Software Design Concept

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AUIS IT DEPARTMENT

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Engineering Software

- A systematic, disciplined approach is needed to build software systems.
- Software engineering is necessary to build some (if not all) software products. But how do we engineer software?

Phase	Description
Requirements	Initial stage in the software development life-cycle where requirements are elicited, analyzed, specified, and validated.
Design	The requirement's specification is used to create the software design, which includes its architecture and detailed design.
Construction	Relies on the requirements' specification, the software architecture, and detailed design to implement the solution using a programming language. A great deal of design can also occur at this phase.
Test	Ensures that the software behaves correctly and that it meets the specified requirements.
Maintenance	Modifies software after delivery to correct faults, improve performance, or adapt it for a different environment.

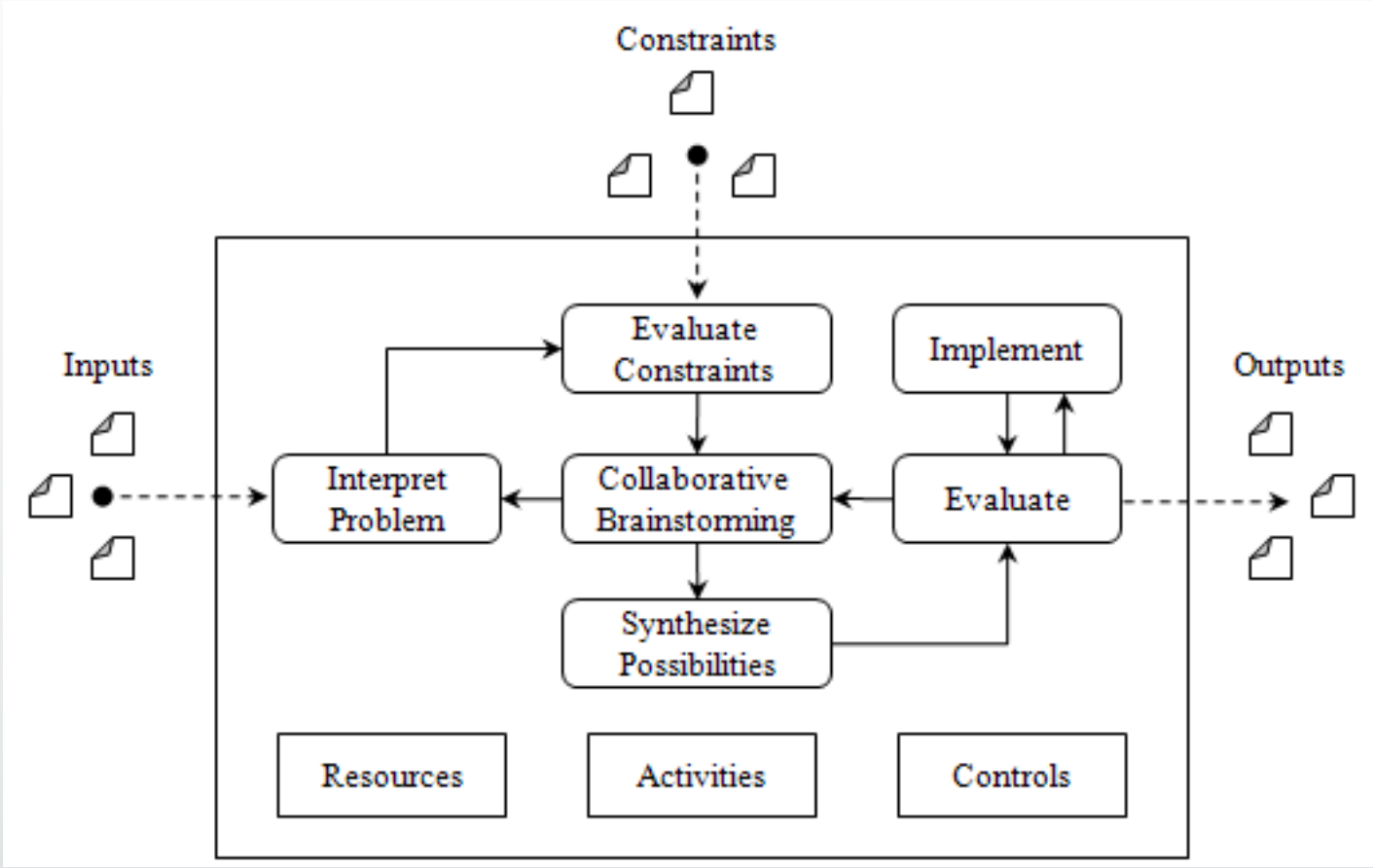
Engineering Design

- Design is a systematic and intelligent process.
- Designers generate, evaluate and specify designs for systems or processes whose form(s) and function(s) achieve clients' objectives and users' needs.
- Designs satisfy a specified set of constraints.

