

# Layered Architectures: the Layers

## Architecture Pattern

**Douglas C. Schmidt**

**[d.schmidt@vanderbilt.edu](mailto:d.schmidt@vanderbilt.edu)**

**[www.dre.vanderbilt.edu/~schmidt](http://www.dre.vanderbilt.edu/~schmidt)**

**Professor of Computer Science**

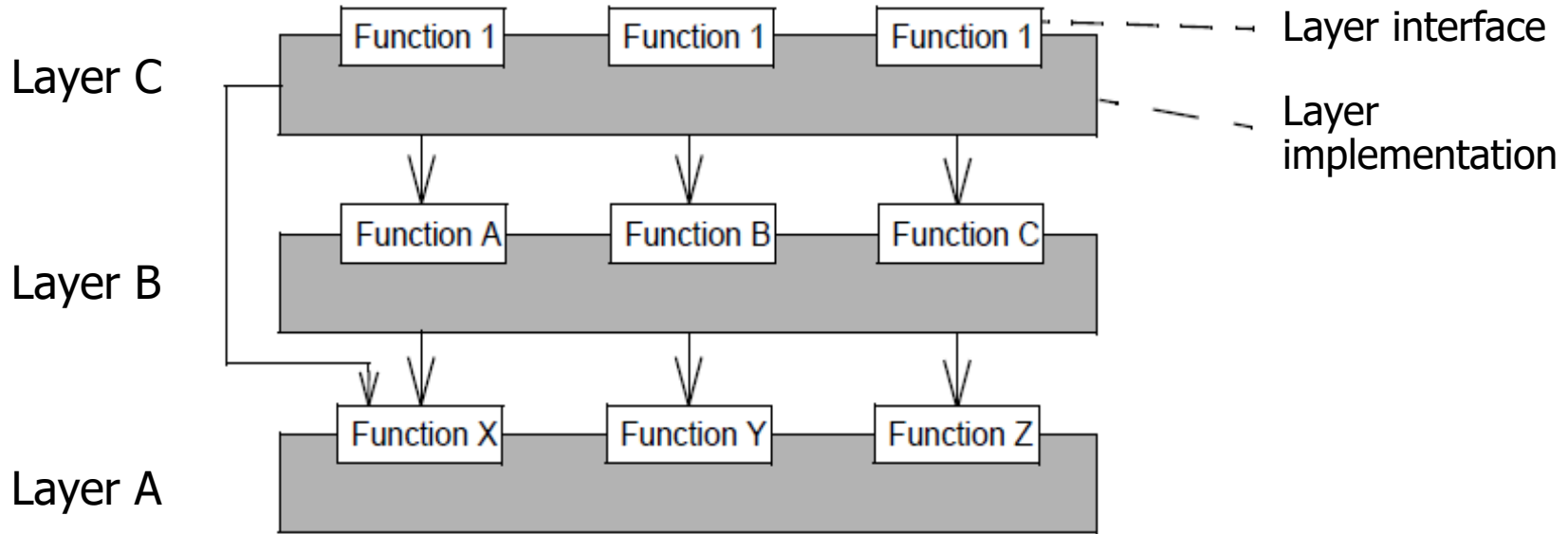
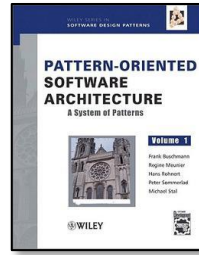
**Institute for Software Integrated  
Systems**

**Vanderbilt University  
Nashville, Tennessee, USA**



# Learning Objectives in this Part of the Lesson

- Know what layered architectures are
- Understand the *Layers* architectural pattern

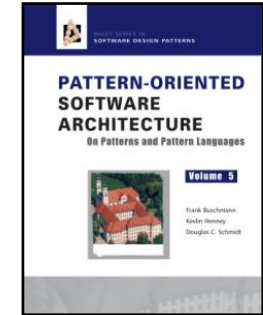
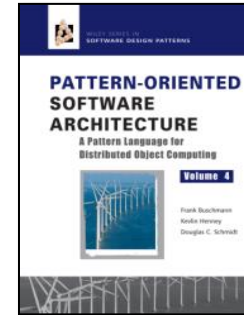
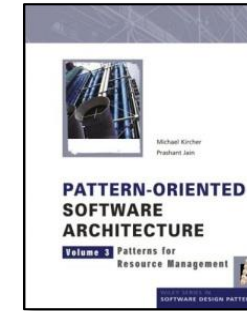
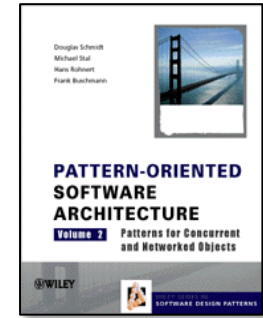
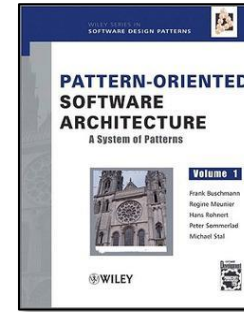


