Algorithms and Data Structures for Data Science
lab_fundamentals

CS 277

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Learning Objectives

Discuss lab structure and acceptable groupwork policies

Review the basics of variable type, conditionals and loops

Review the Jupyter notebook format for autograded assessments

Practice identifying sub-problems, coding functions based on I/O, and testing code

Setting up your own machine

Lab assignments will (hopefully) all be runnable on Prairielearn

Mini-projects may involve larger datasets or runtimes than PL can handle

You must have **Python3** with **Numpy, Matplotlib,** and **Pandas** installed:

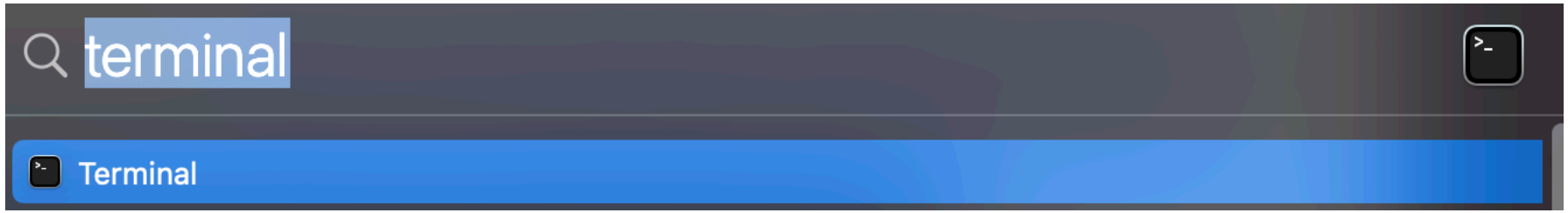
https://courses.grainger.illinois.edu/cs277/resources/own-machine/

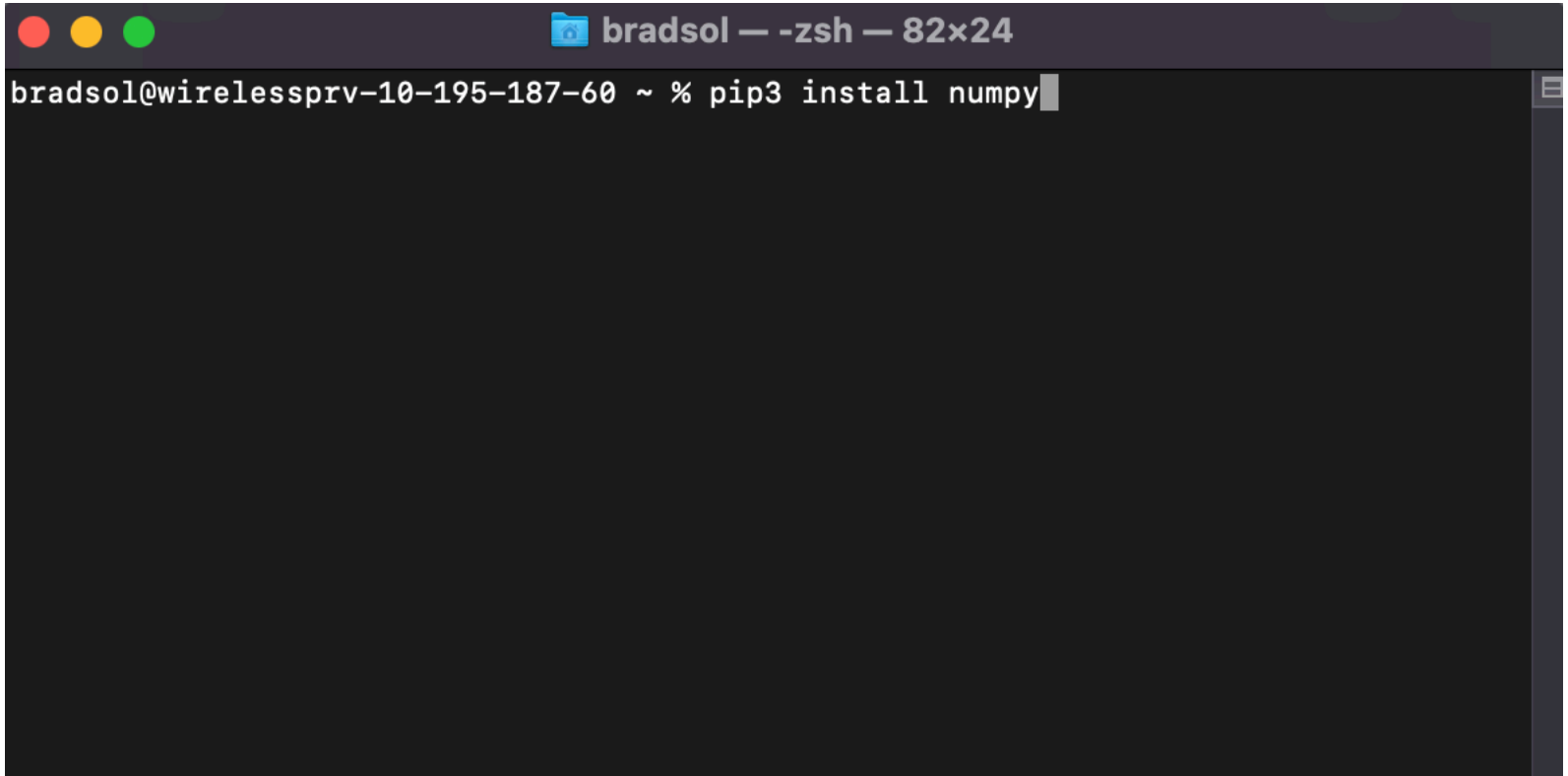
Step 1: Installing Python

Use the official site to download: https://www.python.org/downloads/

Step 2: Installing Packages

Pip3 comes standard with Python now so installing packages is easy!

