CISC 322
Software Architecture

UML - The Unified Modelling Language

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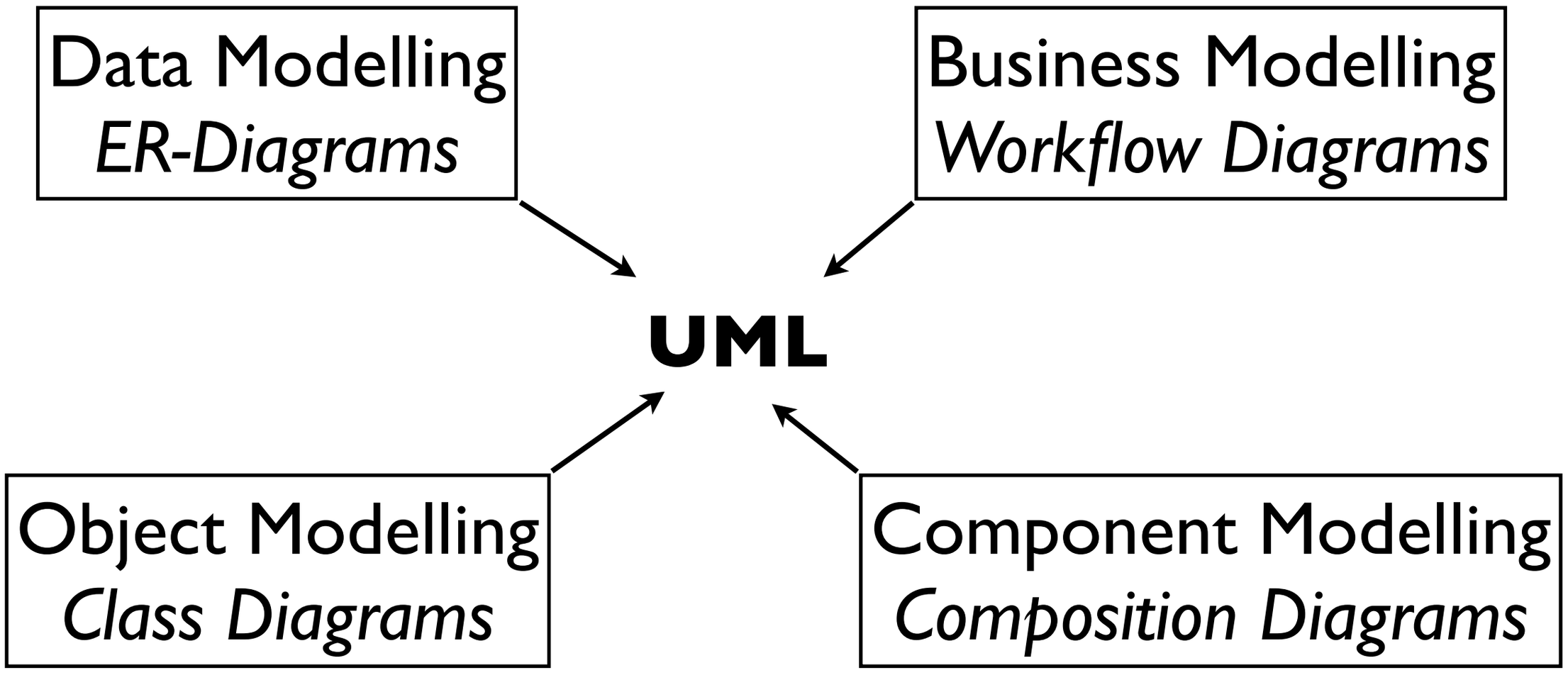
DEFINITION

The Unified Modelling Language (UML) is a graphical language for *visualizing*, *specifying*, *constructing*, *and* *documenting* the artifacts of a software-intensive system. The UML offers a *standard way* to write a system's *blueprints*, including *conceptual* things such as business processes and system functions as well as *concrete* things such as programming language statements, database schemas, and reusable software components.

ISO/IEC 19501

UML combines previous blueprinting approaches



Why UML?

"Developing a model for an industrial-strength software system prior to its construction or renovation is as essential as having a blueprint for large building."

ISO/IEC 19501

- Good models essential for team communication
- Comprehension of systems through visualization
- Reduce the risk of failure
- Industry standard - training, tools, meaning costs

UML in Software Architecture

"UML provides notation and semantics that addresses all scales of architectural complexity and across all domains."

