Towards a Semiotic Framework for Programming Languages

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Abstract

A programming language is "an artificial formalism in which algorithms can be expressed. For all its artificiality, though, this formalism remains a language". In high-level languages, in which the abstraction allows for the introduction of a "structured" form of linguistic representation based on the notion of "control flow" by means of conditionals and loop, there is an osmosis between human and machine semiotics, where the strict formal correctness of the machine side is balanced by the variety typical of natural languages.

All programming languages are Turing-complete. This means that all languages are able to express the same "things", but the variety of languages (thousands of languages in fifty years) demonstrates the need to express some of these "things" better (more easily, more efficiently) than others. In other words, there is obviously a connection to the Sapir-Whorf hypothesis in the relationship between programming language and what it can express. First we discuss the general semiotic framework of the Von Neumann machine; then, following the theory of enunciation, we analyze the concepts of persona, time, and space in the imperative, functional and object-oriented paradigms.

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