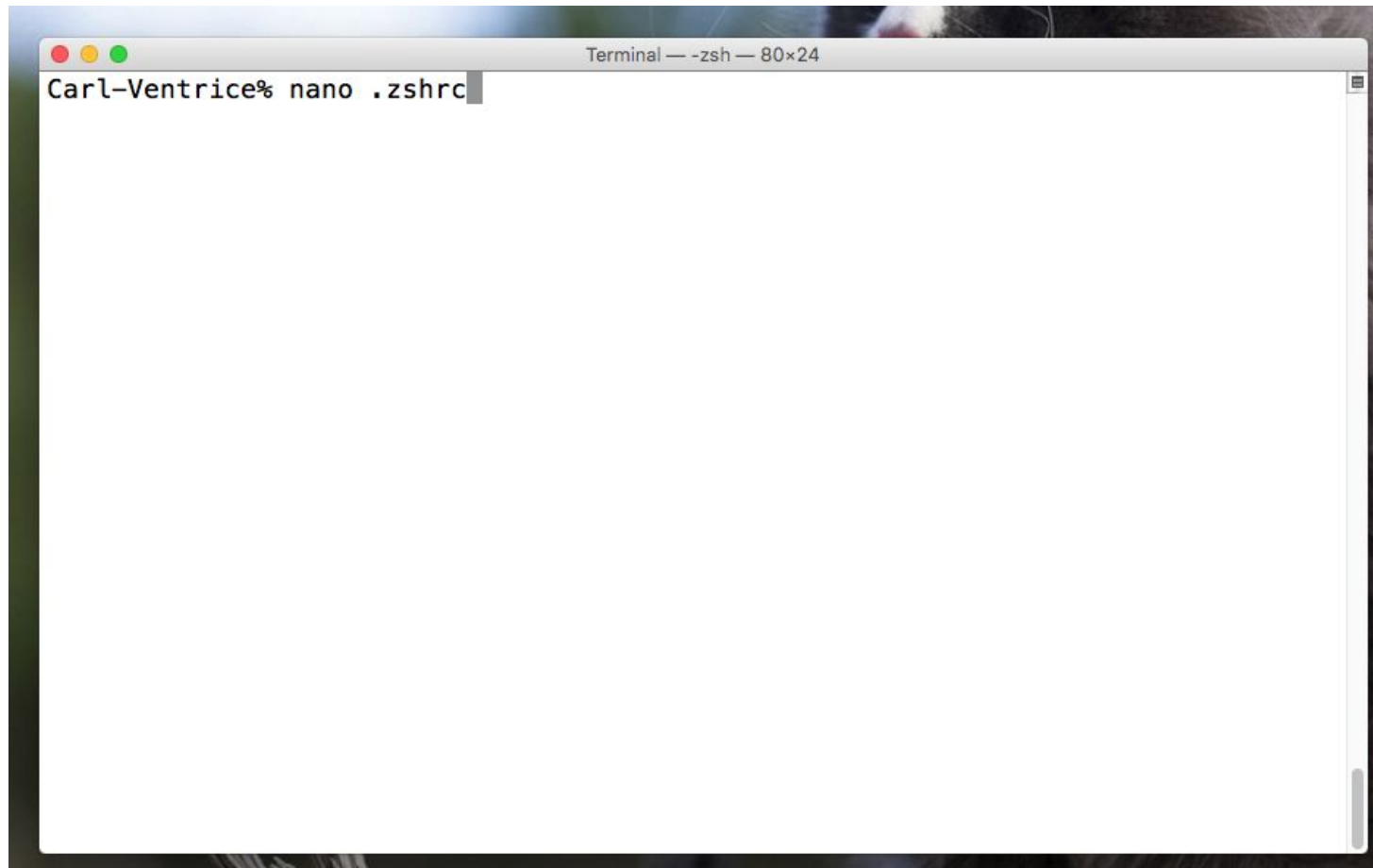
`# <<<conda initialize<<<`

Copy this text.

Note that it is possible that your path to the `anaconda3` directory may not include the `"/Users/<username>"` portion.