ISO/IEC 19501

- Ensure architectural soundness
- Solve recurring architectural problems (Patterns)
- Split up complex architectures in smaller parts

History

Jim Rumbaugh
IBM Rational

Grady Booch
IBM Rational

Ivar Jacobson
Objectory

1994 Booch and Rumbaugh unify BMT and OMT

1995 Jacobson joins Rational merging in OOSE

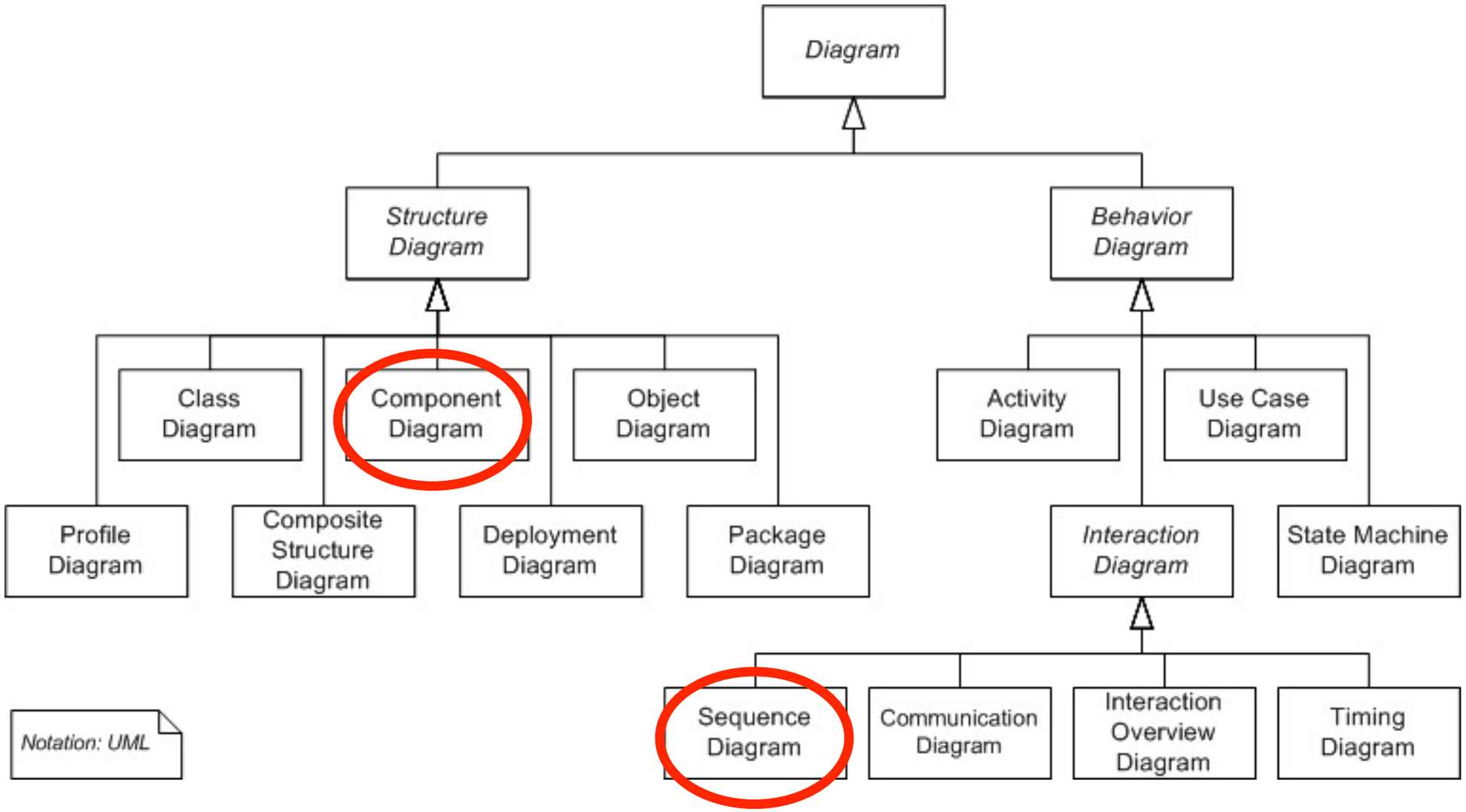
1996 UML v0.9 first specification

1997 UML v1.0 public, non-proprietary open

2005 UML v1.4 widely adopted in industry
becomes international ISO standard.