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# Overview of the Layers Architectural Pattern

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- The concept of layering has been expressed as an *architectural pattern*



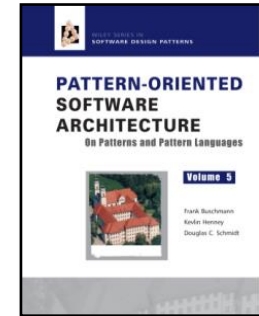
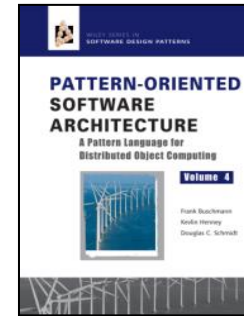
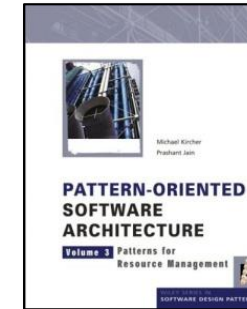
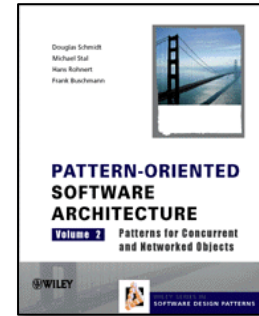
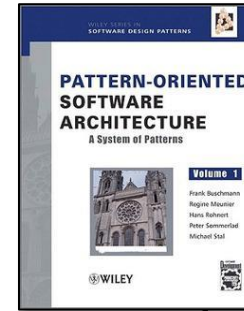
See [www.dre.vanderbilt.edu/~schmidt/POSA](http://www.dre.vanderbilt.edu/~schmidt/POSA)

# An Overview of the Layers Architectural Pattern

- The concept of layering has been expressed as an *architectural pattern*

*"a structural organization schema for software systems that*

- provides a set of predefined subsystems*
- specifies their responsibilities &*
- includes rules & guidelines for organizing the relationships between these roles"*



