Announcements

• Assignment 2 due this week.
  – Turn in one-day prior to recitation

• Journal Check this week.

• Assignment 3 due next week.
Last Time

- Teamwork success factors
- Stages of team development
- Effective meetings
- Managing conflict
An Engineering Design Process

Client Need → Problem Definition → Conceptual Design → System-level Design → Detail Design → Design Communication → Final Design
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
Process Review

Gather Lots of Information: Observation, Interviews, Research

List of Desired Characteristics

List of Objectives

Objective Tree
Functions & Specifications

**Functions** = what system must do to achieve objectives

**Functional Specifications** = how well system must do it

Also called “performance specifications” or “functional requirements”
Black Box Approach

Inputs:
- Energy
- Material
- Information

Main Function

Outputs:
Black Box Approach

Inputs
- Energy
- Material
- Information

Main Function

Outputs
Divide Functions into Subfunctions

Main Function

Subfunction A

Subfunction B

Subfunction C

Subfunction D
Tips

• Functions transform an input into an output.
• Define them as verb-object pairs.
  – E.g., convert energy, apply force, resist load
• Include primary and secondary functions.
Tips

• Functions transform an input into an output.
• Define them as verb-object pairs.
  – E.g., convert energy, apply force, resist load
• Include primary and secondary functions.

Unwanted

Required for primary
Tips

• Functions transform an input into an output.
• Define them as verb-object pairs.
  – E.g., convert energy, apply force, resist load
• Include primary and secondary functions.
• Be as general as possible.
  – E.g., support books vs. support load
Example

Grind Coffee
Exercise

With a neighbor:

Create a **Functional Model** of an overhead projector.