Design

• Chapter 6 in Text
  – At last, the heart of the matter…
    • Good design
    • Complete design
    • Correct design
  • Get the insides of the system defined
  • Implement the plan made in analysis

Overview

Design is a critical intermediate step between a statement of requirements and the construction of a solution. It produces a description of the solution – not the solution itself. This description is sufficiently complete and accurate to assure that the solution can be constructed.

Design models allow the behavior of proposed solutions to be evaluated and compared.
Why Design?

• The desired artifact or system does not exist.
• People cannot wait for gradual evolution.
• Complex systems require multidisciplinary teams and shared design processes.
• It is risky and expensive to construct without a plan.

Why Design? (continued)

• To model and predict system performance.
• Alternatives can be compared to select the best.
• Complex systems need multidisciplinary teams and shared design processes.

Why Design? (continued)

• It is less expensive to test, predict, and evaluate during design than after construction.
• The cost of detecting and correcting errors increases as the process of creating an artifact unfolds.
Goals of Design

• Satisfaction of requirements
• Performance
• Constructibility
• Efficient design process
• Personal preferences and objectives

A General Design Method

1. Define the objectives of the design.
2. State the problem, defining its constraints.

Repeat until a solution is found:
3. Generate a tentative solution.
4. Test the solution for feasibility.

Strategies for Generating a Design Solution

• Re-use an existing design
• Modify an existing design
• Synthesis
• Direct design
**Design Patterns**

Recent practice in program design makes extensive use of patterns. (See Chapter 8.)

A *pattern* is a statement of a design problem together with an appropriate solution to that problem.

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**Design Models**

Design models can:

- Simplify complexity.
- Calculate or simulate the expected performance of the artifact or system.
- Manipulate and alter the relationships between the components of the system.

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**Learning Objectives**

- Identify similarities in the concerns of all designers regardless of their specific discipline.
- Summarize some different perspectives on the nature of design.
- Explain how design differs from requirements analysis and construction.
- Give some reasons for design.
Learning Objectives
(continued)

• Define design as used in textbook.
• Discuss why it is important to have a design method when developing systems.
• Name and explain some strategies for generating design solutions, simplifying design decisions, evaluating designs, and terminating the search for alternatives.
• Discuss the purpose of design models and the principal categories of design models.