

7. Problems of Object-Oriented Programming

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Design Patterns and Frameworks, © Prof. Uwe Alßmann

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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 Bellahsene, 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.

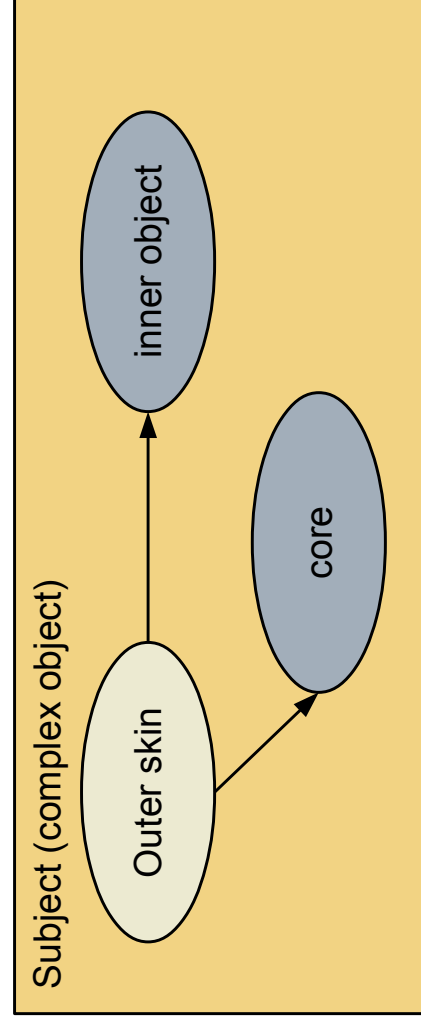


Secondary Literature

- ▶ 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

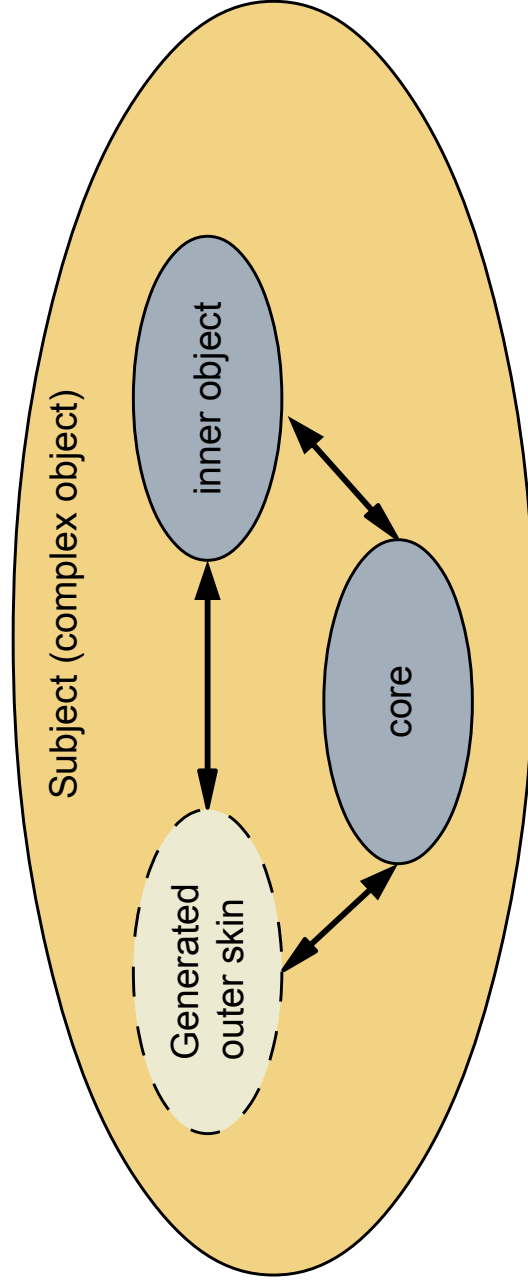
Object Schizophrenia of Complex Objects (Subjects)

- ▶ 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?



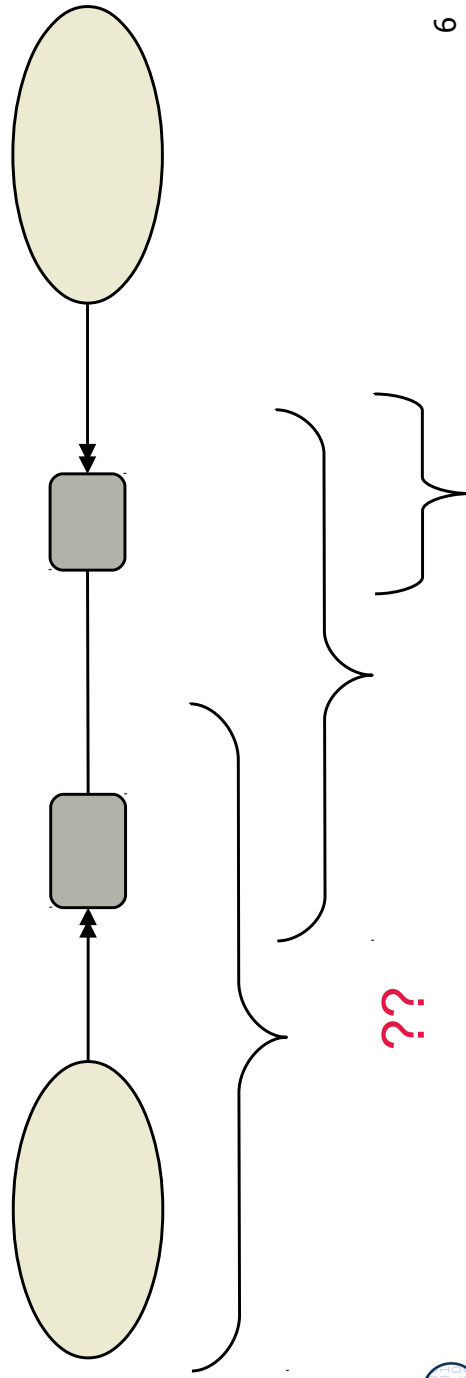
Generative Skin of Subjects

- ▶ 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



Role State Problem (Role State Schizophrenia)

- ▶ 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