Agenda

1) Review of Lecture #1
2) Problem-Solving
3) Homework #1 and Project Kickoff
4) Product Dissection
2) Problem - Solving (structured)

Problem: How do we create comprehensive solutions to complex open-ended problems?

Approach: Structured Problem-Solving

1. Define the real problem
2. Plan the approach (steps) to solving the problem
3. Execute (implement) the plan
   approach ⇒ Results
4. Check your work
5. Learn/Generalize from results
3) Homework #1 and Project Kick off

Schedule a 2-hour meeting with your group

Apply Structured Problem-Solving to create the preliminary project

**Step 1: Define the problem**

Create a Structured report of 5-7 ideas for your Start up to develop into a product (or service)

**Step 2: Plan the approach**

1) Identify 3-4 societal needs your start-up is interested in addressing (e.g. transportation, communication,)
2) Structured Brainstorming to generate 5-10 product ideas for each need
3) Select 5-7 of the most promising ideas
4) Organize results into a Structured report with short description of each idea.
4) Product Dissection

Motivation: Before we can create new products, we need to understand how to analyze (or dissect) existing products.

Problem: How do we dissect a product?

Approach: Apply structured problem-solving

Step 1: Define the problem

How do we analyze a product in a way that enables us to understand what the product does (function) and how the product performs the function (form)?

Step 2: Plan the approach

1) Understand how the product works
   (a) Get the product and "play" with it
(b) Do internet research on the product howstuffworks.com (Basic info)

2) Determine function and form

Function: verb-noun combination that indicates the purpose, i.e., what the product does (function), sub-system or component of the product (sub-function)

Example: Samsung Galaxy S smartphone

Main Function: Provide integrated mobile communication and computing

Sub functions:
- Make and receive telephone calls
- Process information
- Display information

"Why" will stand for function
Form: physical configuration of the product which realizes, i.e., makes real, the function of the product or sub-system/component.

Example: Samsung Galaxy S components

- Samsung S5PC110 ARM Processor
- 512 MB DDR2 RAM
- 4-inch Super AMOLED Screen with Corning Gorilla Glass
- Android Eclair

"How" will stand for Form.

3) Create a structured diagram with the "WHYs" (functions) on the right and the "HOWs" (realizations) on the left.

Result: FAST diagram

Function Analysis System Technique (1970 By the way)
Simple Example:

Light bulb

Sylvania Soft White 25W indoor light bulb

WHYS

Edison Screw Socket

120V Mains

Receive Energy

Create Light

Create very high temperature (~4,000 °F)

Transform Energy into light

Provide O₂ free atmosphere

Argon gas

Glass Bulb

Support Wires

Tungsten Filament

Argon Gas

Glass Bulb

Tungsten Filament

Support Wires

Edison Screw Socket