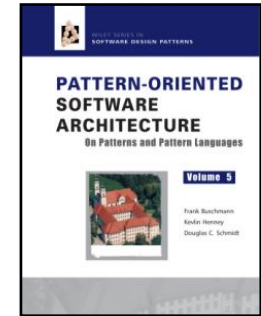
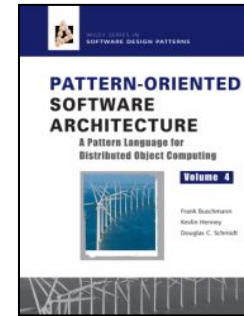
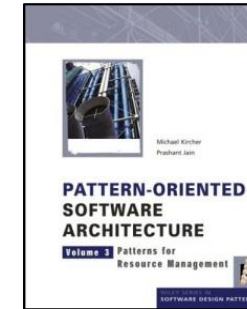
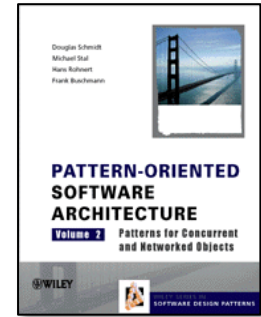
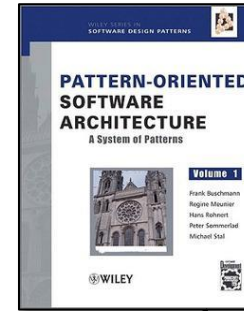
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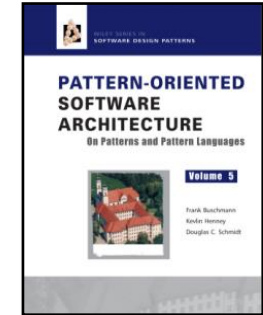
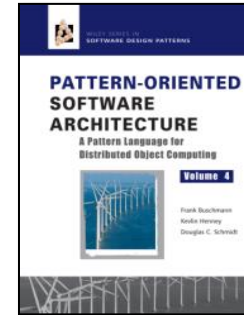
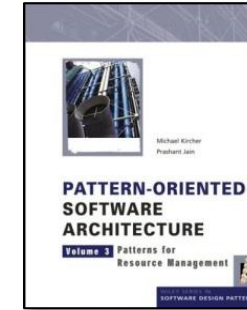
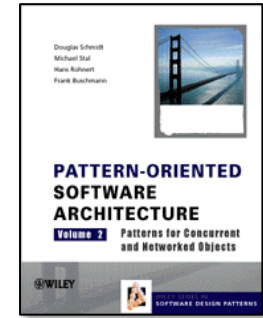
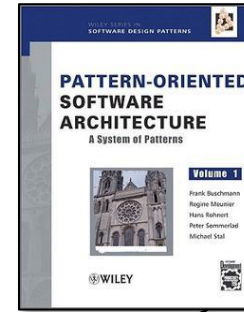
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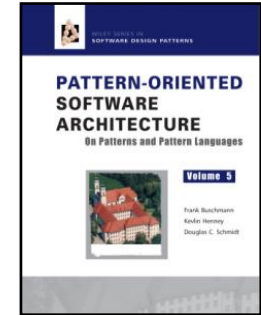
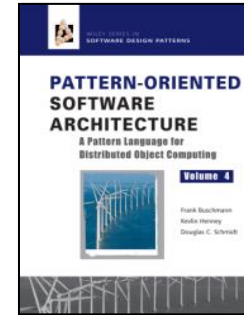
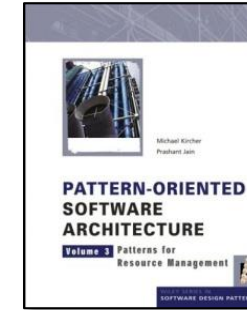
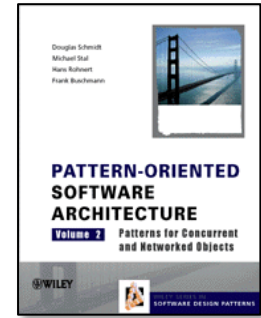
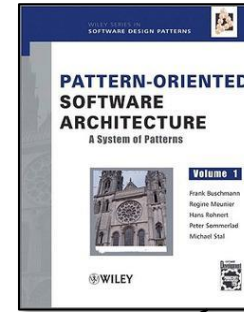
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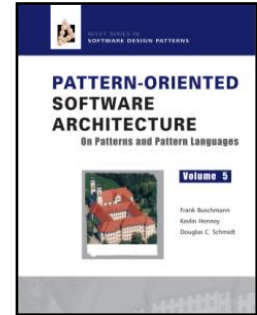
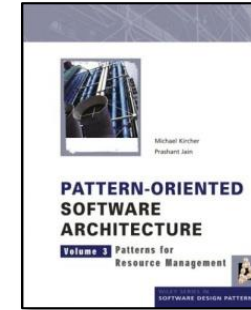
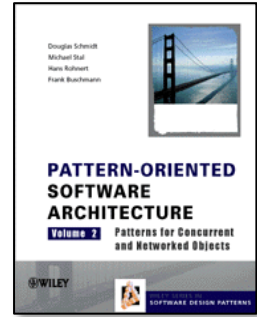
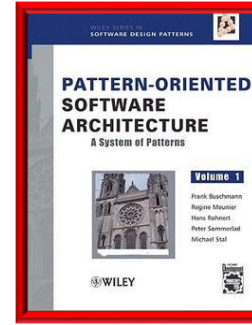


