

# 7. Problems of Object-Oriented Programming

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Version 11-0.1, 11/4/11



# Literature (To Be Read)

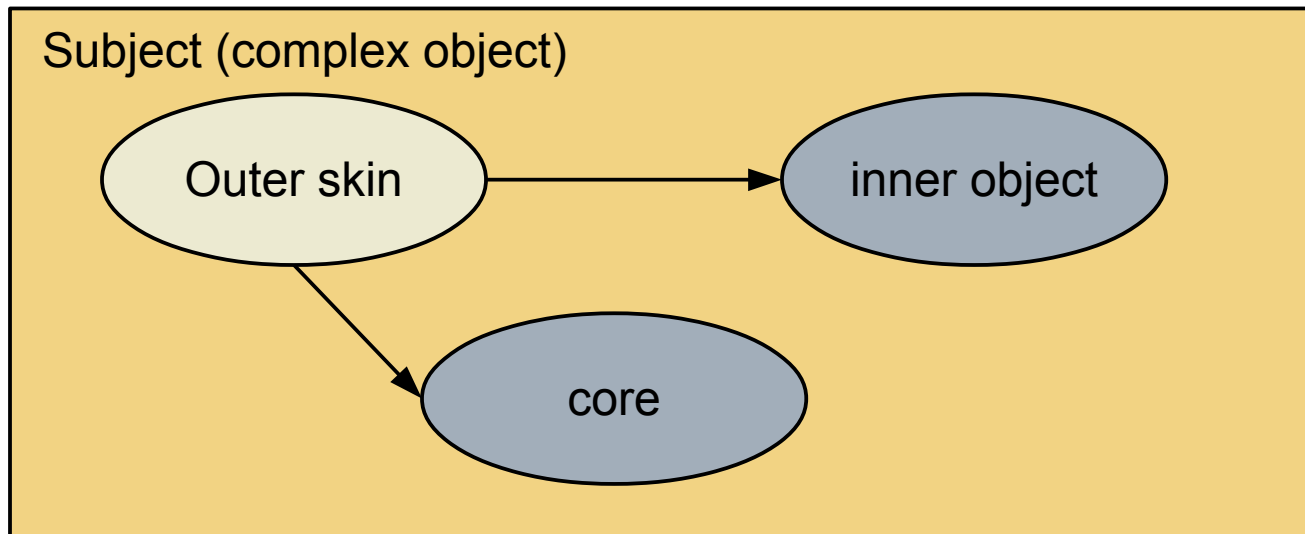
- ▶ K. Chandra Sekharaiah and D. Janaki Ram. Object schizophrenia problem in object role system design. In Zohra Bellahsène, Dilip Patel, and Colette Rolland, editors, Object-Oriented Information Systems, volume 2425 of Lecture Notes in Computer Science, pages 1-8. Springer Berlin / Heidelberg, 2002. 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](http://dx.doi.org/10.1007/11860990_5)

