**Debugging and Collaboration - Strategies**

These debugging strategies come from former AMP students:

* Make it a priority to get good sleep
* Don’t lose sleep over difficult problems – Intention is for homework to take 45 minutes
* Pre-coding:
  + Outline strategy with comments first. Comments help you keep track of what you’re doing.
  + Decomposition into functions
  + Self-documenting naming
* Variable Tracing
  + print(locals()) #examine all variables for a namespace
  + VSCode makes it easy to insert breakpoints so that you can trace the value of variables by stepping through your code
* Common errors
  + Off-by-1 when iterating through a string/list/tuple
  + Wrong data type
* Through having bugs and errors, the bug was very clearly due to poor naming conventions and extraneous code
* Don’t be scared to ask questions if you don’t know something, when to ask for help vs. struggle through things
* Python cheat sheet is helpful, use it as a resource

**Collaboration vs “Cheating” when Getting Help**

Your goal for AMP: CS should be to treat every problem/project as an opportunity to grow in your own problem solving abilities. Comparing approaches to hard problems can be a helpful way to grow. Asking for an answer doesn’t really count as solving a problem.

Some general guidelines for helping others on individual CS problems/projects:

* No typing on someone else’s keyboard, no sharing your code via email, etc.
* Try to avoid looking at someone else’s code for a problem you haven’t solved
* When talking about problems with other students, use as high a level of abstraction as possible
  + Start with general approaches and refer to the problem description
* Try to turn questions into an opportunity to act as a real life “[rubber duck](https://en.wikipedia.org/wiki/Rubber_duck_debugging)”. Patiently listening to someone explain a problem can often be enough help to get them past the original road block.
  + Good questions to reflect what you’re hearing without giving away the answer:
    - “What is it that you’re trying to accomplish? What are your goals with this approach?”
    - “I heard you say \_\_\_\_\_\_\_\_. How does that help you accomplish \_\_\_\_\_\_\_\_\_?”
    - “How do you know it doesn’t work? What were you expecting should happen?”
    - “Is there a way you could comment out code to separate what works and what doesn’t work?”