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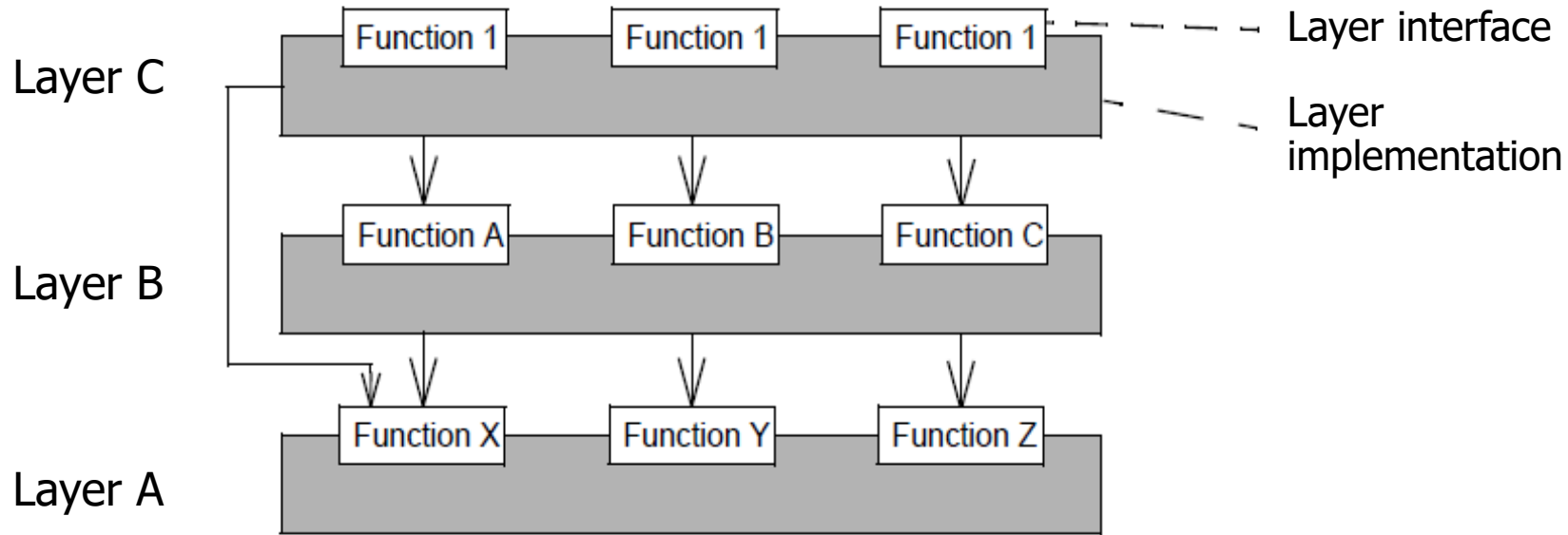
- The *Layers* architectural pattern has been described in various publications



See [en.wikipedia.org/wiki/Multilayered\\_architecture](https://en.wikipedia.org/wiki/Multilayered_architecture)

# An Overview of the Layers Architectural Pattern

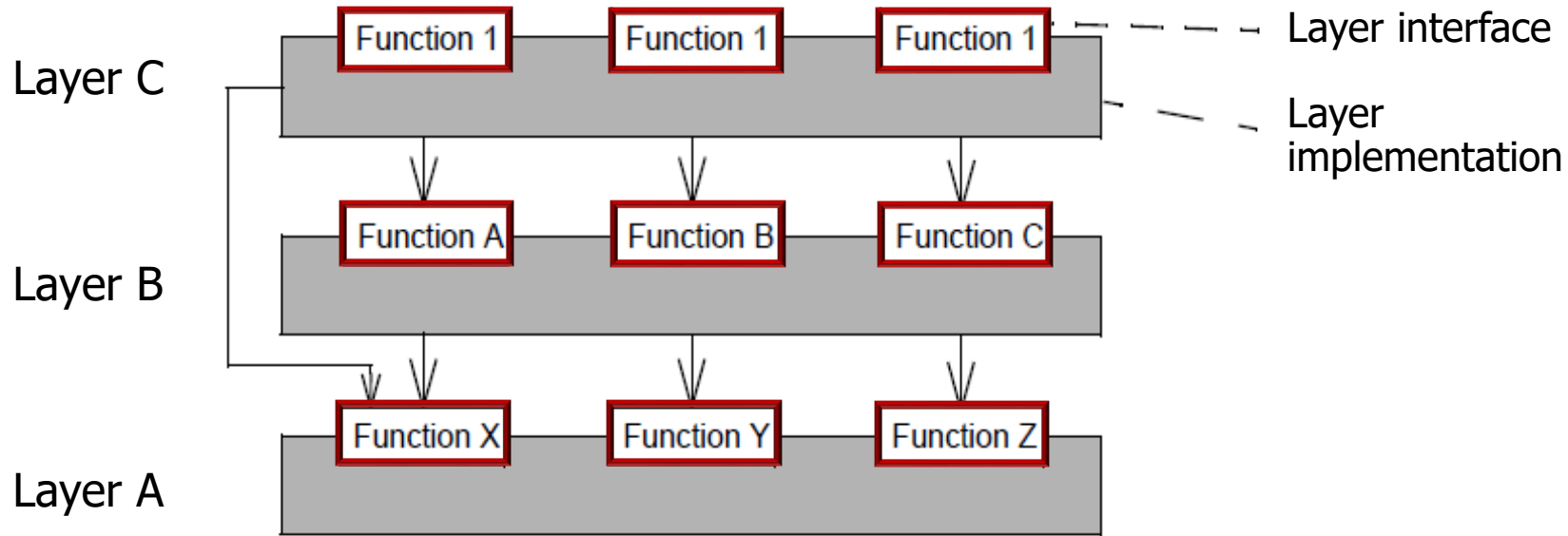
- The *Layers* pattern structures software apps & infrastructure in several ways



