14.1/11

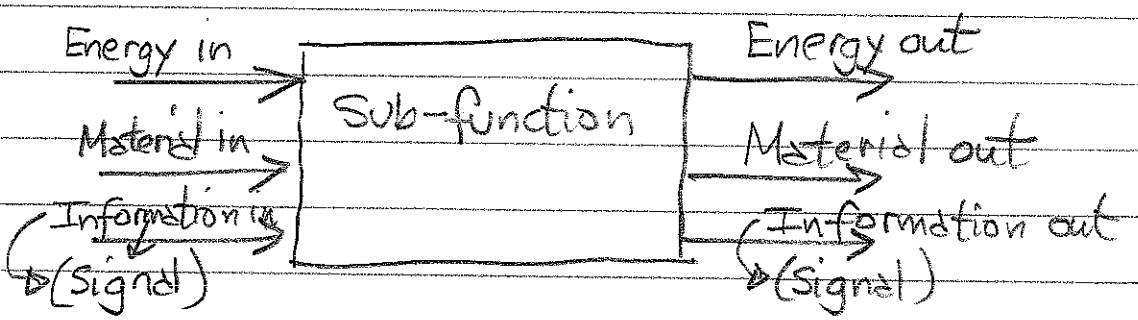
# FIM 105/205, Lecture #14 (11/12/13)

## Agenda:

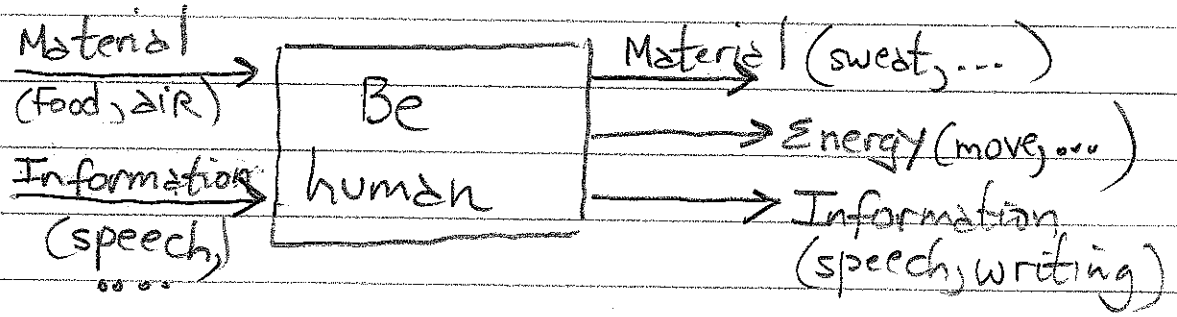
1. Function structures
2. HW #6
3. Prototyping
4. Project Feedback
5. Midterms returned to class

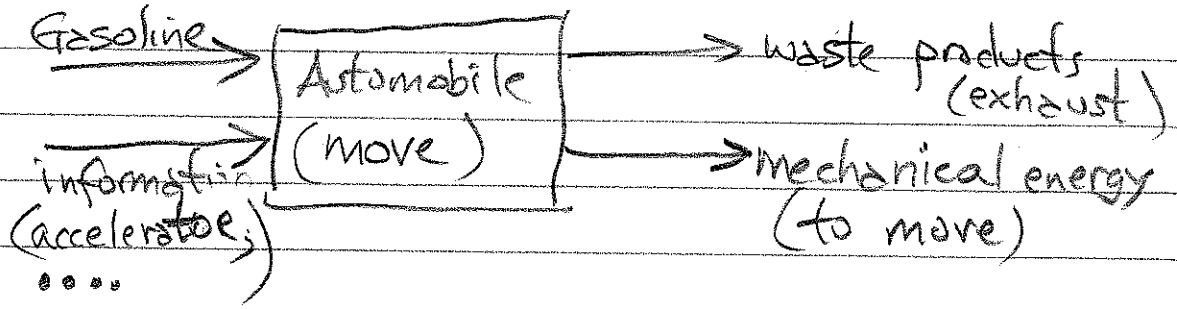
# Function Structures: FLOWS

There are, in general, three types of flows into & out of each function or sub-function.




## Example: A human being



# PROTOTYPING:

HP: Design a thermal ink-jet

Process: After generating a feasible design concept, we go through several prototyping (BUILD → TEST) cycles.

