ADDIE WORKSHOP: DESIGN

ECE 4335: ECE Design I

Dr. Diana de la Rosa-Pohl

Much of the material in these slides has been adapted from the textbook: The Systematic Design of Instruction (6th Ed.) by Walter Dick, Lou Carey, & James O. Carey

SUPPLIES

- Sharpies
- Large Drawing Pads
- Tape or Pins
- Paper
- Camera

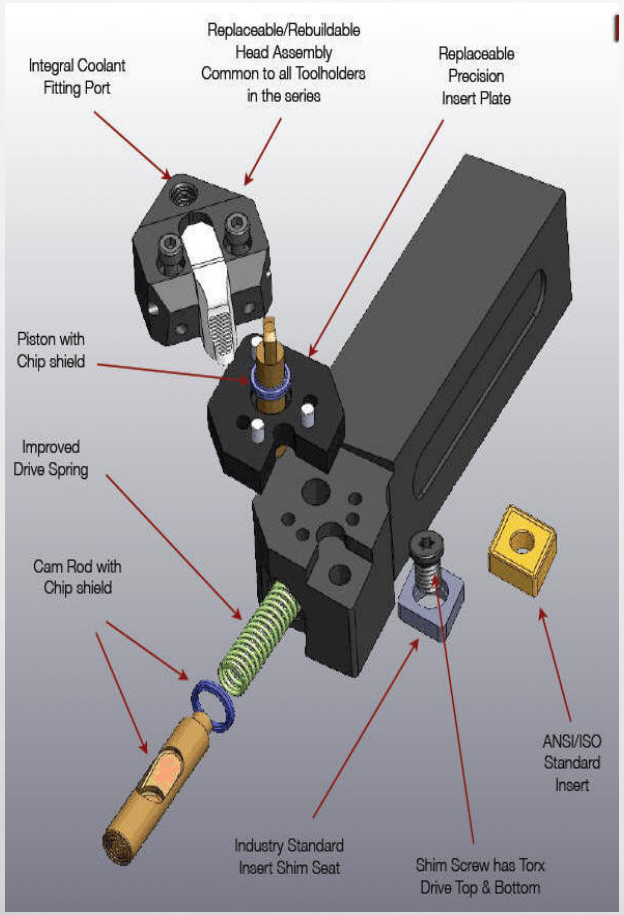
TODAY'S AGENDA

Objectives for the day:

1. ADDIE Design
   a. Draw an overview diagram of the project
   b. Write a terminal objective (T.O.)
   c. Complete a goal analysis

OVERVIEW DIAGRAM

DESIGN



Overview Diagram

- entire system you are designing
- major components identified/labeled
  - if you need to include the context to make the diagram make sense, then **include it!**
    - e.g., track for an autonomous robot
- let your audience **see** it without actually seeing it