Today UML v2.3 released in March 2010

Types of UML Diagrams

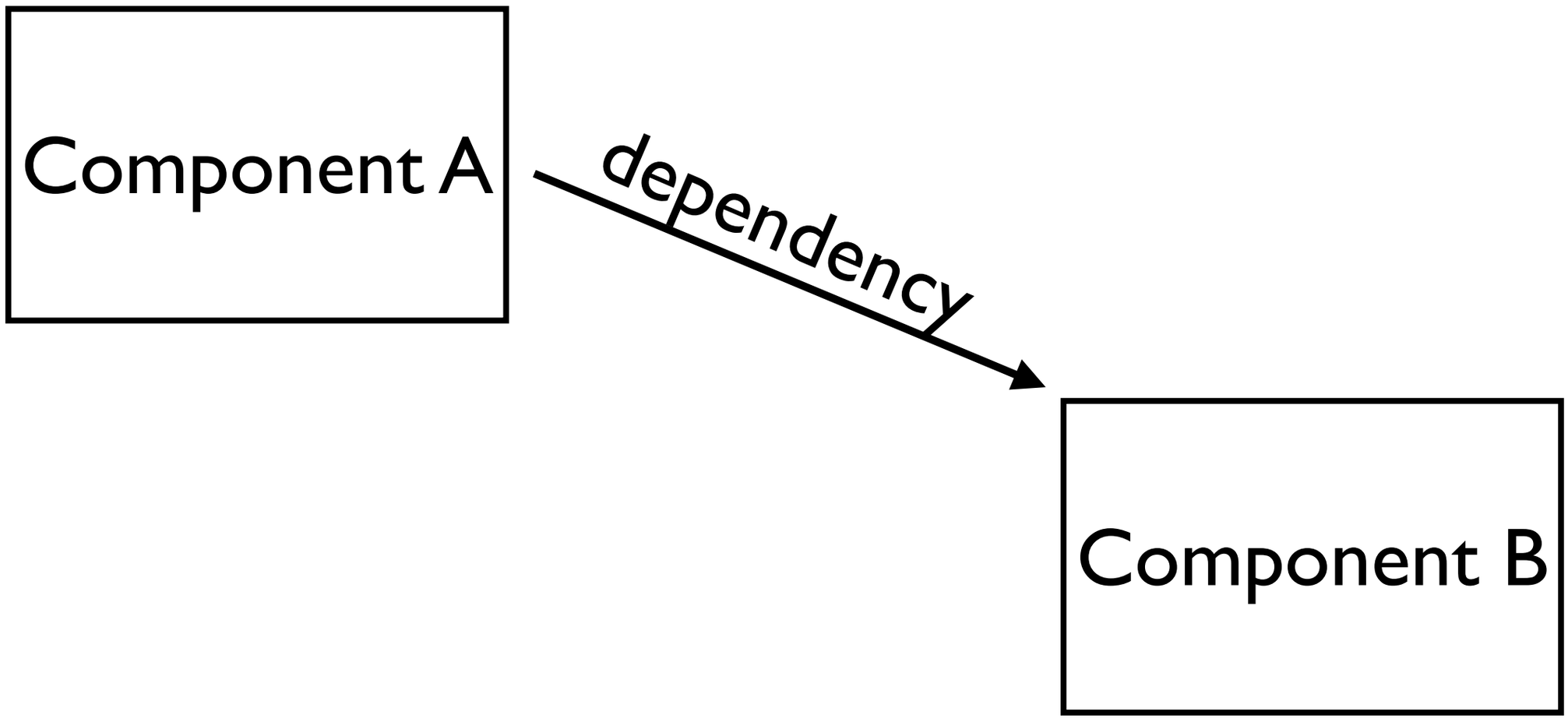


http://www.omg.org/spec/UML/2.2/

Structure Diagrams

- Emphasize things that must be present in the system (Existence).
- Extensively used in documenting the architecture of a system.
- A *Component Diagram* describes how a software system is split up into components and shows the dependencies among them.
- A *Package Diagram* describes how a system is split up into logical groupings by showing the dependencies among these groupings.