The first prototype might be a simple functional prototype: performs the basic function & "proves the concept"

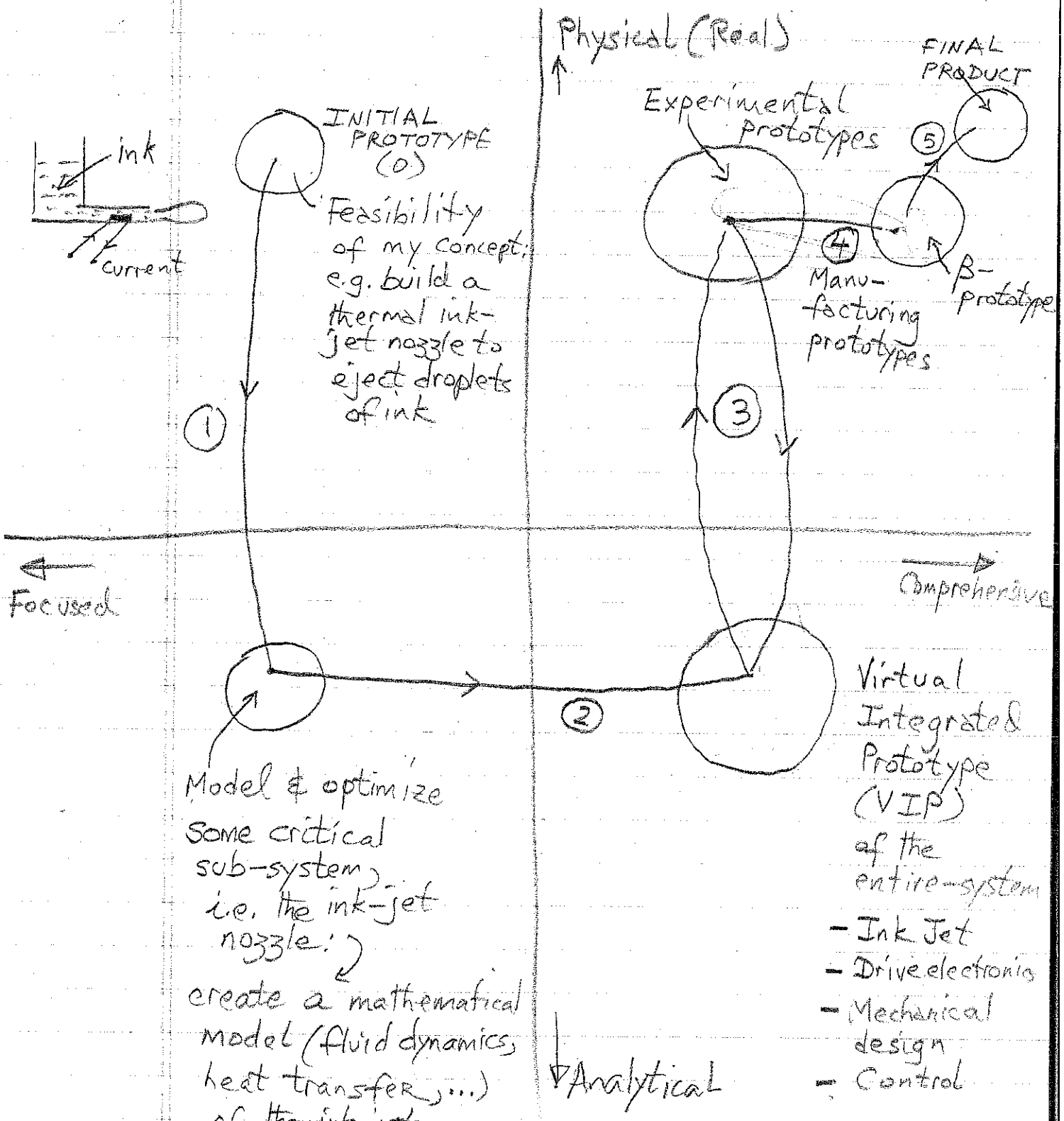
## TYPES OF PROTOTYPE:

- Physical (Real)
- Analytical Prototype ⇒ Virtual Prototype
  - Focused (sub-system)
  - Comprehensive (the entire system)

⇓

PROTOTYPING SPACE

# PROTOTYPING SPACE



PROTOTYPING STRATEGY is to follow the path (1) → (2) → (3) → (4) → (5)