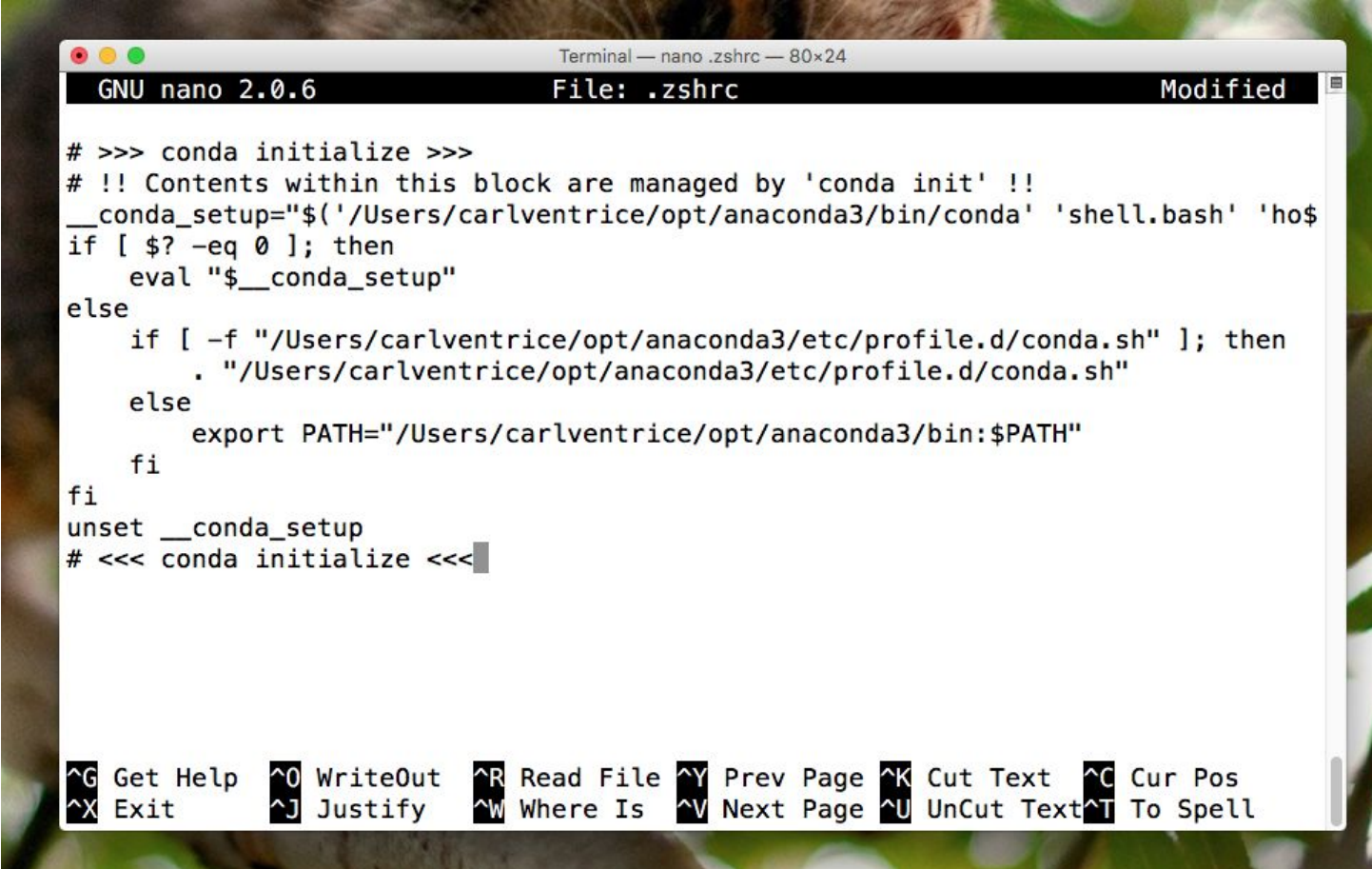
Appendix

Next, open or create your `.zshrc` file by typing
`nano .zshrc`



Appendix

Paste in the conda initialize text and then press Control + x to exit. You will be asked if you want to save your changes, so indicate yes.



```
Terminal - nano .zshrc - 80x24
GNU nano 2.0.6 File: .zshrc Modified

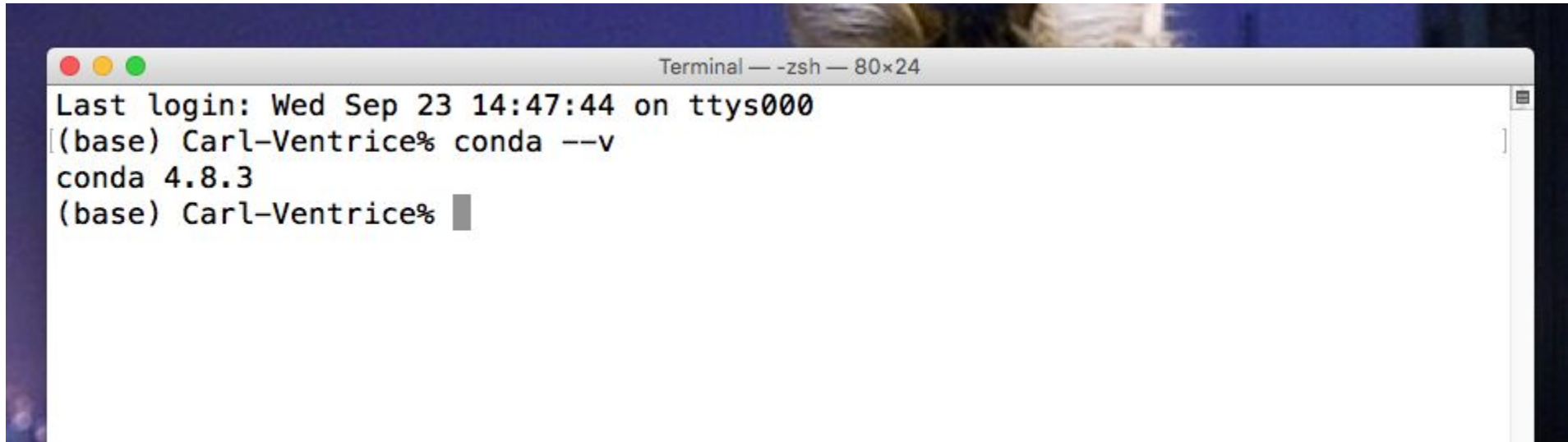
# >>> conda initialize >>>
# !! Contents within this block are managed by 'conda init' !!
__conda_setup="$('/Users/carlventrice/opt/anaconda3/bin/conda' 'shell.bash' 'ho$
if [ $? -eq 0 ]; then
    eval "$__conda_setup"
else
    if [ -f "/Users/carlventrice/opt/anaconda3/etc/profile.d/conda.sh" ]; then
        . "/Users/carlventrice/opt/anaconda3/etc/profile.d/conda.sh"
    else
        export PATH="/Users/carlventrice/opt/anaconda3/bin:$PATH"
    fi
fi
unset __conda_setup
# <<< conda initialize <<<

^G Get Help ^O WriteOut ^R Read File ^Y Prev Page ^K Cut Text ^C Cur Pos
^X Exit ^J Justify ^W Where Is ^V Next Page ^U UnCut Text ^T To Spell
```

Appendix

Now open a new terminal window. Test that the changes went through by trying out

`conda --v`

A screenshot of a macOS Terminal window. The title bar reads "Terminal — -zsh — 80x24". The terminal content shows a login message: "Last login: Wed Sep 23 14:47:44 on ttys000". Below that, the prompt is "(base) Carl-Ventrice%". The user has entered the command "conda --v", and the output is "conda 4.8.3". The prompt is now "(base) Carl-Ventrice%".

```
Terminal — -zsh — 80x24
Last login: Wed Sep 23 14:47:44 on ttys000
(base) Carl-Ventrice% conda --v
conda 4.8.3
(base) Carl-Ventrice%
```