AWS Machine Learning Foundations Course

# Software Practices I

## Writing clean code

Use meaningful names, and proper whitespace.

## Writing modular code

* DRY (Don’t repeat yourself)
* Abstract out logic to improve readability—like into a function
* Minimize number of entities
* Functions should do one thing—Single responsibility principle
* Arbitrary variable names can be more effective in certain functions
* Minimize number of arguments to a functions to 3

## Writing efficient code

* Code that runs infrequently for a short time need not be highly optimized
* Code that needs to run fast, such as a live feed, should be highly optimized
* Code can be refactored to be optimized after an initial solution
* Use vector operations over loops whenever possible
* Refactor using different data structures to make code more efficient
* When searching for solutions, it’s better to experiment with different solutions to find methods that are optimum, rather than stick with the most popular solution

Related links: [What makes sets faster than lists?](https://stackoverflow.com/questions/8929284/what-makes-sets-faster-than-lists/8929445#8929445)

### optimizing\_code\_common\_books

1. Using NumPy and it’s intersect1d instead of lists and loops makes a difference of 1386.01 times speed increase
2. Using sets over lists and their intersection method makes a difference of 4595.53 times speed increase
3. Set and intersection() is 3.315 times faster than using NumPy and it’s intersect1d

Related links: [numpy.intersect1d](https://numpy.org/doc/stable/reference/generated/numpy.intersect1d.html) and [Intersection() function Python - GeeksforGeeks](https://www.geeksforgeeks.org/intersection-function-python/)

### optimizing\_code\_holiday\_gifts

1. Arithmetic operations can be optimized over numpy arrays. Scalar values (entire rows) or vectors can be easily all multiplies, divied, added to, subtracted from, etc. much faster than using loops or other iterations

Related links: [1.4.2. Numerical operations on arrays](https://scipy-lectures.org/intro/numpy/operations.html), [How do I select elements of an array given condition?](https://stackoverflow.com/questions/3030480/how-do-i-select-elements-of-an-array-given-condition), and [numpy.sum](https://numpy.org/doc/stable/reference/generated/numpy.sum.html)

## Documentation

1. Using inline comments to add line level docs
   1. Useful for explaining code when code can’t speak
2. Using doc strings to add docs at the function and module level
   1. They can be one line to explain a single function
   2. Multiline docstrings have more parts such as Arguments: , Returns: , and a longer descriptions

## Version Control

Version control can be used to store, retrieve, and search through changes in a project. It helps protect the project developers from losing work, and takes care of the work of managing versions and change control.

# Software Practices II

## Testing

1. Unit tests are used to test small units of code
2. Pytest is used to process tests
3. We should only have one assert statement per test function
4. Pytest stops if there are syntax errors

## Test Driven Development

1. Writing tests before writing implementation code
2. Tests can check for all the different scenarios and edge cases you can think of, before even starting to write your function
3. You can also write better tests this way as your program evolves, rather than writing one hurried test at the end
4. When refactoring or adding to your code, tests help you rest assured that the rest of your code didn't break while you were making those changes (regression testing).

## Logging

Logging is valuable for understanding the events that occur while running your program. For example, if you run your model over night and see that it's producing ridiculous results the next day, log messages can really help you understand more about the context in which this occurred.

## Code Review

# References

*What makes sets faster than lists?* (n.d.). Retrieved from https://stackoverflow.com/questions/8929284/what-makes-sets-faster-than-lists/8929445#8929445

Hello

# Hello

## Hello

### Hello

#### Hello

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