Agenda

(1) Problem Solving
(2) Product Dissection
(3) Homework #1
(4) Project Preproposals
(1) Structured Problem Solving

Issue: How do we create a comprehensive solution to complex open-ended problems?

Approach:

1. **Define the Problem**

2. Plan the approach (steps) to solving the problem

3. Implement plan & get results

4. Analyze results & draw conclusions

5. Learn from / Generalize the results
Example: Improve the Home Computer

Step 1: Define the Problem

"Home computers are underutilized."

Step 2: Create a Plan

(1) Assess the existing home computer with respect to people's needs, and generate recommendations.

(1.a) Identify the different types of home computers (laptops, desktops, tablets, phones) select 1 to focus on.

(1.b) Determine user needs for the selected type of computer

- personal experience
- survey our friends
- internet research
(2) Assess how well existing products satisfy the identified user needs

(3) Create a table with recommendations for improvement (use structured brainstorming)

<table>
<thead>
<tr>
<th>Customer needs</th>
<th>Assessment</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

STEP 3 Implement the plan

Step 4 Analyze results & draw conclusions

Answer: Are existing products doing a good job of satisfying user needs? Do we have a viable alternative?
STEP 5 learn from, generalize results

- improve the process
- apply insights to other products

(2) Product Dissection

motivation: Before we can create new products we need to understand the existing products.

Function: what does the product do?

Form: how does it do it?

Step (1) Get familiar with the product
(a) "play with it" use it
(b) internet search
(c) study documentation

"howstuffworks.com" provides basic information
(2) Determine function & form

Function: verb-noun combinations that indicate the purpose of the product

Example: Apple MacBook Pro laptop

Main function: Provide mobile computing

Sub-functions:
- Input information
- Process information
- Display information
Form: Physical configuration of the product that realizes the functions

Examples for MacBook Pro
- Intel i7 processor
- Retina Display
- Aluminum chassis
- Lithium battery
- Keyboard

(3) Create a structured diagram of the relationships between the functions & the form ("realizations") of the product
FAST Diagram

Function Analysis System Technique

Form

How?

Keyboard

Intra

IT

Retina display

Functions

Wys?

Input information

Process information

Display information

Provide mobile computing
Inert Gas (Argon) → Glass Bulb → Support Wire → Tungsten Filament → Power Lines → Socket

How?

FAST DIAGRAM

LIGHT BULB

Create an oxygen-free environment → High temperature

Why?