Multi-paradigm and Meta-programming in the Software Engineering

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Abstract

All programs are data. Some data are interpreted as values, others are interpreted as types of these values, and others are interpreted as instructions for processing the first two. All programming paradigms and techniques are just a way to form metadata that gives the rules and control flow of processing sequence other data. Multi-paradigm programming takes the best of all paradigms and builds syntactic constructions from them, which makes it possible to describe the subject area clearly and conveniently. We reflect high- level DSLs (domain languages) into low- level machine instructions through many layers of abstractions. It's important to represent the task in the most efficient way for execution at the machine level, not to fanatically follow one paradigm. The most efficient is the one with fewer layers and dependencies, the most human- readable, maintainable and modifiable, ensuring code reliability and testability, extensibility, reusability, clarity and flexibility of metadata constructs at every level. We believe that such an approach will allow us to get both quick first results in the development, and not lose performance with a large flow of changes at mature and complex project stages. We will try to consider the techniques and principles of different programming paradigms through the prism of metaprogramming and thereby change if not the software engineering itself, but at least to change its understanding by new generations of engineers.

Index