

ENGR 310

Lecture 7

4 Feb 2008



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Announcements

- REMINDER:
 - No lecture Wed;
 - Recitations instead.
- TEAM NOTEBOOKS:
 - Use them to keep yourselves organized.
 - Use extra tabs if you see fit.



“A problem well-stated is a
problem half-solved.”

- Charles Kettering

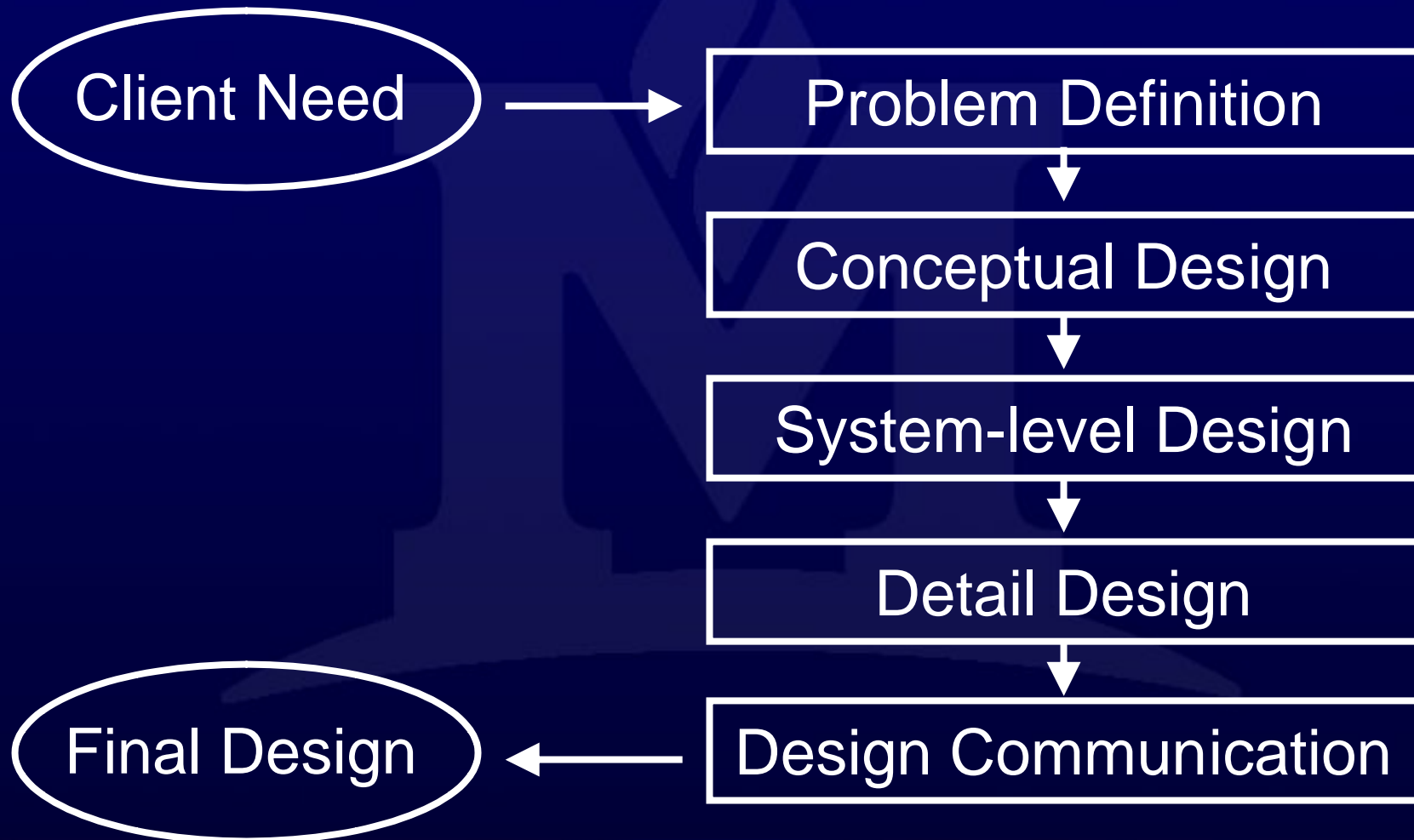


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An Engineering Design Process



client's statements



**Problem
Definition**

Gather information to develop a statement of client wants in engineering terms:

1. Clarify objectives
2. Establish user requirements
3. Identify Constraints
4. Define desired functions



statement of:

**objectives
constraints
requirements
functions**



Last Time

Clarify the design problem through:

Observation
Interviews
Researching
existing solutions



Comprehensive
list of desired
characteristics



By Asking...

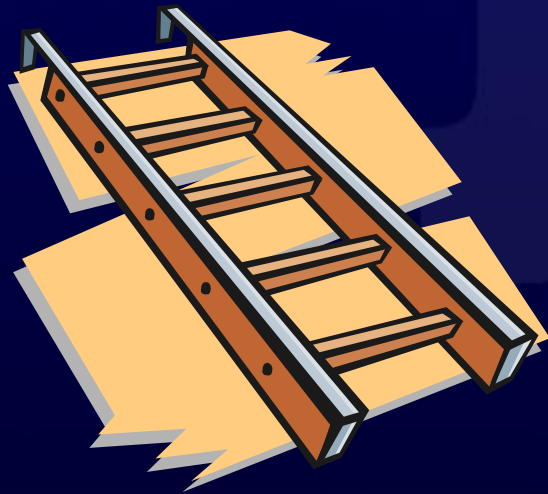
- What features/attributes would client like the system to have?
- What should the system do?
- Are other solutions currently available?

Long list of characteristics



“Safe Ladder” Attributes

With partner, review list of attributes provided.
Are all items comparable?
If no, identify differences.
(3 min.)



Most initial attribute lists are a mix of:

- Objectives
- Constraints
- Functions
- Means (or implementations)



Objectives

What the design strives to achieve.

- “Being” rather than “doing”
- Often more/less is better
- Express preference among feasible ideas

Ex.: convey material rapidly, easily
reconfigurable, inexpensive, low
maintenance



Constraints

Restrictions on behavior or performance.

- Clearly binary
- Define feasibility

Ex.: hold 200 lb. static load, fit in 8' x 10' footprint, weigh no more than 45 lbs.



Functions

Things the designed system must “do.”

Ex.: Keep material off ground,
convey material without manual
intervention, preserve FIFO queue,
feed material to next operation



Means

Ways of executing functions

- solution-dependent

Ex.: roller conveyor, gravity chute



Exercise

With a neighbor, divide the “Safe Ladder” attribute list into:

- Objectives
- Constraints
- Functions
- Means



Objective Tree

Helpful to organize objectives into a hierarchy.



Add Constraints (but differentiate).
No functions or means!



Exercise

With your neighbor, create an objective tree for the “safe ladder.”



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