A step after creating good functional prototypes is to firm up the Product Architecture

- Product Platform
- Product Lines

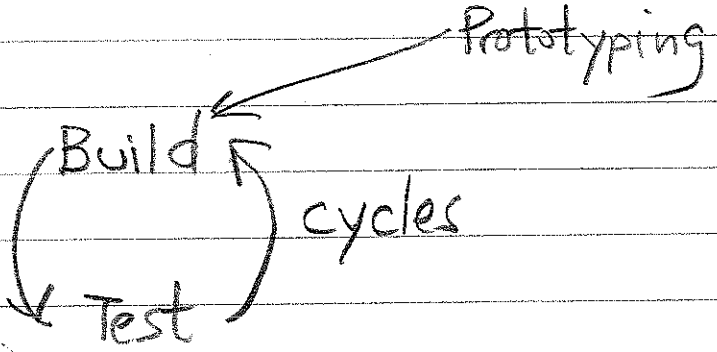
to be discussed in the next lecture

Once the analytical prototype is checked and validated against a real physical prototype, then the analytical prototyping can be used for

Virtual Prototyping : a quick and cheap way to do prototyping.

Reference : Read the chapter on "Prototyping" in U&E, PD&D & the chapter on "Concept Testing" in U&E, PD & D

Typically :




Build & Test Cycles :

# Home-work #6

1. Functional Decomposition of a Personal Computer

One purpose of this problem is to clearly understand the difference between

FAST (reverse engineering an existing product)

function & form (realization)

WHY — HOW

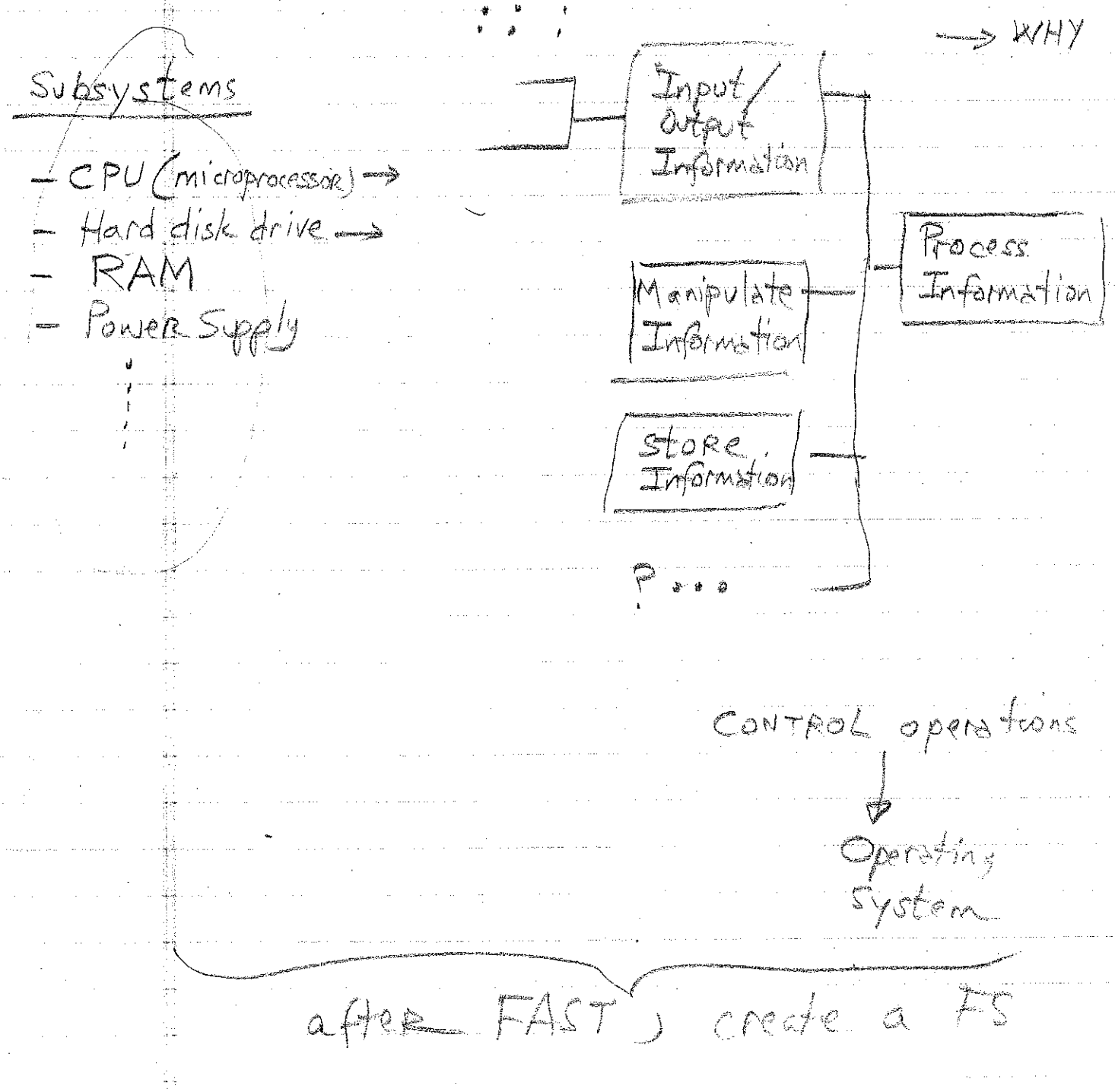
FUNCTION STRUCTURE (FS)