In this course: simplified notation



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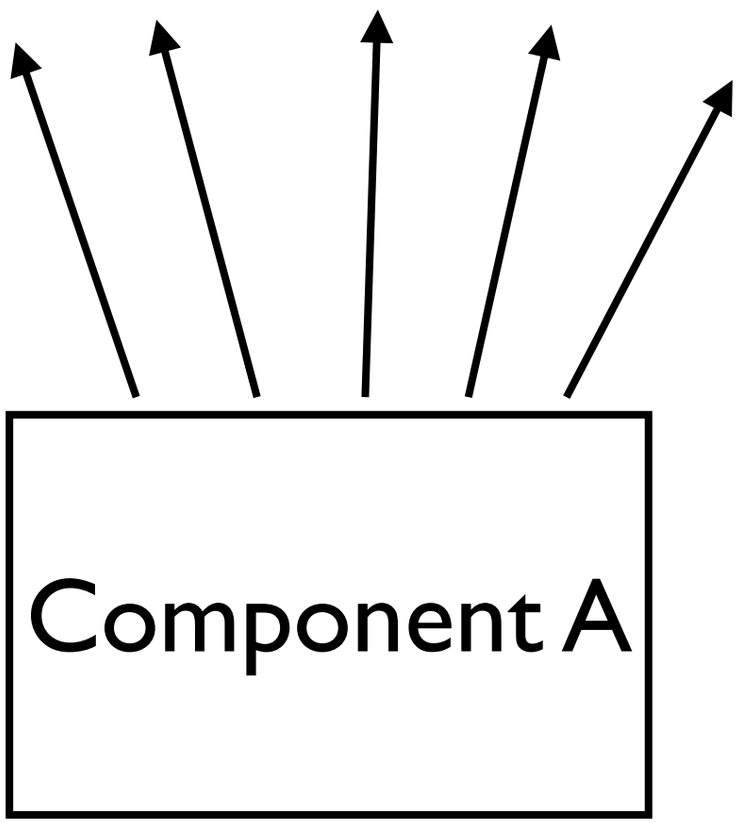