Problem Solving

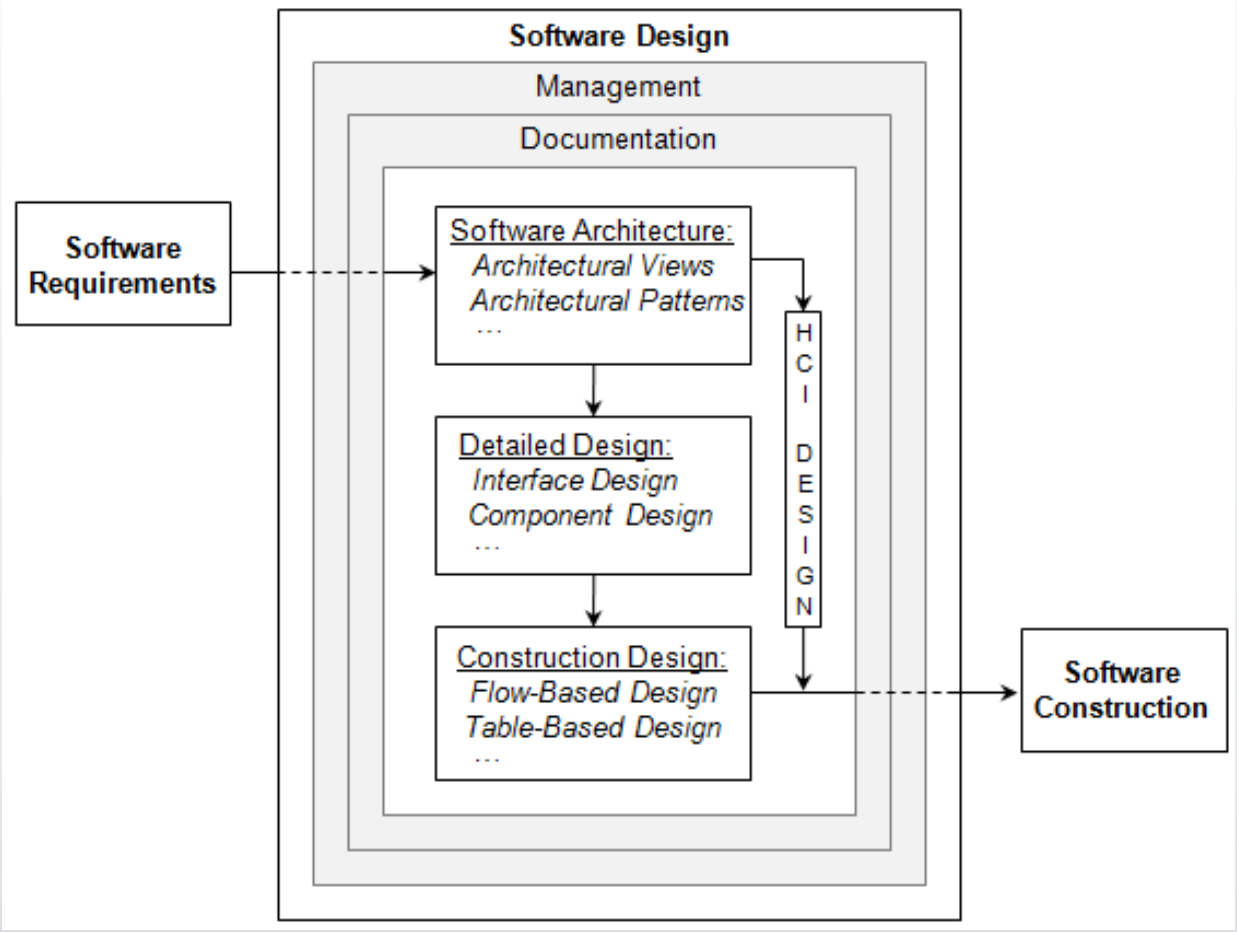
Engineering Problem Solving – Holistic Approach

- Interpreting the problem
- Evaluating the constraints
- Collaborative brainstorming
- Synthesizing the possibilities
- Evaluating the solution
- Implementing the solution



Software engineering design

- The process of identifying, evaluating, validating, and specifying the architectural, detailed, and construction models required to build software that meets its intended functional and non-functional requirements



Software Design Challenges

- The increasing complexity of today's software systems has created a set of particular design challenges :

- Requirements volatility
- Inconsistent development processes
- Fast, and ever-changing technology
- Ethical and professional practices
- Managing design influences

Software Architecture and Detailed Design

- **Software Architecture:**
- Provides black-box models used to evaluate the system's projected capabilities as well as its expected quality.
- It provides the major structural components and interfaces of the system.
- Lays the foundation for software implementation/
- **Detailed Design:**
- Builds on the software architecture to provide a white-box approach to design the structure and behavior of the system.
- Focuses on functional requirements, whereas the architecture focuses mostly on non-functional

Roles of Software Designers

- **Systems Engineer**: Designs systems using a holistic approach, which includes designing how software, hardware, people, etc. collaborate to achieve the system's goal.
- **Software Architect**: Design software systems using (for the most part) a black-box modeling approach; concern is placed on the external properties of software components.
- **Component Designer**: Focuses on designing the internal structure and behavior of software components
- **User Interface Designer**: Design the software's user interface; skilled in determining ways that increase the usability of the system

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Summary

- **Designs provide answers to the following and similar questions:**

- What specific business requirements should be addressed by a software?
- What infrastructure should be provided?
- What hardware and software should be installed?
- What applications should be developed?
- What data entitles should be used?
- How exactly should different system components communicate and interact with each other?

References

- As specified in the syllabus