DESIGN

Sample Overview Diagram

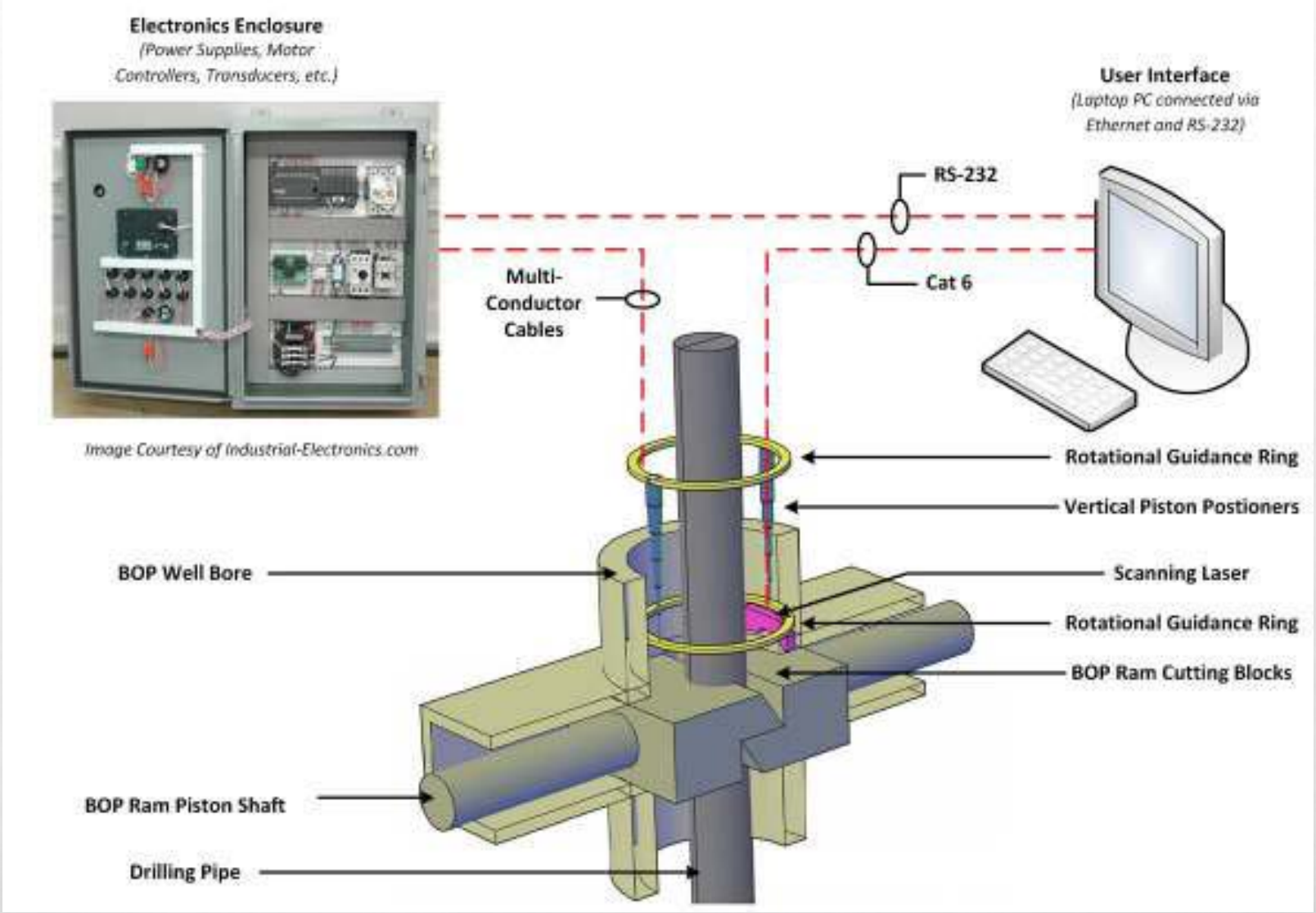
