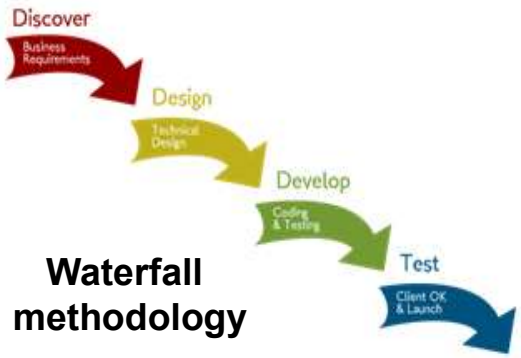
Introduction to Software Design

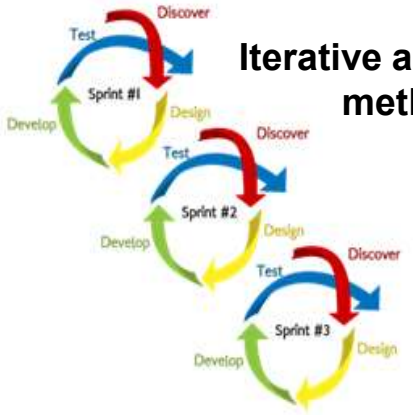
Introduction to Software Design

- Software Design and Architecture
- Software Architecture Views
- Pattern-based Design
- References

