7. Problems of Object-Oriented Programming

Prof. Dr. U. Aßmann

Software Engineering Group

Faculty of Informatics

Dresden University of Technology

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Literature (To Be Read)

▶ K. Chandra Sekharaiah and D. Janaki Ram. Object schizophrenia problem in object role system design. In Zohra Bellahsène, Dilip Patel, and Colette Rolland, editors, Object-Oriented Information Systems, volume 2425 of Lecture Notes in Computer Science, pages 1-8. Springer Berlin / Heidelberg, 2002. 10.1007/3-540-46102-7_52.

▶ Elizabeth A. Kendall. Role model designs and implementations with aspect-oriented programming. In Proceedings of the 14th ACM SIGPLAN conference on Object-oriented programming, systems, languages, and applications, OOPSLA '99, pages 353-369, New York, NY, USA, 1999. ACM.
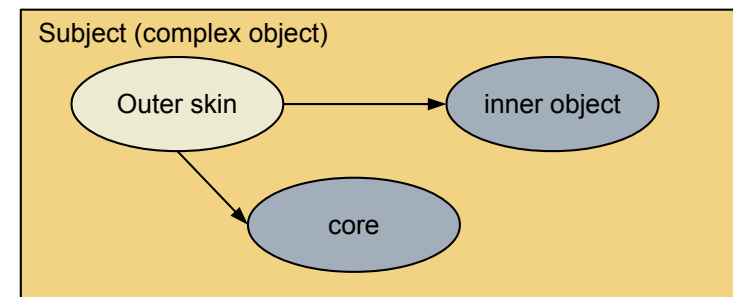

Secondary Literature

▶ Stephanie Balzer, Thomas R. Gross, and Patrick Eugster. A relational model of object collaborations and its use in reasoning about relationships. In Erik Ernst, editor, ECOOP, volume 4609 of Lecture Notes

▶ Stephanie Balzer and Thomas R. Gross. Verifying multi-object invariants with relationships. In Mira Mezini, editor, ECOOP, volume 6813 of Lecture Notes in Computer Science, pages 358-382. Springer, 2011.

▶ Ernst, Erik. Reconciling Virtual Classes with Genericity. Modular Programming Languages. Lecture Notes in Computer Science 4228, 2006, Springer. http://dx.doi.org/10.1007/11860990_5
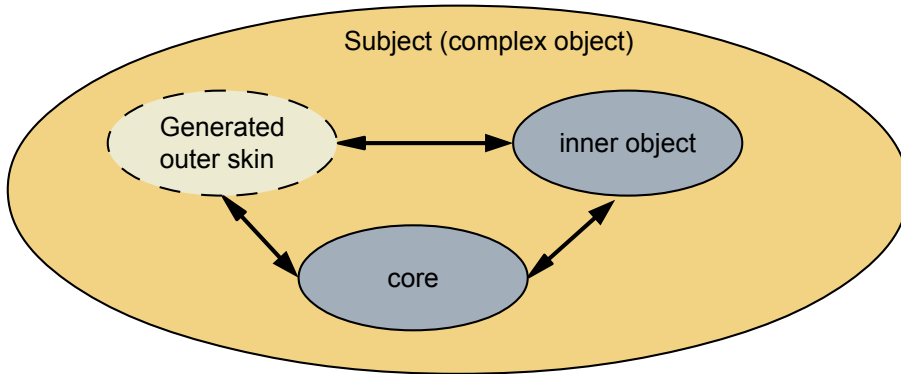

Object Schizophrenia of Complex Objects (Subjects)

▶ A **physical object** is layouted as a coherent record in memory.

▶ However, objects can be complex. The representation of a complex application object can be *split* over an **outer** and many **inner** physical objects (implementation objects) in the memory.

▶ A **subject** is a complex object realized with several physical objects
  ▶ How to keep coherence of the physical objects of a subject?
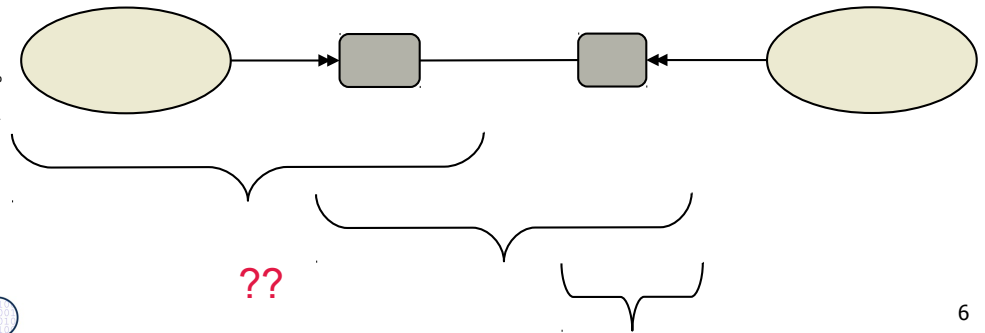   ▪ unidirectional linkage, bidirectional linkage?

Generative Skin of Subjects

▶ A **Generative Skin** of a subject is a generated outer skin object which delegates to inner objects. [Ernst]

- The implementation of the delegations in the outer skin is generated.
- The outer skin is a facade for the inner objects.

▶ A **subject** is a complex object realized with several physical objects

Subject (complex object)

Generated outer skin ⟷ inner object

core

Role State Problem (Role State Schiophrenia)

▶ The state of a role (association end) must be stored:

- In the core object
- In the relationship
- In the role object

▶ With [Balzer]s language RUMER, this can be controlled.

??

Summary

▶ Object-oriented languages have inherent problems with

- complex objects
- roles in associations

The End

Speed

- ▶ Polymorphism
- ▶ metamorphic programming (Maurer)

Fragile Base Class Problem

- ▶ Syntactic and semantic

Pool Problem

- ▶ Essential-Part-of relationships are not ending up in memory

Natural vs Role Types

Tyranny of Predominant Decomposition

▶ Osshers Paper from the brown book

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