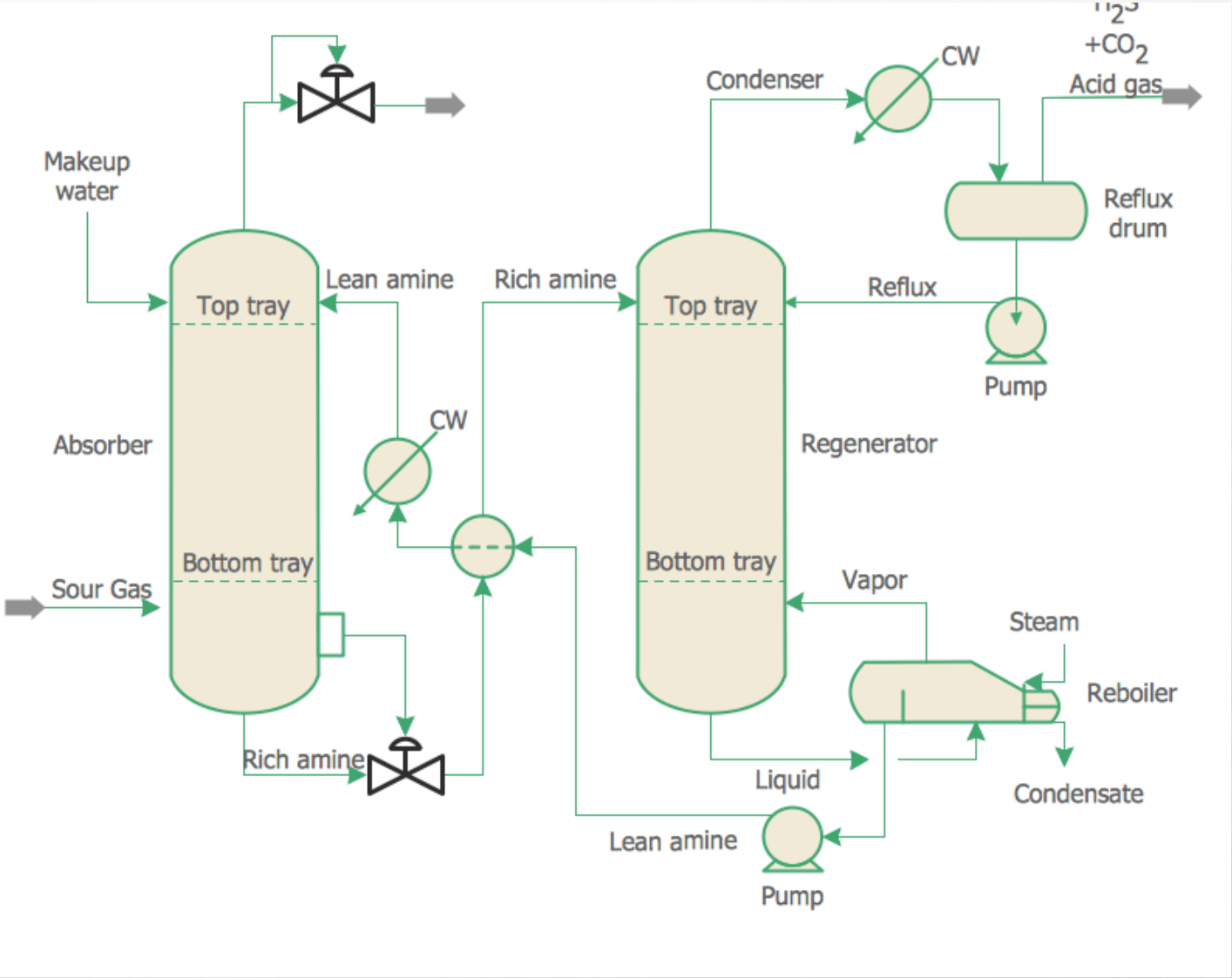