Software Design and Architecture



Waterfall methodology

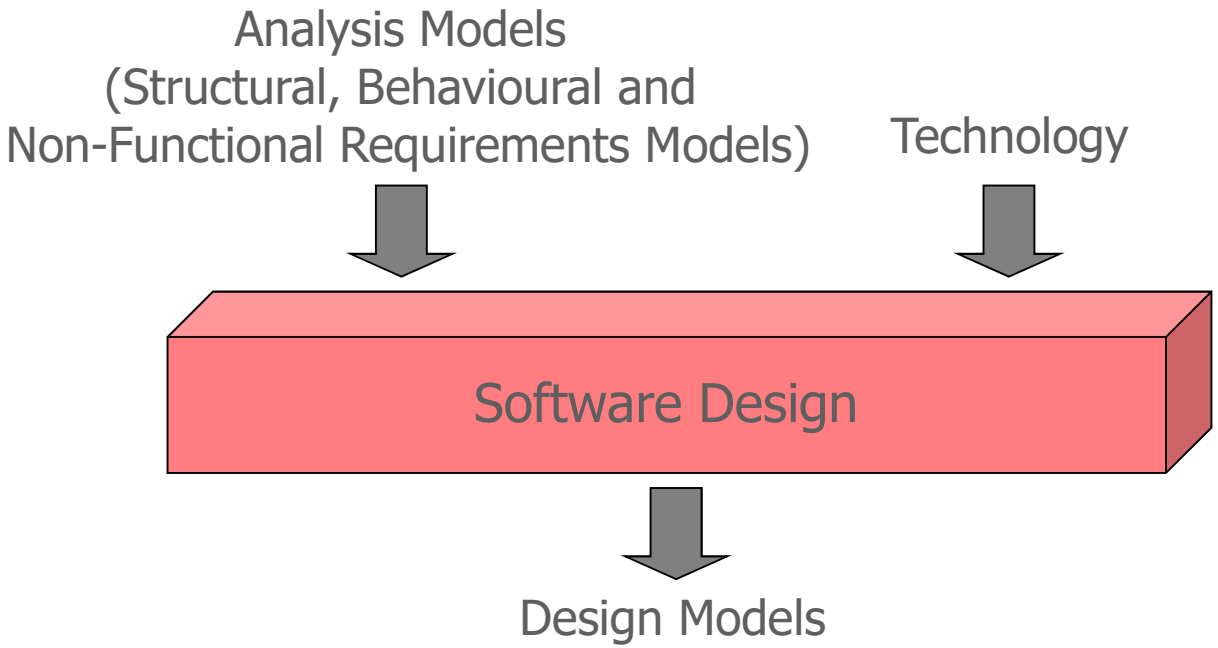


Iterative and incremental methodology

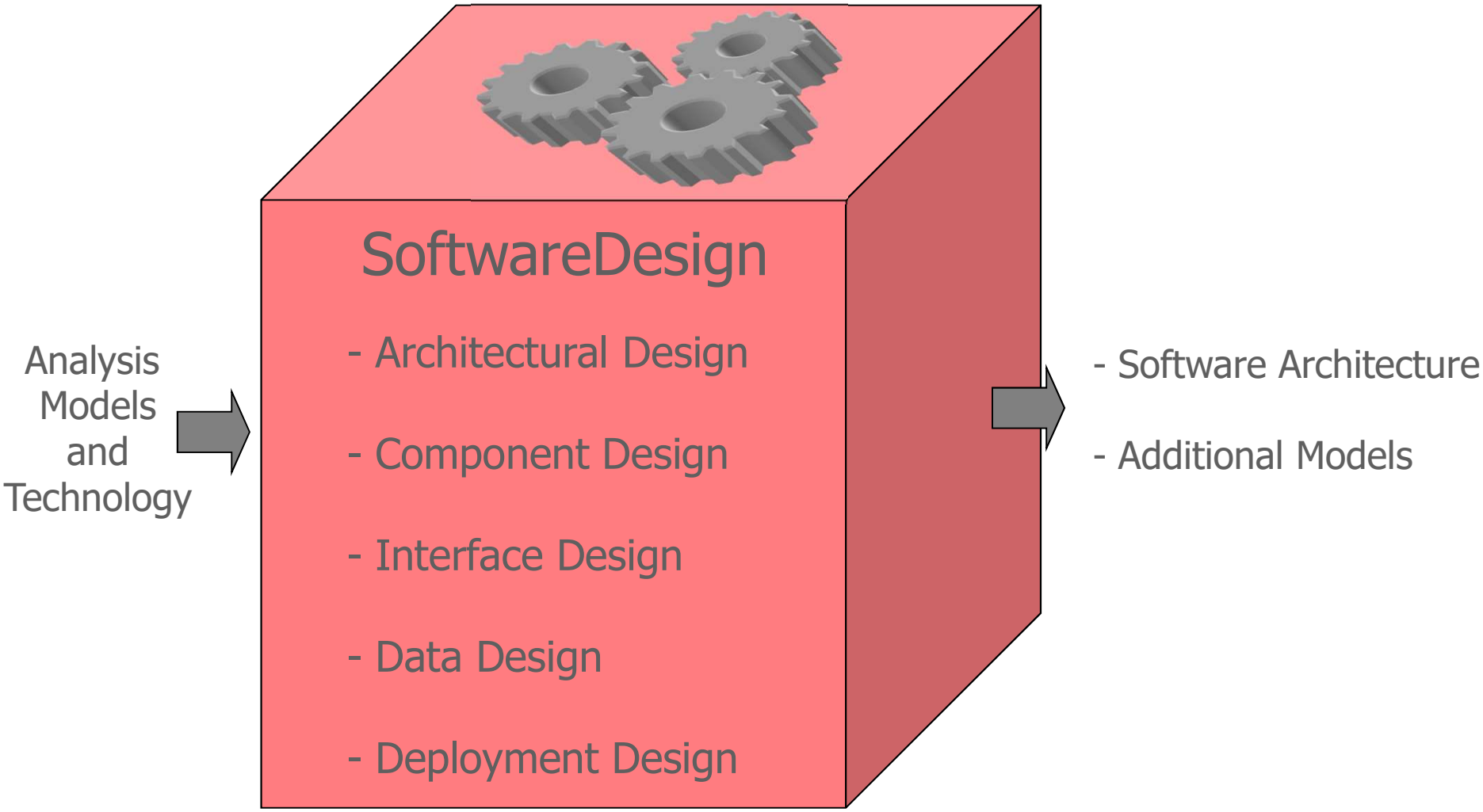
- Software design and Architecture in waterfall and in some of iterative methodologies starts when the discover phase is finished or almost finished.
- Software design and Architecture is very well documented and completed before coding starts.
- Software design is focused on completing modules of the architecture.
- Software design is a heavy process.
- Software design requires architects and designers.
- Architects have infrequent interactions with business people.

Software Design and Architecture

- Inputs and outputs of software design



Software Design and Architecture



Software Architecture Views

- In 

Logical View

Structural View
- Class diagram
- *Colaboration diagram*
- *Component diagram*

Dynamic View
- *State Machine diagram*
- *Activity diagram*
- Sequence diagram
- *Communication diagram*