See [posa1.blogspot.com/2008/05/layered-architecture-pattern.html](http://posa1.blogspot.com/2008/05/layered-architecture-pattern.html)

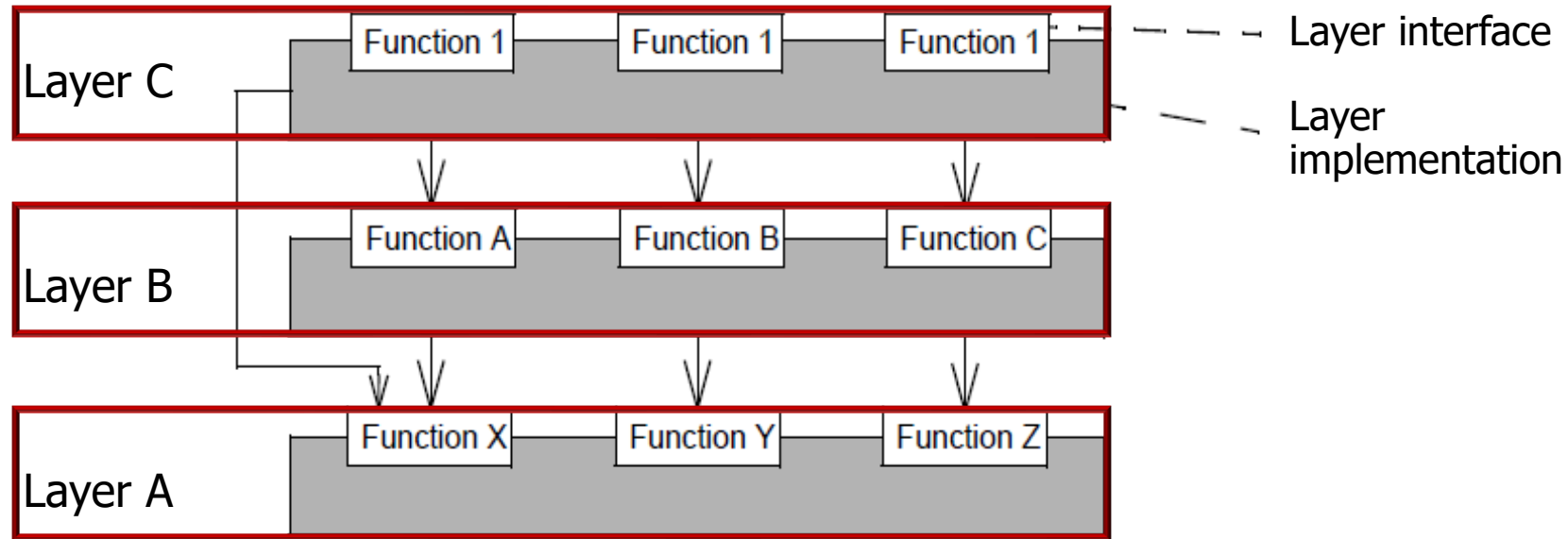
# An Overview of the Layers Architectural Pattern

- The *Layers* pattern structures software apps & infrastructure in several ways
  - Partitions an overall system architecture into groups of subtasks



