# CSE 303: Quiz #6

Due December 4, 2019 at 1:35 PM

Please use the remainder of this page to provide your answer. To submit your answer, create a pdf whose name is exactly your user Id and the "pdf" extension (e.g., abc123.pdf) and email it to spear@lehigh.edu before the deadline.

A network security engineer at a top 20 tech company recently stated that his company does all of its real-time threat analysis using Python programs that run on AWS Lambda. Clearly, the ability to scale with demand makes Lambda an appealing platform. From a software engineering perspective, the use of Python makes sense, too (more maintainable code, less developer effort than C++). However, this engineer made a *systems* argument justifying the use of Python. Your task in this quiz is to make your own *systems* argument to justify the use of Python instead of C++. You should state any assumptions you are making, and you should be sure to incorporate whichever of the 5 themes make the most sense (you shouldn't try to incorporate all 5… focus on depth, not breadth).

The 5 themes:

1. Security
2. Concurrency
3. Persistence
4. Resource Management
5. Virtualization

Python is a good language that allows for easier development because of its readability. C and C++ is more efficient generally more efficient when it comes to runtime, but a lot easier to make mistakes due to its difficulty to write in. This leads me to believe that python would be a better choice for security than C++ because it is less error prone. Another benefit of Python is the absence of pointers and its use of garbage collection. This benefits both security and resource management. C++ uses an abundance of pointers that can take up a lot of resources, in addition, in C++ pointers need to be allocated and deallocated within the code which can lead to memory leaks and ultimately poor resource management. Python on the other hand does not use pointers because it is simply unnecessary to use within the code, also, python has a garbage collector which will automatically clean up any unreferenced portions of memory. The big advantage of this is that python has less resources to keep around as well as preventing users from accessing vulnerable points in memory, which could contain code for an attack.

Another key benefit of Python is the libraries that are available for use. Python has libraries that can do many complex tasks in the most efficient ways possible, even sometimes using other languages. This gives python all of the system advantages of other programs without having to actually use those programs. Many of the available libraries help do complex arithmetic and algorithms efficiently as well as a way to do each of the 5 themes. For example, there are libraries for encryption such as PyCrypto, which makes data more secure while also keeping it easy to implement.