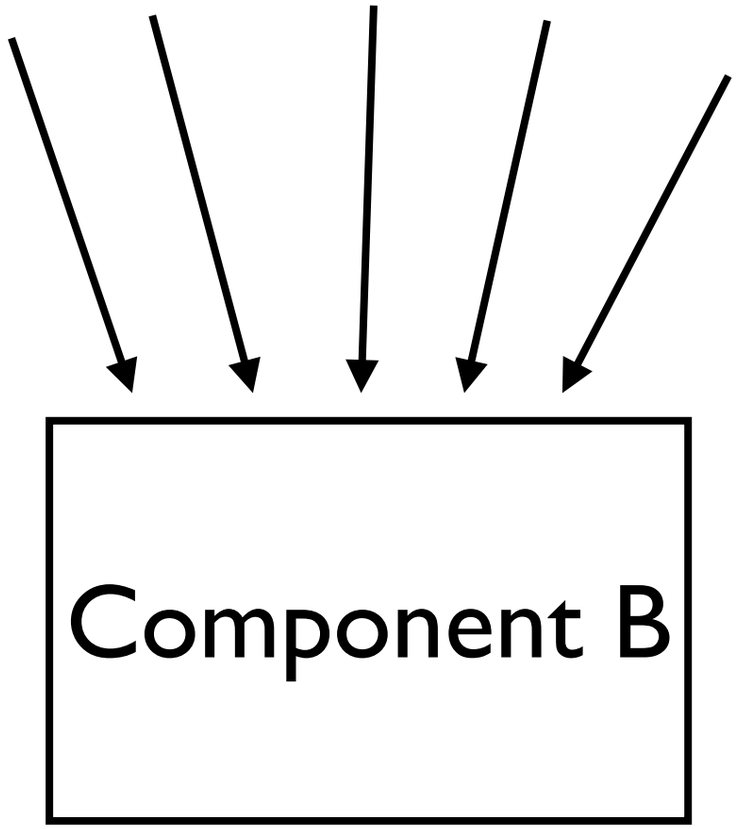

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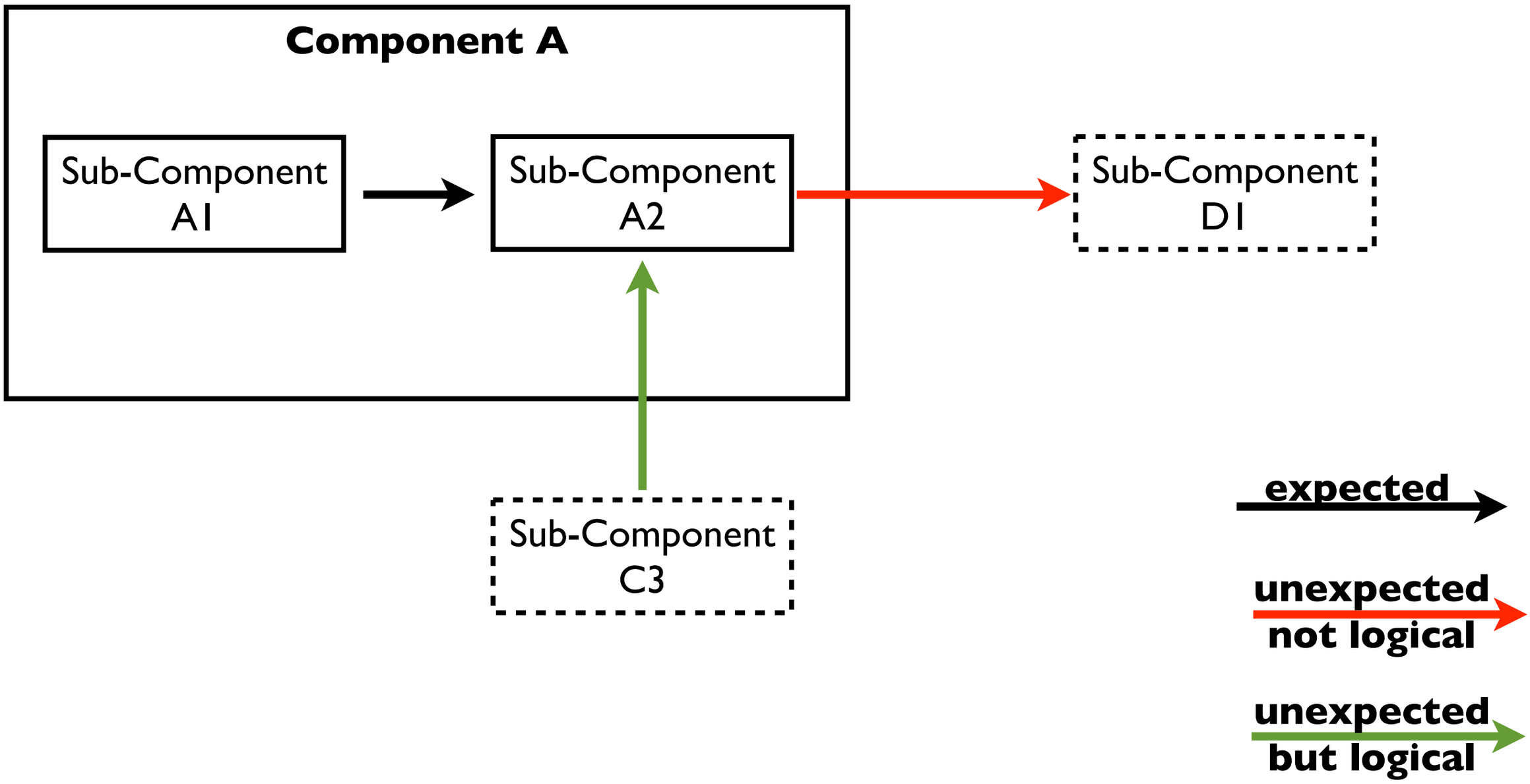