# An Overview of the Layers Architectural Pattern

- The *Layers* pattern structures software apps & infrastructure in several ways
  - Partitions an overall system architecture into groups of subtasks
  - Decomposes groups of subtasks into levels of abstraction



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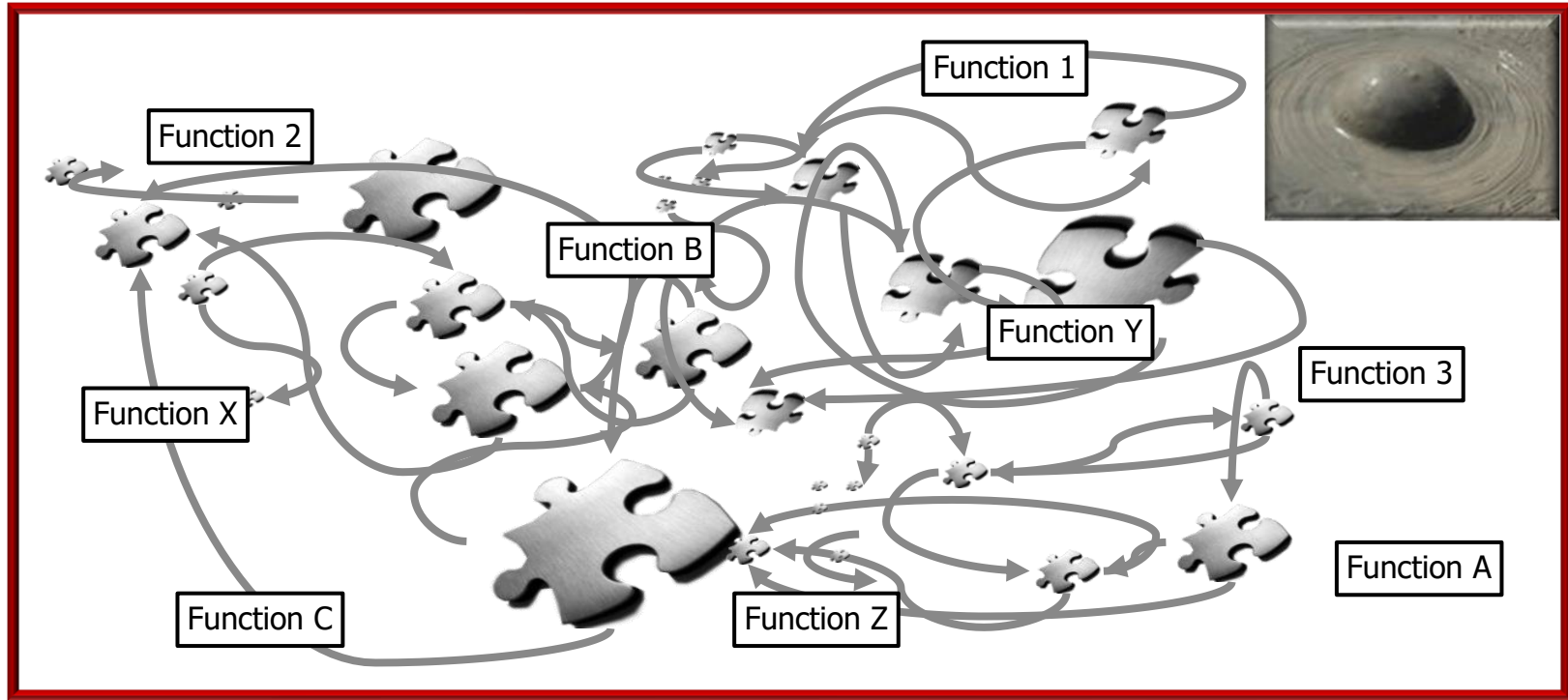
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- The *Layers* pattern helps to simplify software development & evolution