Figure 2.1 *Overview Diagram - Vertical Piston Positioning System*

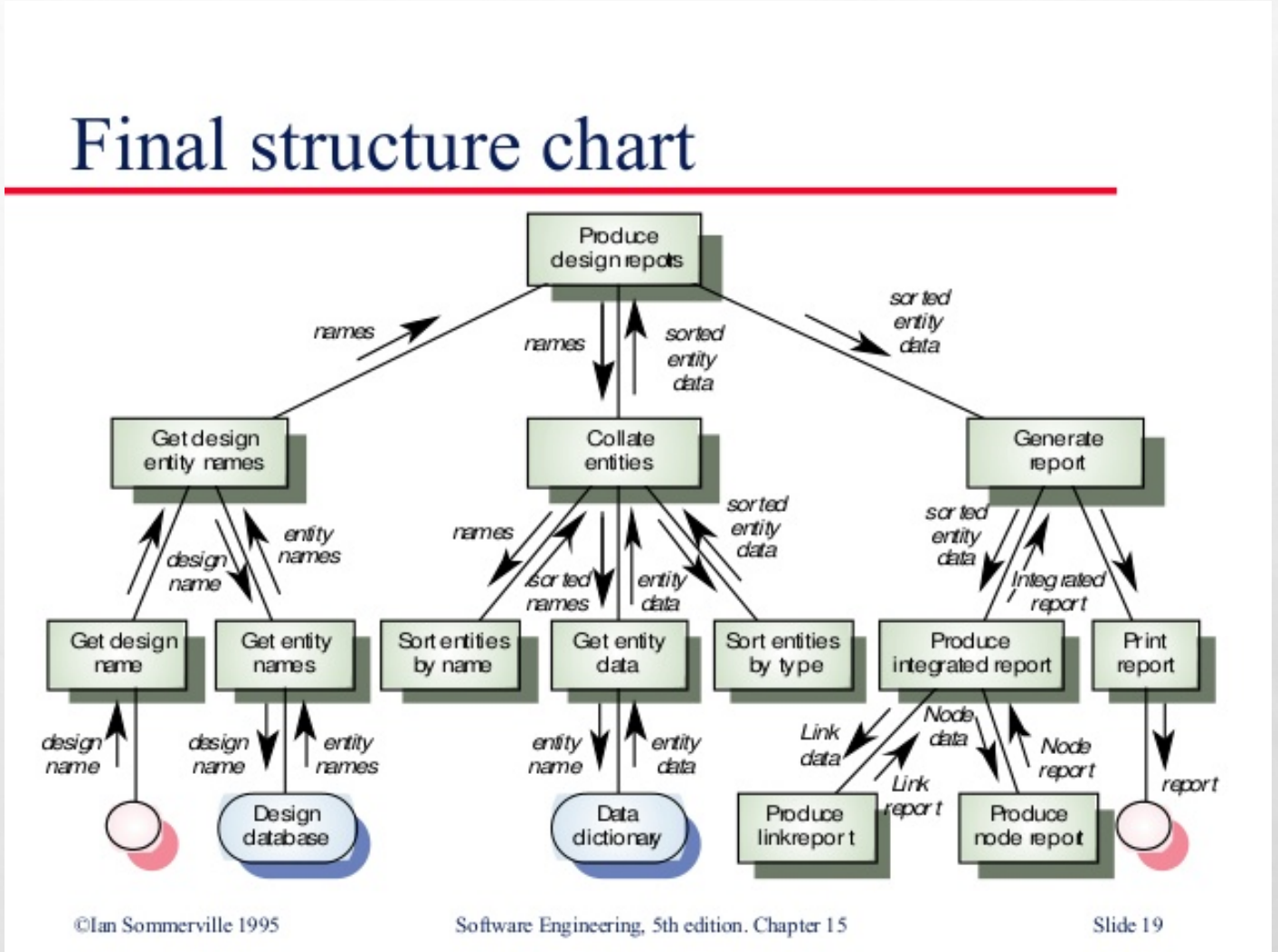
WHAT NOT TO DO…

Disclaimer: you can include a schematic diagram like this **ALSO**, but **NOT INSTEAD**.



EXCEPTION… SOFTWARE PROJECTS

Note: If the hardware that your software runs on is a significant component of your design, you should still include an overview diagram of the hardware.



