Miscellanous Coding Concepts

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The difference between installing packages and using packages in Python and R

Have you ever wondered what is the difference between the following two commands?

```
pip install numpy

import numpy as np
```

or in R

```
install.packages('ggplot2')

library(ggplot2)
```

Making a delicious dinner (two steps)

Step 1: Acquire the ingredients from the store and "install" them in your refrigerator or pantry.

- You only need to do this once.
- This is like installing a package on your computer.
- The store is like PyPI (Python) or CRAN (R).
- You may or may not use it right away.
- But you have it in case you need it.

Making a delicious dinner (two steps)

Step 2: Use the ingredients to make your dinner.

- This is like using a package in your code.
- You may use it many times.
- You may use it in different recipes.
- You may use it in different ways.
- You may use it with other ingredients.

When you install a package, where does it go?

- Python: `pip install numpy` installs the package in a directory like `/usr/local/lib/python3.8/site-packages/numpy`
- R: `install.packages('ggplot2')` installs the package in a directory like `/usr/local/lib/R/site-library/ggplot2`
- In short: it gets stored ON DISK!

When you use a package, where does it go?

- Python: `import numpy as np` makes the package available in your Python session.
- R: `library(ggplot2)` makes the package available in your R session.
- In short: it gets stored IN MEMORY!

Why is there a difference between install and use?

- We don't want to have to go to the grocery store every time we want to make dinner (although sometimes it seems like we do!)
- We don't want to have to re-download the package every time we use it.
- We don't want the code to have to specify the location of the package.

Differences between how Python and R install packages

- In Python the install command is in the command line (outside of Python)
- In R the install command is in the R console (inside of R)

Which is better? It depends on your perspective. But I think the Python way is better. :)

Thank you!