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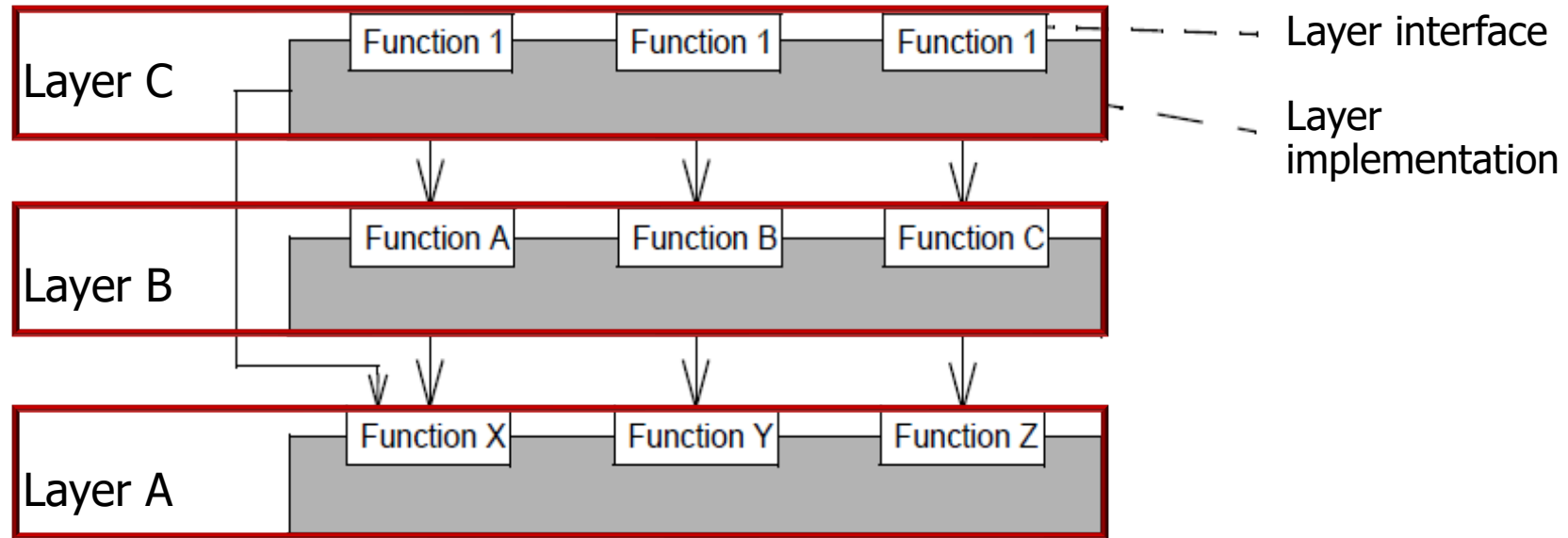
- The *Layers* pattern helps to simplify software development & evolution
  - e.g., it replaces tightly coupled “big balls of mud”...



See [en.wikipedia.org/wiki/Big\\_ball\\_of\\_mud](https://en.wikipedia.org/wiki/Big_ball_of_mud)

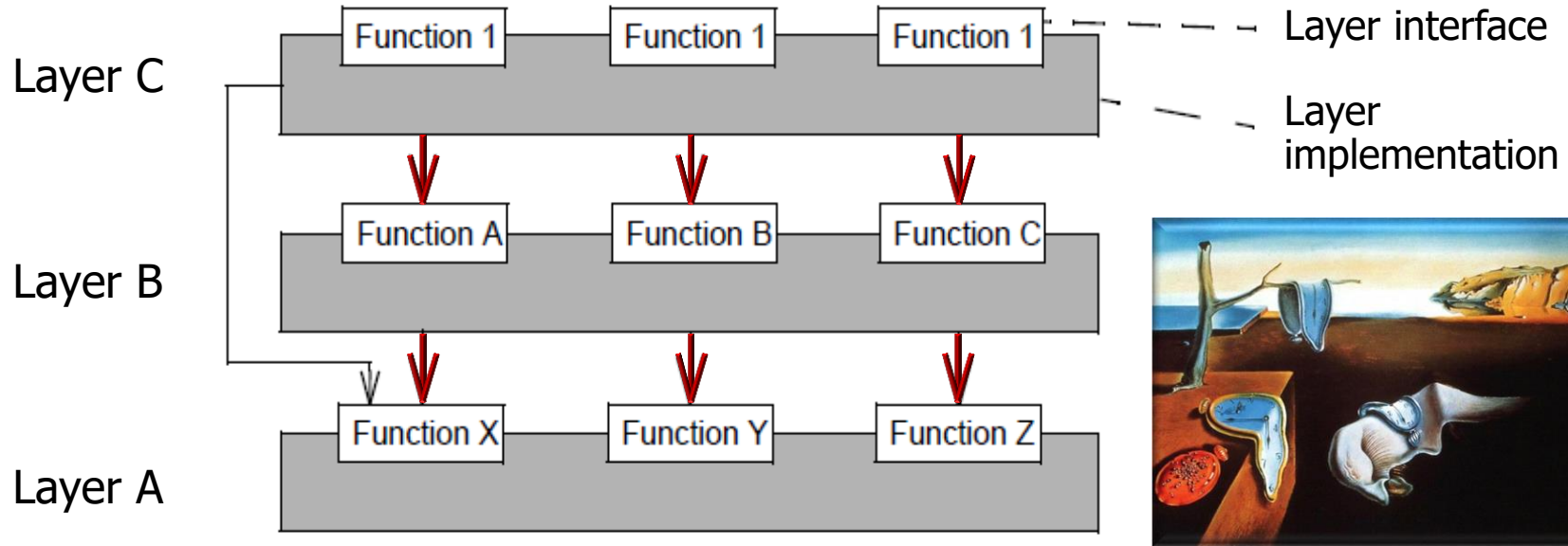
# An Overview of the Layers Architectural Pattern