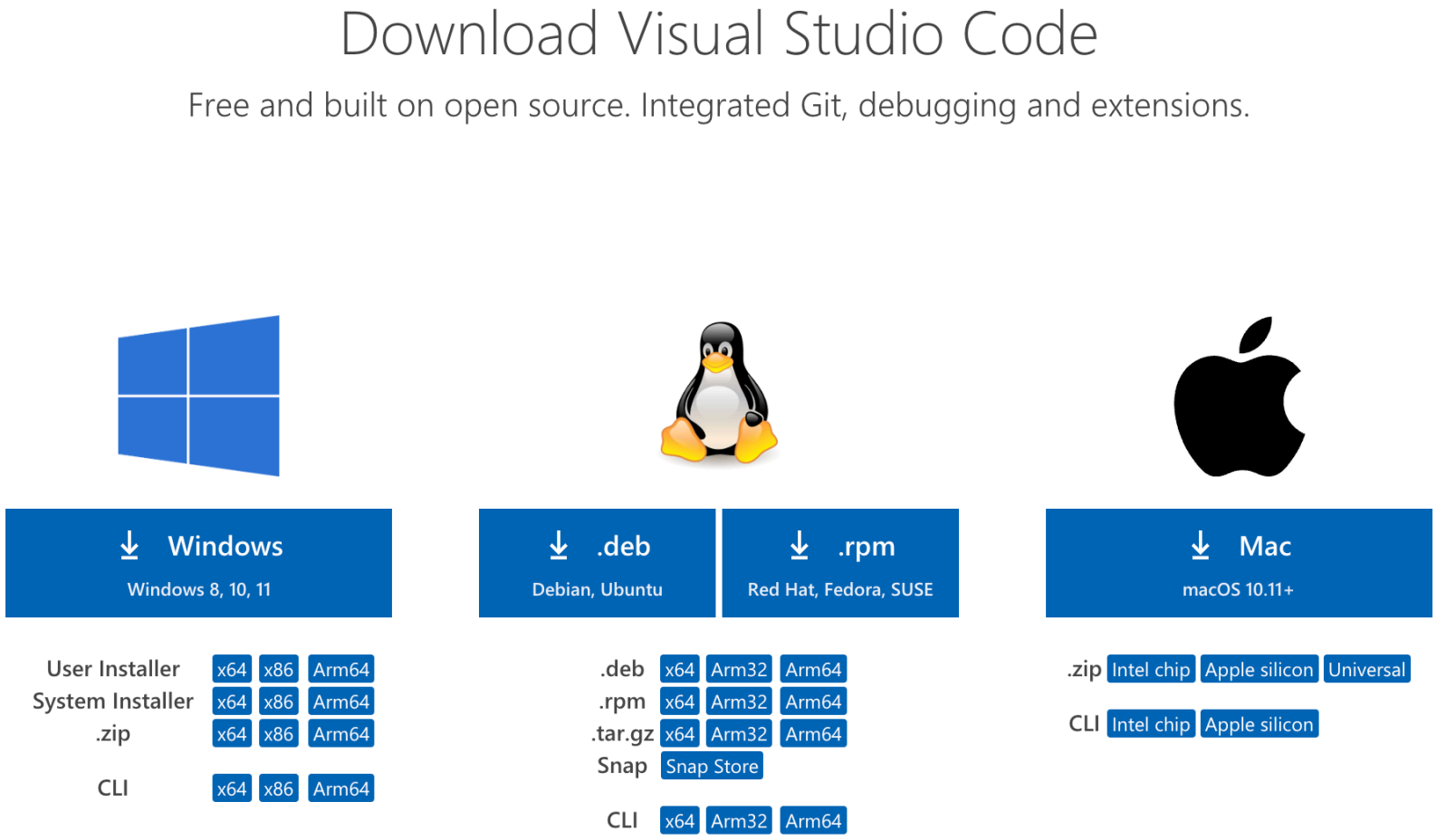




Step 3: Install VSCode

You can use your own code editor but this is recommended:

https://code.visualstudio.com/download



How to work through coding assignments

1. **Make sure you understand the problem**

   What is the **input** and **output** of the problem?

   Can you break the problem down into parts?

   Do any of the sub-problems build off each other?

2. **Solve (and test) each part one at a time**

   What should the output be given an input?

   Are there any edge cases you are missing?

`getTotalTime()`

Given **HH:MM:SS** format, I want to know the exact difference between start and stop times in minutes. How would we approach this problem?

`getSmallestEven()`

Given three integers, return the smallest even number.

`electricBill()`

Given one integer, return total energy bill according to conditional logic.

`oddCountByIncrement()`

Given start, stop, and increment integers, return all odd values in **range**.

`sumUntilGreater()`

Given start and stop integers, sum numbers from start until total is greater than stop.

Lab Tips

First couple of assessments will help establish background knowledge

Give feedback (anonymously or not) about class pacing