ENGR 310

Lecture 12

25 Feb 2008

MONTANA STATE UNIVERSITY | College of ENGINEERING

Mountains & Minds

Why do design projects fail to deliver a good solution on time and within budget?

- With a neighbor, make a list of reasons.
- Order the list from most common to least common.
- Call out.

Why do design projects fail?

1. Misunderstanding what the customer needs.
2. Committing to a solution too early.
3. Lack of teamwork: esp. communication & conflict resolution, and across disciplines.
4. Poor system architecture, especially interfaces.
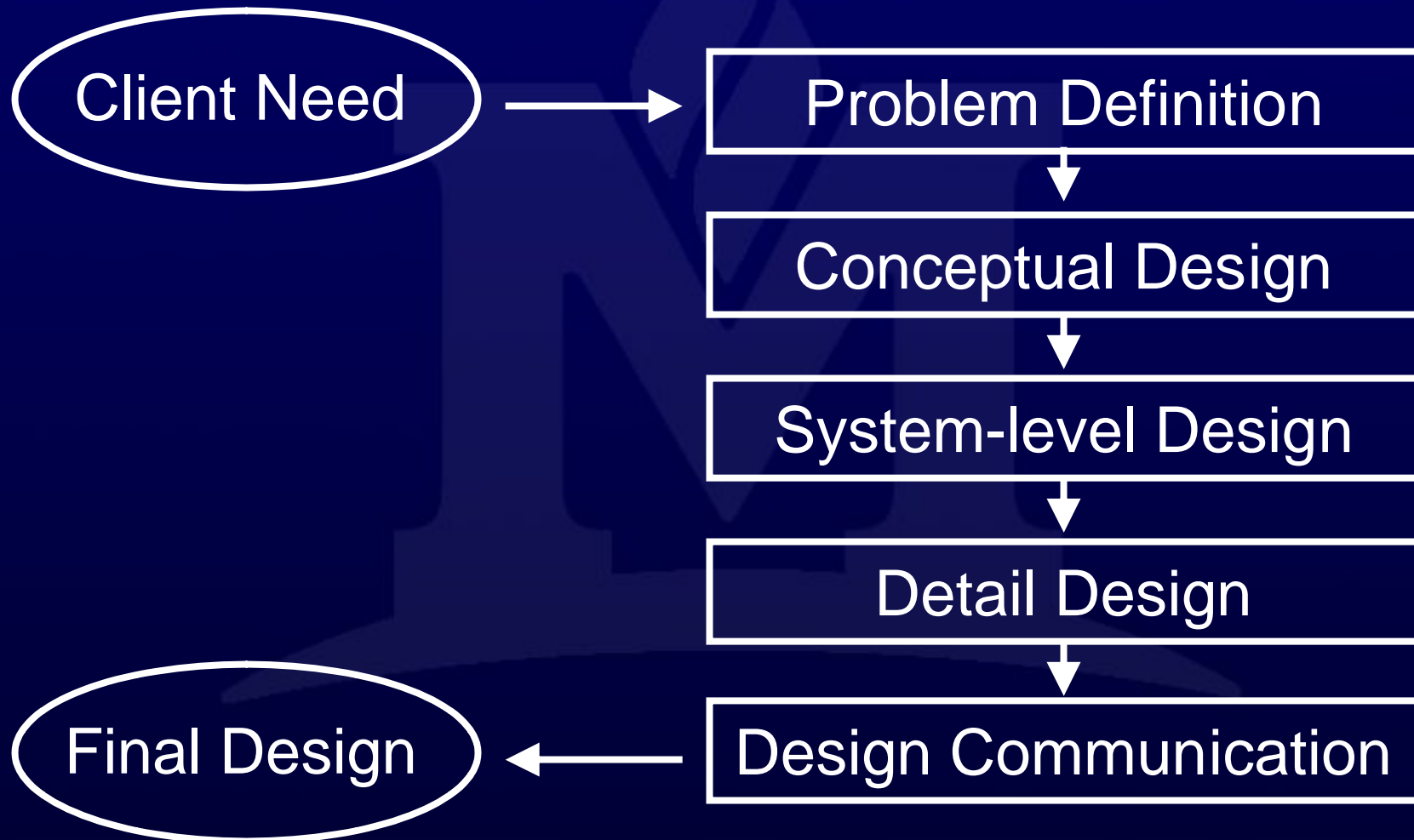5. Poor planning.

Assignment 4

Please take it seriously:
- real alternatives
- real evaluation

An Engineering Design Process

Client Need → Problem Definition

↓

Conceptual Design

↓

System-level Design

↓

Detail Design

↓

Final Design ← Design Communication

MONTANA STATE UNIVERSITY | College of ENGINEERING

Mountains & Minds

problem statement

↓

┌─────────────────────┐
│ Conceptual   │
│ Design   │
└─────────────────────┘

↓

design specs

conceptual design alternatives

Generate concepts of candidate designs:

5. Establish design specifications

6. Generate ideas

Last Time

- Mental blocks
- "Fail often to succeed quickly."
- Most good ideas are old ideas applied in new ways
- Techniques for breaking mental blocks:
  - Brainstorming
  - Morphological charts

Technique 3: Group Brain-writing

- Make sure everyone in group is clear on problem to be addressed
  - Write a statement / draw diagram
- Silently, generate 3 ideas. Use multiple sheets of paper if paper is small. Limit time.
  - Sketches + labels (minimum of words)
- Rotate ideas to person on the right.

Technique 3:
Group Brain-writing, cont.

- Build on the ideas just passed to you, for a set period of time.
  - New ideas allowed, if spurred by ideas given to you
- Repeat until ideas reach originator.
- Review, discuss, evaluate, combine.
  - post on the wall
- Choose a subset to carry forward.

6-3-5 Approach

- +/- 6 team members,
- Rotate 3 ideas in a round,
- Complete ~5 rounds:
  - one round for each of the ~4 most prominent functions
  - one round on system configuration

Exercise

1. Combine your team with another.

2. Identify a design problem to address.

3. Generate 3 ideas, silently. **(5 min.)**

4. Rotate, and build on others' ideas, silently. **(5 min.)**

5. Rotate again, and build once more, silently. **(5 min.)**

6. Together: discuss, evaluate, combine

Now what do we do?

- Establish evaluation criteria.
- Evaluate the alternatives.
- Eliminate the infeasible / inferior ideas.
- Do more research and development work.
- Converge on a solution that meets/exceeds client's and users' needs.