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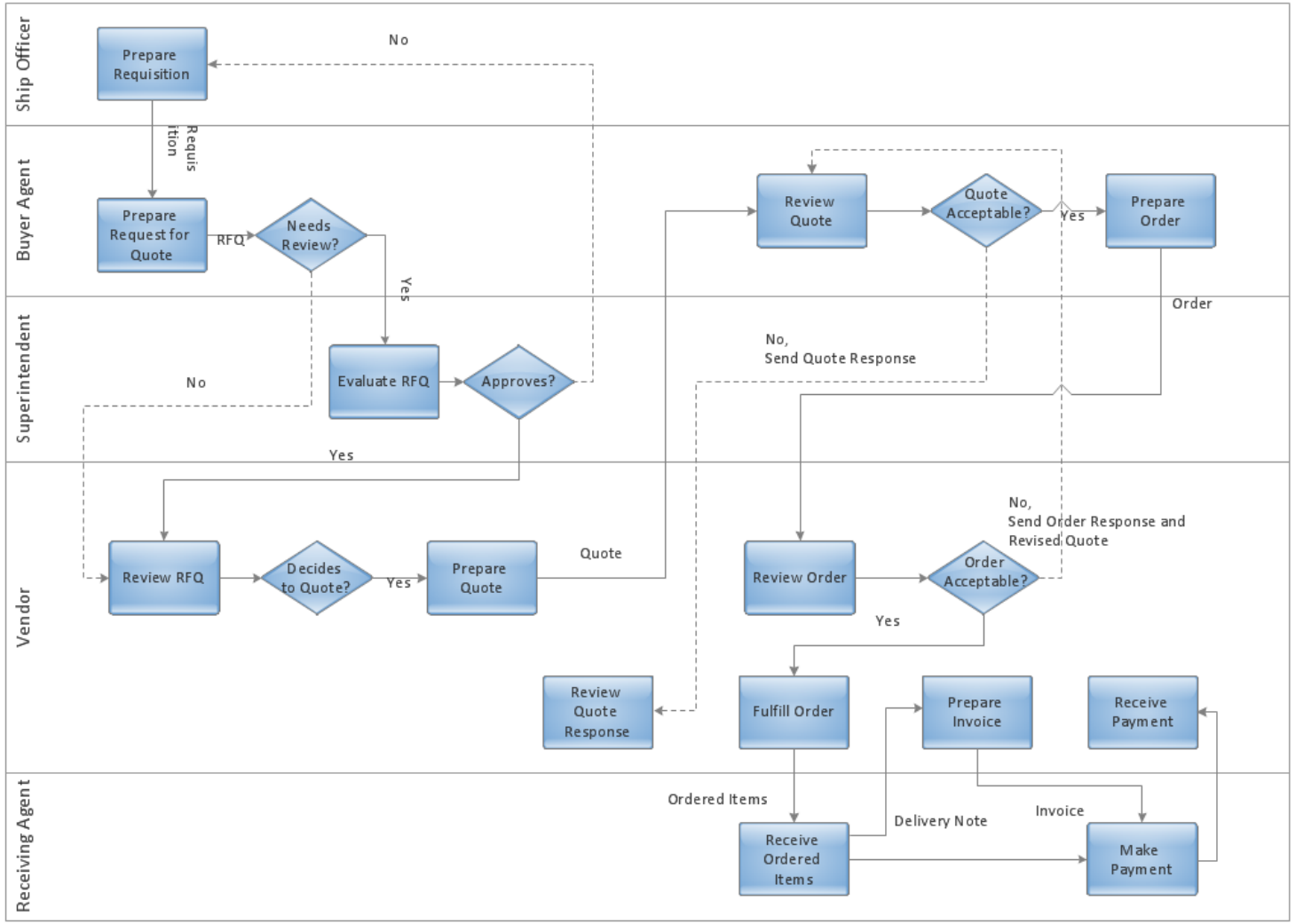
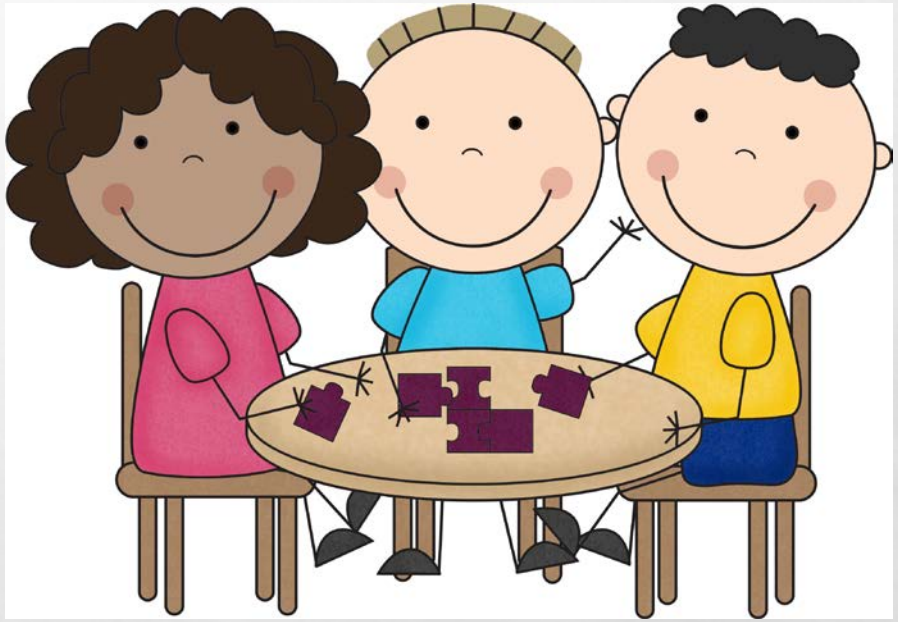


