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Extensible Systems Homework 1
Language: Python

Python's defining feature is its focus on ease of development. This design decision has influenced every aspect of the language. In comparison to other languages, Python creates significant advantages for the developer, at the cost of some disadvantages at runtime.

Python's primary focus makes it an incredibly fast language to develop in. It has a very clean and readable syntax, it's memory safe, and it uses a garbage collector. Python's high-level abstractions, dynamic typing and first-class functions simplify development and grant the programmer flexibility in problem solving. In addition, semantic structures such as the for loop and the 'with' context manager allow for safe, concise, and elegant code. As a result, almost all Python code is relevant to the problem domain, with very little boilerplate necessary. Python has well-established style conventions: there is usually one, and only one, obvious 'pythonic' way to solve a problem. Community adherence to these idioms enables rapid collaborative development and enhances code readability.

The infrastructure required for these advantages also result in Python's major weaknesses. For all its ease of use and speed of development, Python is still an interpreted language, and code runs much more slowly than it would in Java or C. Python's dynamic typing system, while helpful for rapid development, also allows for an entire class of bugs that would otherwise be caught by the type checker in a statically typed language. These disadvantages result from Python's prioritization of ease and speed of development over runtime performance and compile-time sanity checking.