Interactive Demo: Structure of a Web Browser

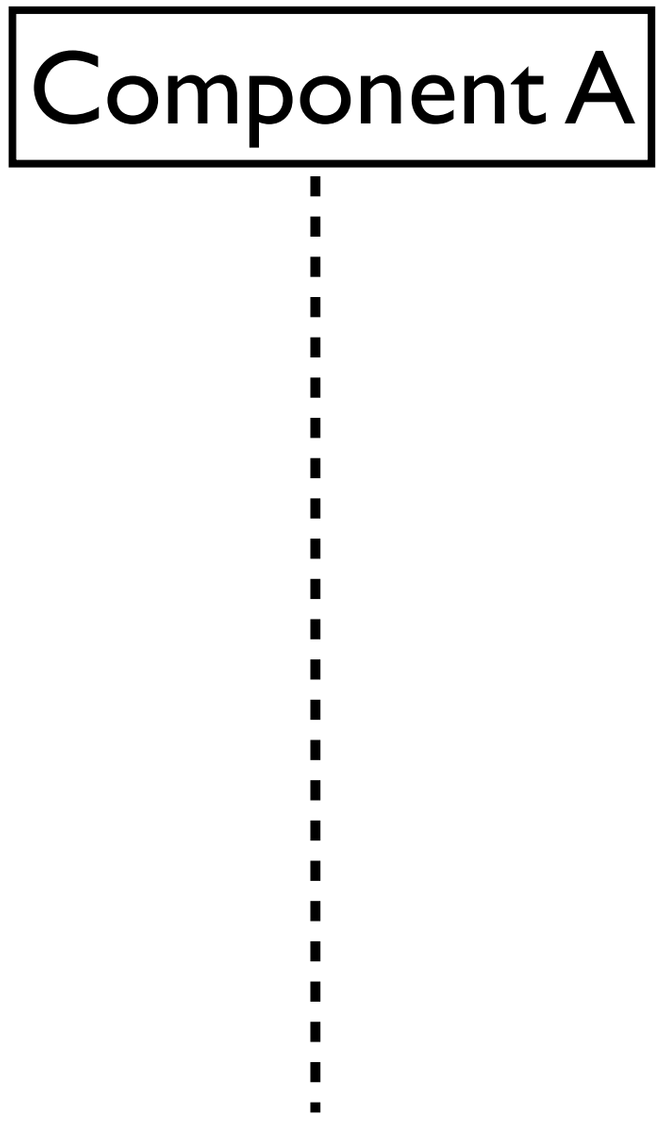
Behaviour Diagrams

- Emphasize things that must happen in the system (Functionality).
- Extensively used in documenting the functional behaviour of a system.

Interaction Diagrams

- Emphasize control and data flow in the system (Static and Dynamic Behaviour).
- A *Sequence Diagram* shows how objects communicate with each other. Also indicates lifetime and activity time of objects.

In this course: simplified notation



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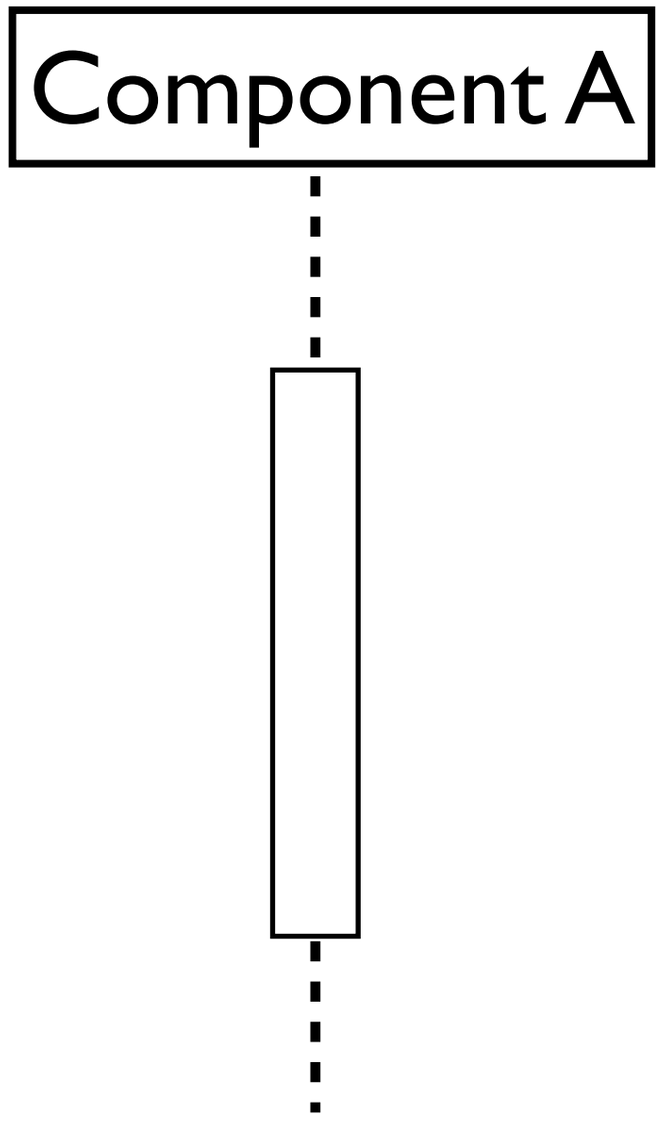