GROUP WORK

Create an overview diagram for your project.



TERMINAL OBJECTIVE

DESIGN

http://www.engineersgotblued.com/wp-content/uploads/2014/03/rube-goldberg-machine-from-getty-images.jpg

Terminal Objective

- the end game
- what your entire system does in measurable and observable terms
- *tells you/us when you are done!*

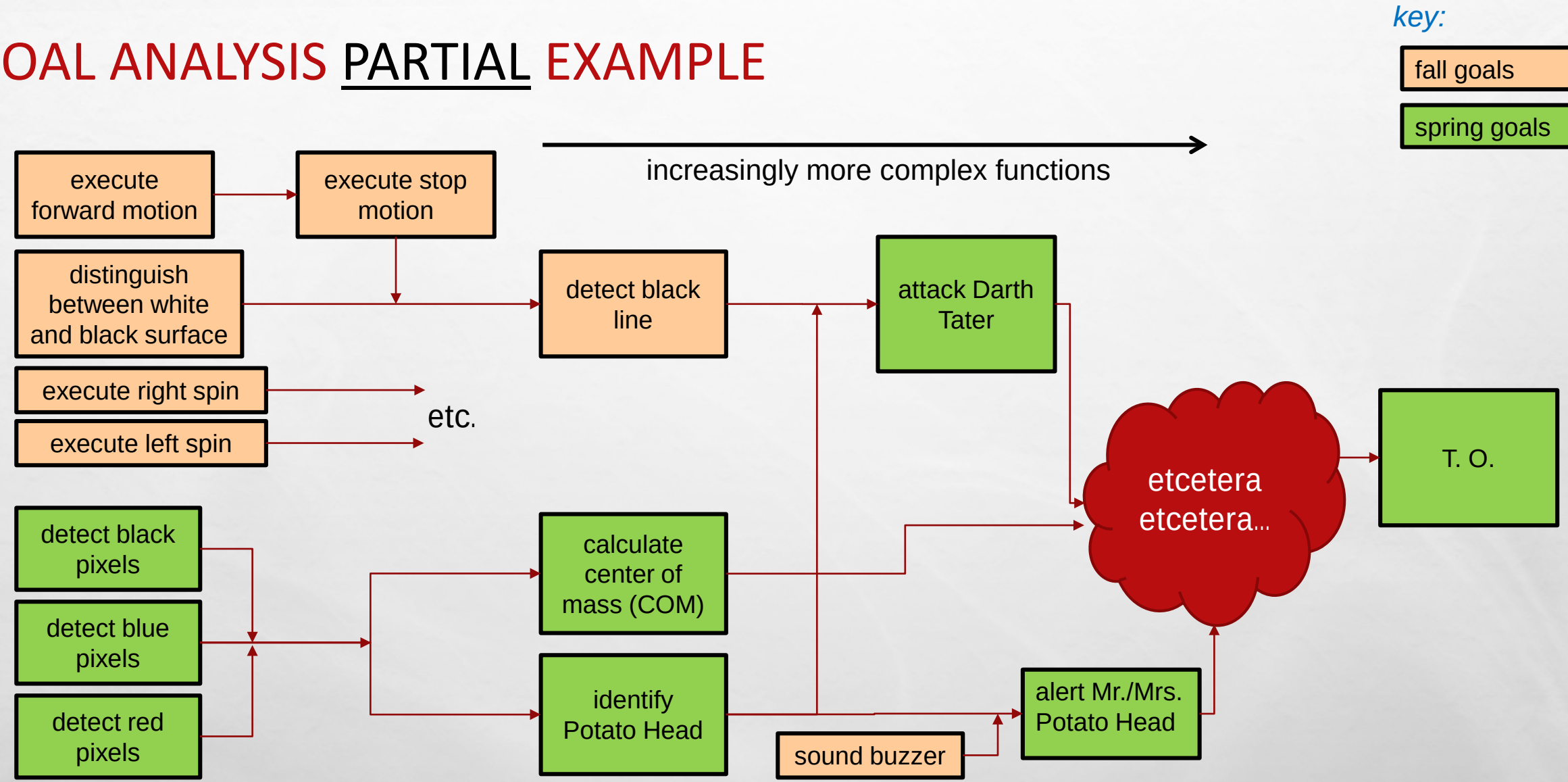
DESIGN

- Project Objectives
  - These are the boxes in your goal analysis. (next)
  - Must be observable AND measureable!
    - *Gagné and Mager*
  - Robert Mager *(Preparing Instructional Objectives, 1997)*
    - outcome vs. process
    - specific vs. general
    - measureable vs. not measurable
    - system v. designer → **functionality** of system vs. **task** of engineer

DESIGN

- Robert Gagné *(Principles of Instructional Design, 2005)*
  - situation
    - what is the stimulus?
    - environmental conditions?
  - capability verb
    - [discriminates, identifies, classifies, demonstrates (a rule), generates, adopts, states (or displays), executes (a motor skill), chooses (an attitude)]
  - object
    - the "what" of the capability verb
    - "what" is the capability?
  - action verb (measurable/observable)
    - how the performance is to be completed ("by…")
    - [moves, displays, sounds, turns, stops, explains, walks, lights, withdraws, transfers]
  - tools, constraints, or special conditions
    - specific equipment?
    - limited time, budget, error?

GOAL ANALYSIS PARTIAL EXAMPLE



WRITING OBJECTIVES

- Objective examples
  - When the user hits the blue button, the robot separates egg **by** pouring the yolk from one shell to the other until all of the egg white remains in capturing bowl and the entire yolk remains in one of the two shells.
    - diagram version: separates egg

(capability verb) (object) (action verb)

  - When the user inputs an ATM card, the system inputs user information **by** retracting the card into the machine, scanning the magnetic strip, and displaying the user name on the screen.
    - diagram version: input user information

