Object Algebra - An approach of the Expression Problem

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Abstract. The expression problem is a known problem in practical computer science where the goal is to define types of data and extend them with new types or functions neither with recompiling the code nor retaining static type safety [1]. This paper is about a new approach of dealing with this problem. We will introduce and discuss a new pattern called object algebra and use Linear Temporal Logic (LTL) formulas as examples. We will build a core set of LTL and show how easily new formulas and functions can be added.

1 Introduction

2 Expression problem

2.1 Interpreter Pattern

2.2 Visitor Pattern

2.3 Object Algebra

3 Implementation

4 Conclusion

References

1. Wadler, P.: The Expression Problem. E-Mail Discussion (1998), http://homepages.inf.ed.ac.uk/wadler/papers/expression/expression.txt
2. Odersky, M., Zenger, M.: Independently Extensible Solutions to the Expression Problem. In FOOL'05
3. Pnueli, A.: The temporal logic of programs. In 18th Annual Symposium on Foundations of Computer Science, Providence, Rhode Island, USA, 31 October - 1 November 1977, pages 46-57, IEEE Computer Society, 1977
4. Gamma, E., Helm R., Johnson R. and Vlissides J.: Design Patterns: Elements of Reusable Object-Oriented Software. Addison-Wesley Professional Computing Series, Pearson Education, 1994

5. Parr, T.: Language Implementation Patterns: Create Your Own Domain-Specific and General Programming Languages. Pragmatic Bookshelf, 2009
6. Oliveira, B., Cook, W.: Extensibility for the Masses - Practical Extensibility with Object Algebras. In ECOOP 2012 – Object-Oriented Programming: 26th European Conference, Beijing, China, June 11-16, 2012, pages 2-27, Springer Berlin Heidelberg
7. Guttag, J., Horning, J.: The algebraic specification of abstract data types. In Acta Informatica Vol. 10, pages 27-52, March 1978