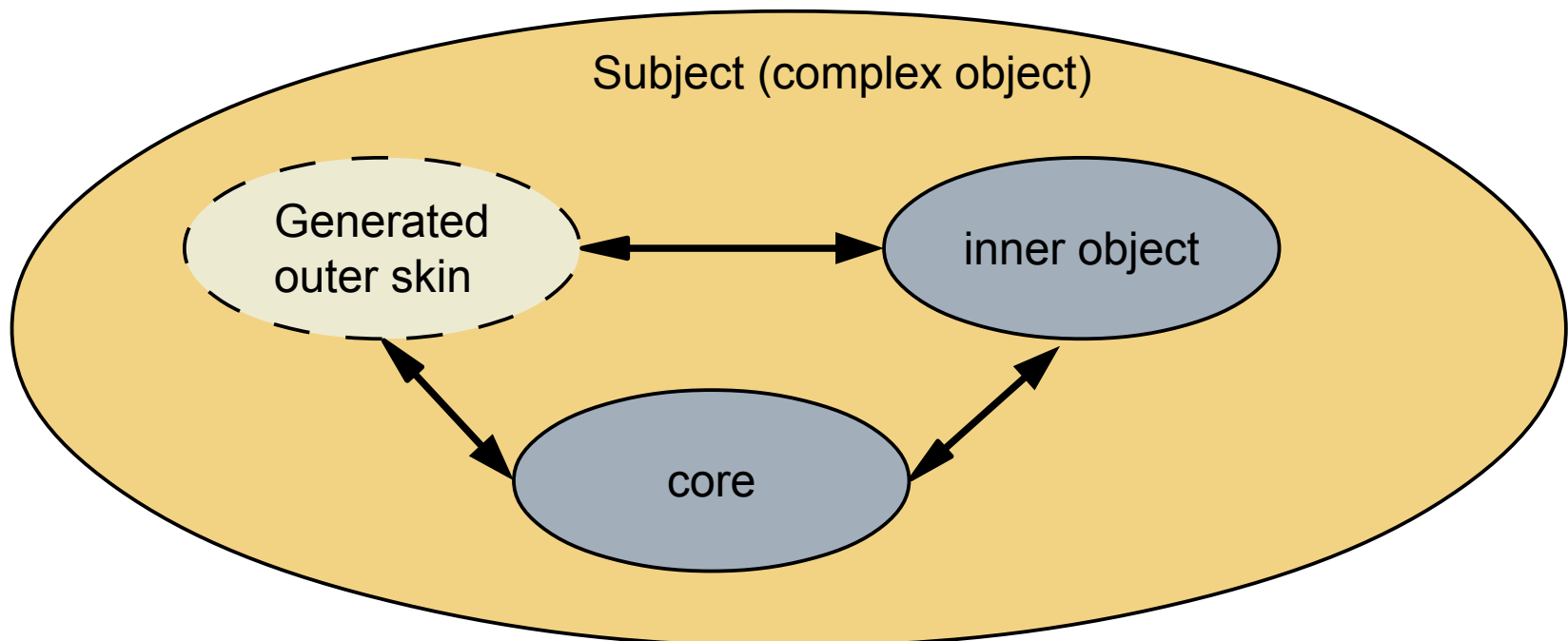
# Object Schizophrenia of Complex Objects (Subjects)

- ▶ 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?



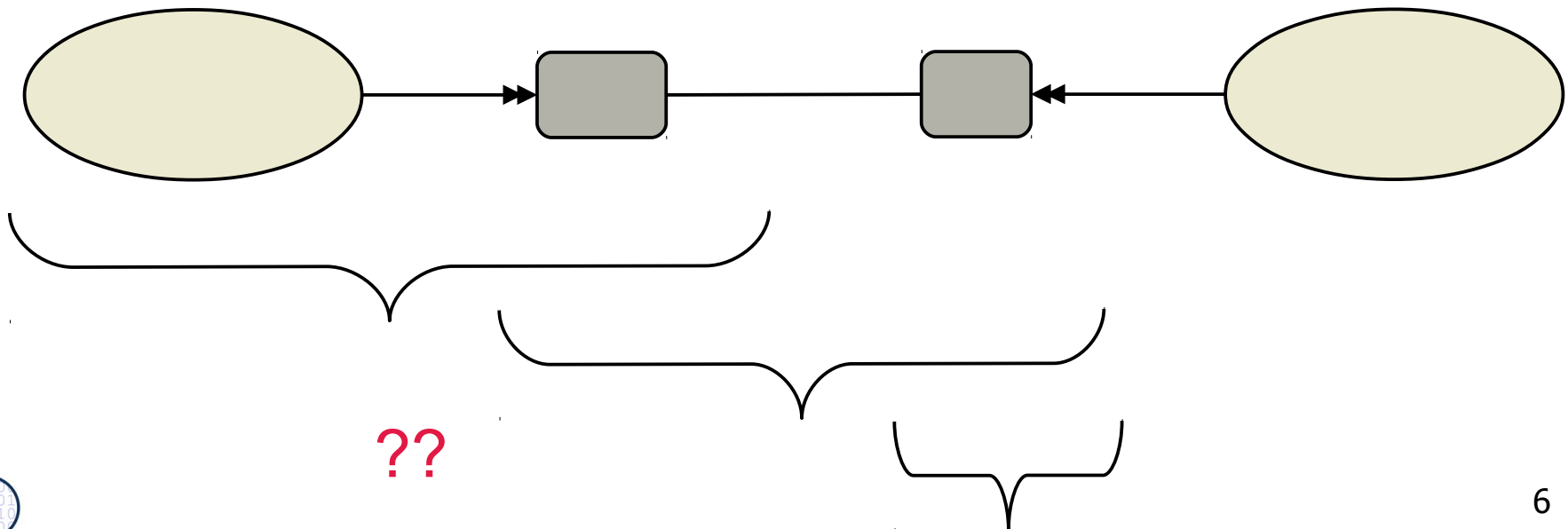
# Generative Skin of Subjects

- ▶ 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