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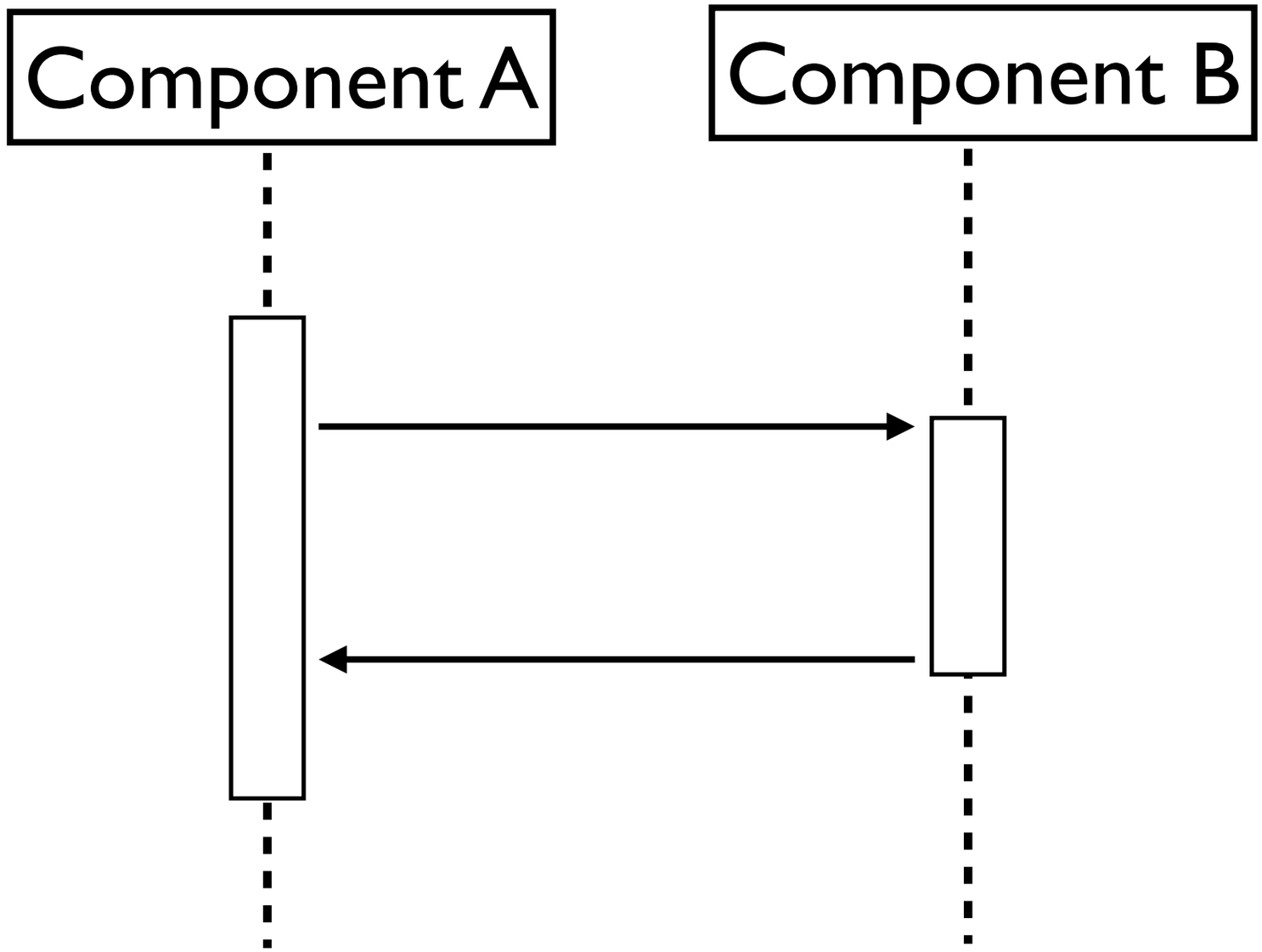

