World Academy of Science, Engineering and Technology
International Journal of Computer and Information Engineering
Vol:9, No:02, 2015

Adding a Few Language-Level Constructs to Improve OOP Verifiability of Semantic Correctness

Authors : Lian Yang

Abstract : Object-oriented programming (OOP) is the dominant programming paradigm in today's software industry and it has literally enabled average software developers to develop millions of commercial strength software applications in the era of INTERNET revolution over the past three decades. On the other hand, the lack of strict mathematical model and domain constraint features at the language level has long perplexed the computer science academia and OOP engineering community. This situation resulted in inconsistent system qualities and hard-to-understand designs in some OOP projects. The difficulties with regards to fix the current situation are also well known. Although the power of OOP lies in its unbridled flexibility and enormously rich data modeling capability, we argue that the ambiguity and the implicit facade surrounding the conceptual model of a class and an object should be eliminated as much as possible. We listed the five major usage of class and propose to separate them by proposing new language constructs. By using well-established theories of set and FSM, we propose to apply certain simple, generic, and yet effective constraints at OOP language level in an attempt to find a possible solution to the above-mentioned issues regarding OOP. The goal is to make OOP more theoretically sound as well as to aid programmers uncover warning signs of irregularities and domain-specific issues in applications early on the development stage and catch semantic mistakes at runtime, improving correctness verifiability of software programs. On the other hand, the aim of this paper is more practical than theoretical.

Keywords : new language constructs, set theory, FSM theory, user defined value type, function groups, membership qualification attribute (MQA), check-constraint (CC)
Conference Title : ICOOP 2015 : International Conference on Object-Oriented Programming
Conference Location : Kuala Lumpur, Malaysia
Conference Dates : February 12-13, 2015