Model Management View
- Package diagram

Use-Case View
- Use Case diagram
- Textual Use Case

Deployment Process

Implementation View

Deployment View
- Deployment diagram

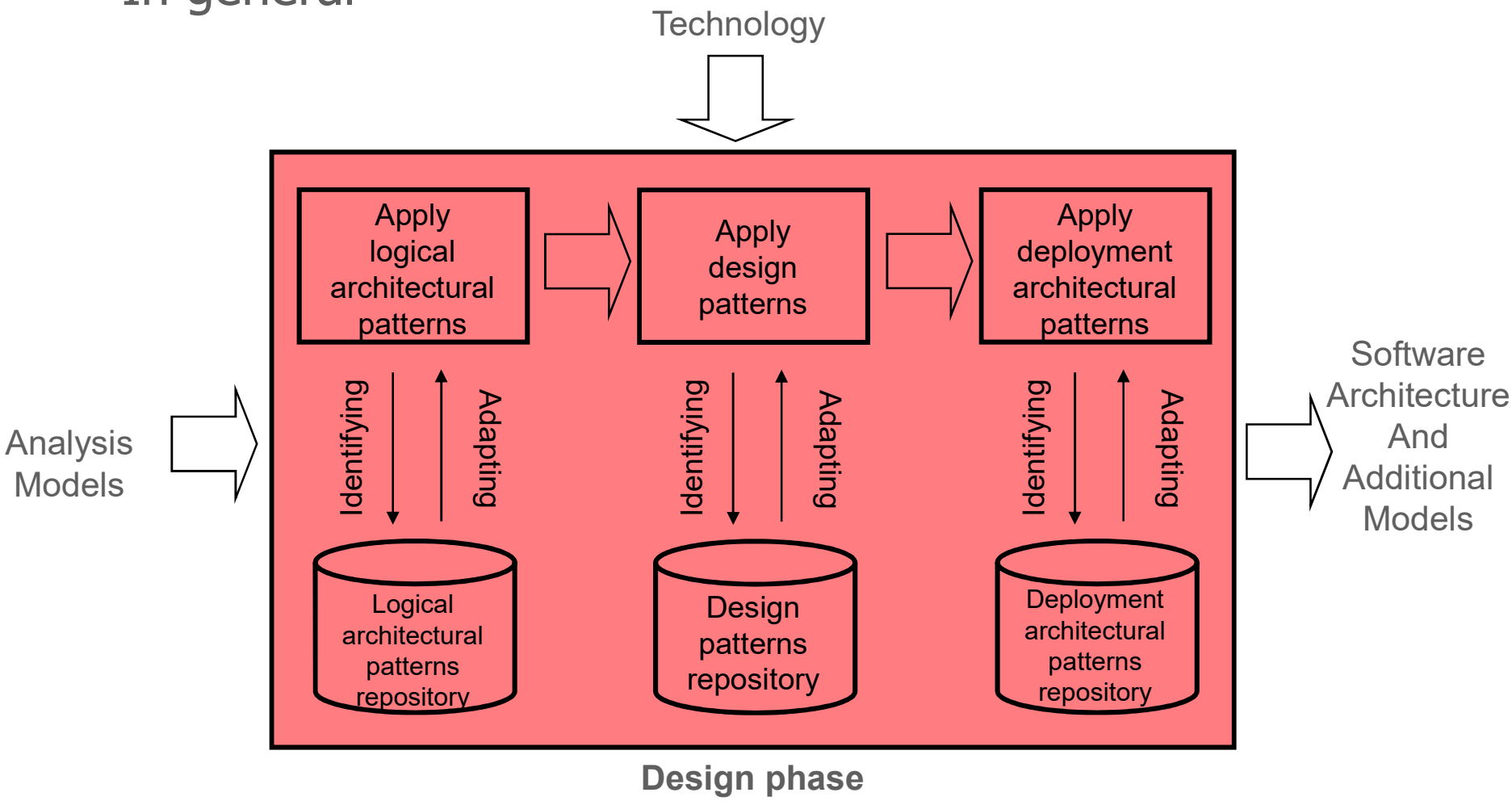
Pattern-based Design

- **Pattern-based design** creates a new application by finding a set of proven solutions to a clearly delineated set of problems. Each problem and its solution is described by a design pattern that has been catalogued and vetted by other software engineers.