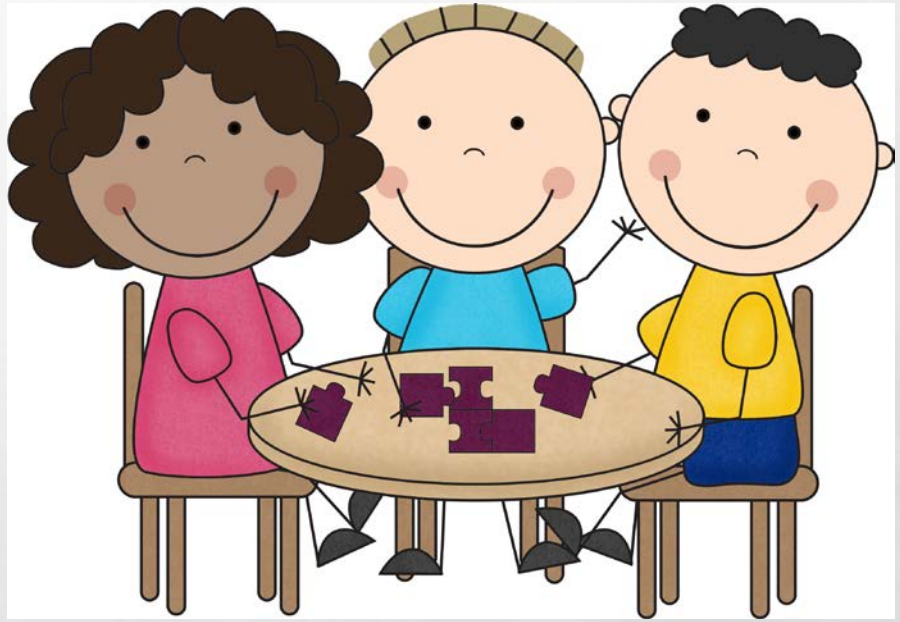
(capability verb) (object) (action verb) (action verb) (action verb)

DESIGN

- Terminal Objective Example
  - When the user presses the reset button, the robot demonstrates object detection by spinning right until at least 2/3 of a Potato Head is in its field of view. Upon detecting an object, the robot classifies the object as friend or foe by sounding a warning beep if the object is a Mr. or Mrs. Potato Head, or moving forward at 3-5 in./sec if the object is Darth Tater. Once moving forward, the robot detects the edge by stopping at the first black line. Once stopped, the robot acquires the target by centering a laser on Darth Tater's center of mass within 1 cm of COM. If no objects are detected or if only friends are detected, the robot spins until the robot power is switched off.
    - diagram version: T. O.

GROUP WORK

Write a terminal objective for your project.



GOAL ANALYSIS

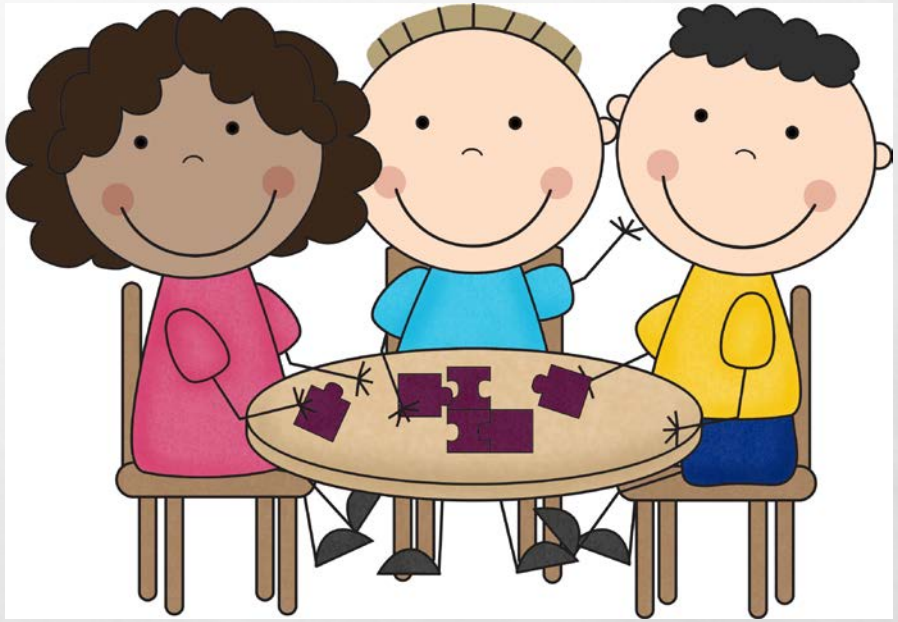
DESIGN

Goal Analysis

- 6-20 steps typical
- depending on how your brain works…
  - start with basic functions and work to terminal objective
  - start with terminal objective and work back to easier objectives (recommended…why?)

GROUP WORK

Create a goal analysis for your project design.



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