pure functional (abstract) representation of the product

No realizations in the FS

FAST diagrams are very useful as a preliminary step in creating a FS.

To create a FAST diagram of a complex product please use the process given in Lecture # 11




after FAST, create a FS

# Problem 2

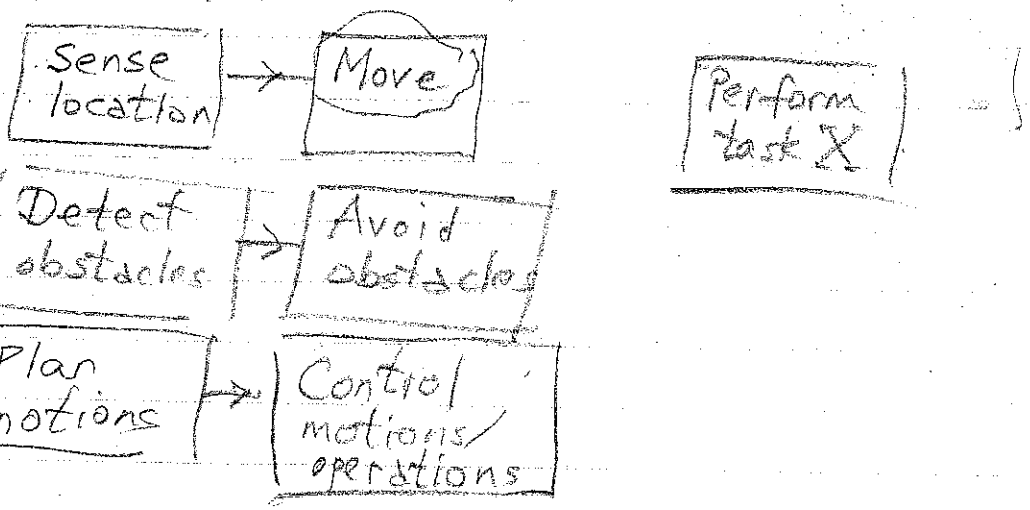
Apply the Product Conceptual Design process (Lectures 12 & 13) to designing an INDOOR mobile robot

— dissect existing robots (FAST)
The company iROBOT (see Chapter 12 of the text) builds a vacuum-cleaning robot called ROOMBA

FS for a mobile robot

Main function: Perform some useful task autonomously

Some important subfunctions

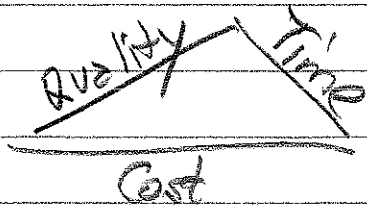


# Project feedback:

1. For every project deliverable, e.g. the Aggregate Project plan, sizing the real market for your product, etc.) create a process or plan for delivery before executing the process:

1. Deliverable (or objective or statement of the problem)
2. Process or Plan (flexible)
3. Execution or Implementation
4. Results / Recommendations
5. How (you) plan to use these results in YOUR project.

TEAM



14.11/11

2. Working as team:

- Doing team problem solving on each deliverable

- Being aware of all the parts of each phase

3. Doing more work per person per week

(A chain is only as strong as the weakest link)

The work on Phase 1 ranged from excellent (A) to fair (B-)