- Two types of patterns used at the design phase:
  - Architectural patterns
  - Design patterns

Pattern-based Design

- In general

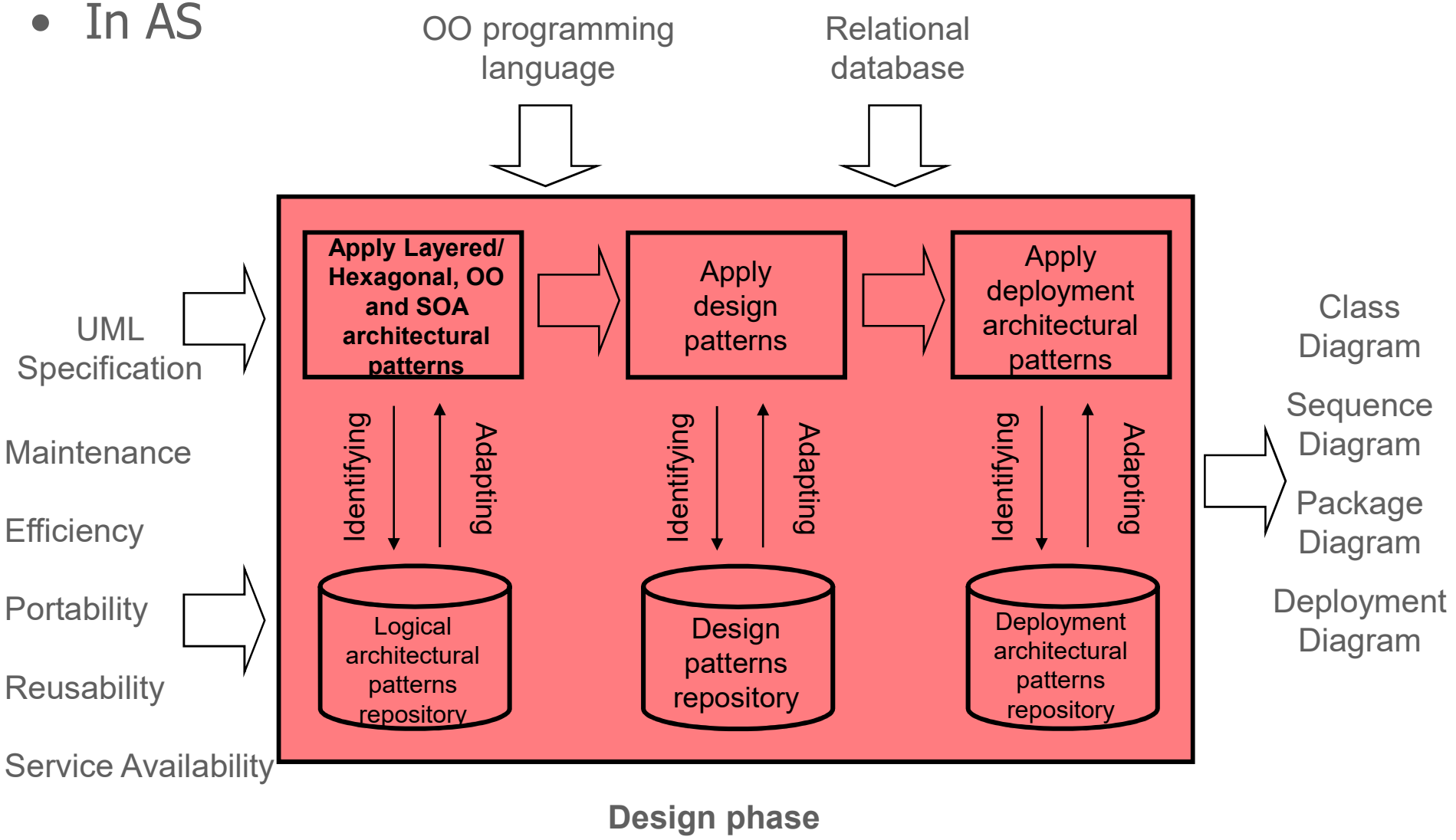


Pattern-based Design

- In AS we will apply the pattern based design to software systems that:
  - Keep a consistent representation of the domain state.
  - Answer queries about the domain state.
  - Produce reactions when some predefined conditions are given.
  - Use external services

Pattern-based Design

- In AS



References

- *Ingeniería del software. Un enfoque práctico*
  R.G. Pressman
  McGraw Hill, 2010 (Séptima edición), cap. 8, 9 and 10

- *Enginyeria del software: Especificació*
  D. Costal, X. Franch, M.R. Sancho, E. Teniente
  Edicions UPC, 2004

- *Applying UML and Patterns*
  C. Larman
  Prentice Hall, 2005 (3rd edition), ch. 33, 34 and 39

- *Software Engineering*
  I. Sommerville
  Pearson, 2011 (9th edition), ch. 6

- *The Unified Modeling Language Reference Manual*
  J. Rumbaugh, I. Jacobson, G. Booch
  Addison-Wesley, 2004 , ch. 3

- Microsoft Application Architecture Guide (2nd edition)
  Microsoft
  http://msdn.microsoft.com/en-us/library/ff650706.aspx, ch. 1,2 and 3