- The *Layers* pattern helps to simplify software development & evolution
  - e.g., it replaces tightly coupled “big balls of mud”... with modular solutions that can be extended & contracted more easily



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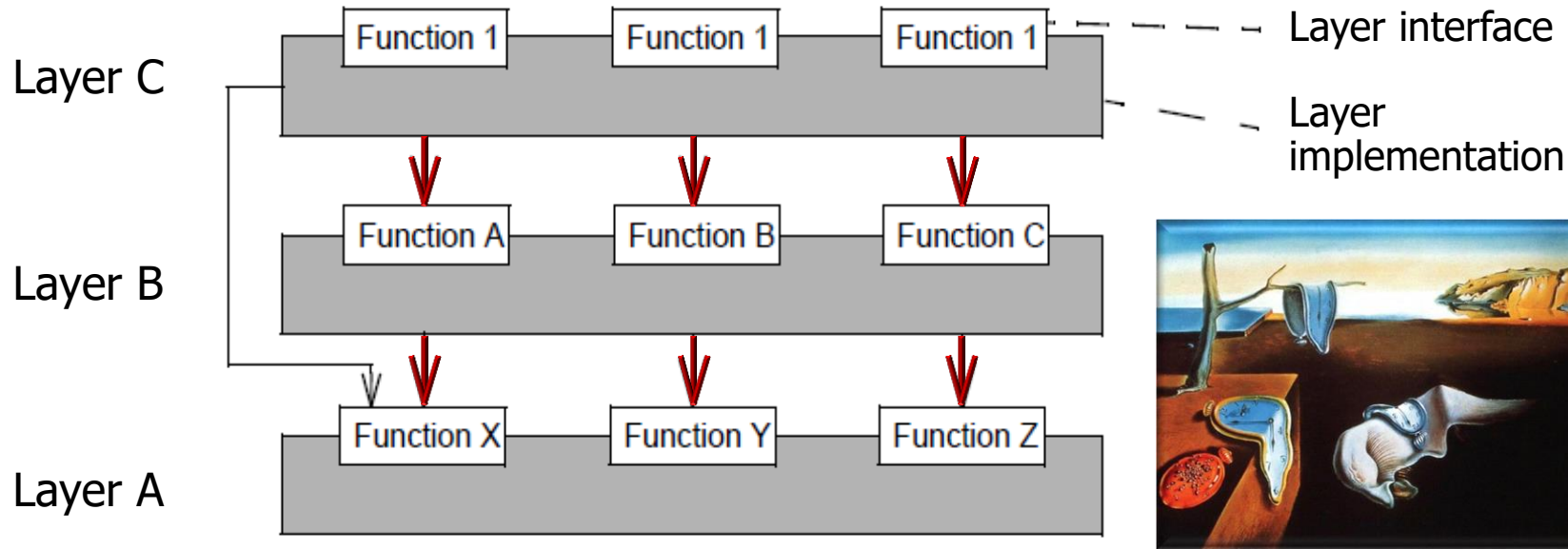
- Be careful when implementing a layered architecture to avoid unnecessary overhead when exchanging data between the layers





# An Overview of the Layers Architectural Pattern

- Be careful when implementing a layered architecture to avoid unnecessary overhead when exchanging data between the layers
  - e.g., minimize context switching, synchronization, & data copying overhead



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# End of Layered Architectures: The Layers Architecture Pattern