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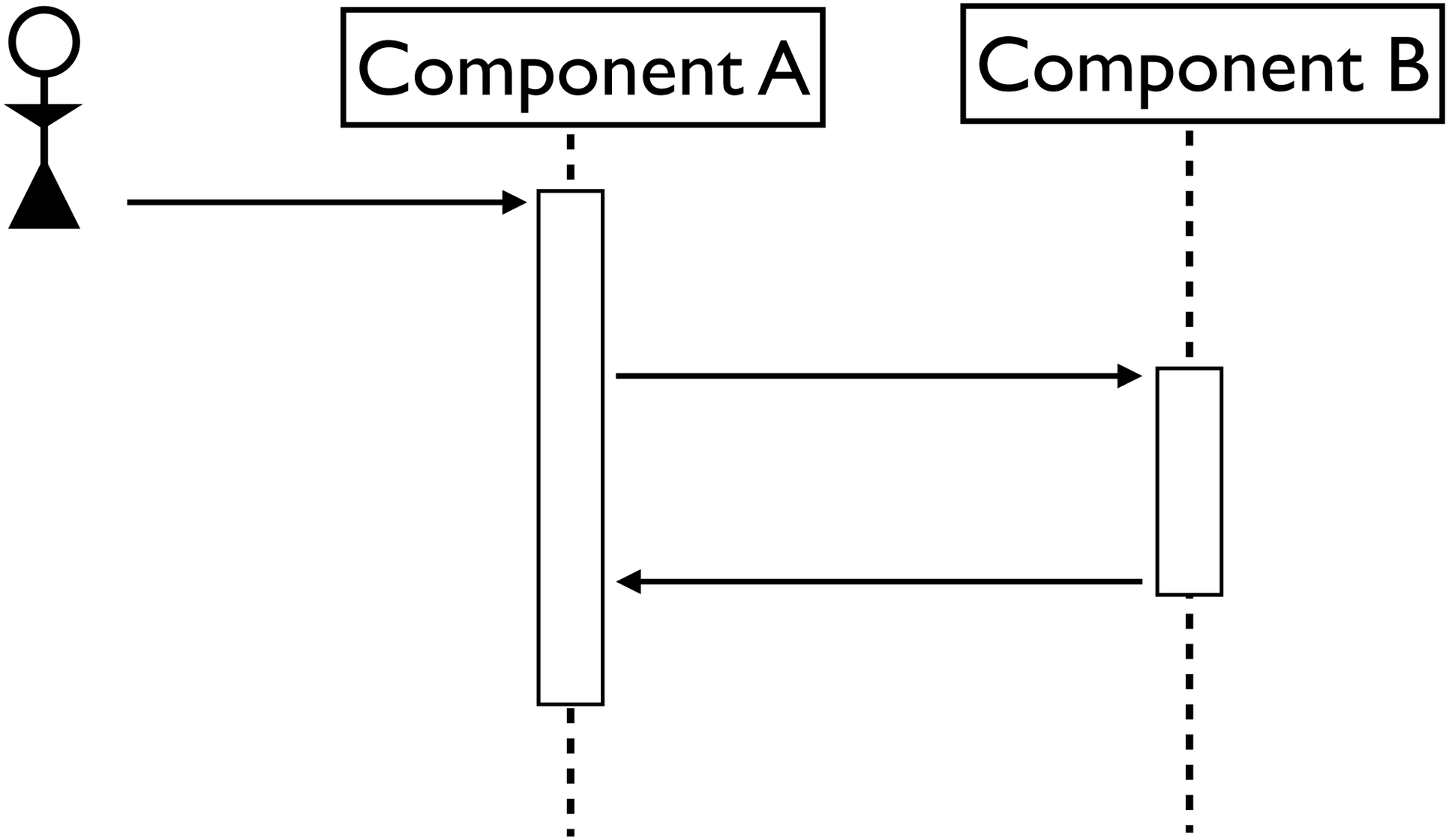

Interactive Demo: Behaviour of a Web Browser

You will be using the same notation in your project deliverables.