

**22 days**

**to**

**PDR**

## Senior Design Project - SDP19

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### Schedule

This schedule shows the main events for SDP19. Please note that the schedule is subject to change.

September 2018						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1
2	3	4 First day of classes	5	6	7	8
9	10 Lecture 1: Introduction	11	12	13	14	15
16	17 Lecture 2: Problem Specification and Team Management	18	19	20	21 Advisors due	22
23	24 Lecture 3: PDR	25	26 Benchside Meetings	27	28	29

October 2018						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
30	1 Benchside Meetings	2	3	4	5	6
7	8 Holiday	9 PDR	10 PDR	11 PDR	12 PDR	13
14	15 PDR	16 PDR	17 PDR	18 PDR	19 PDR	20
21	22	23	24	25	26	27

# SDP19

## Design Process and Team Management

Department of Electrical and Computer Engineering  
Lecture 2



## Rationale

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- Once your team has decided on a project, a solid **plan** is needed to address the problem
  
- **Design Process** requires deep and honest analysis
  - Project may be harder than it initially seems
  
- **Managing** a team project is hard
  - Need clearly defined plan
  - Need assignment of tasks to people
  - Accountability!

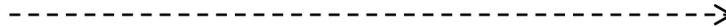
# Objectives

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- Design Process
  - Identify how to break the project into manageable pieces
  - Evaluate how to assign pieces to specific teams members
  - Define interfaces and create a block diagram
  
- Team management
  - Identify roles for team members
  - Consider how to stay on track
  - How will progress be evaluated?

# Design Process: From Idea to Final Design

- Do great projects just happen?

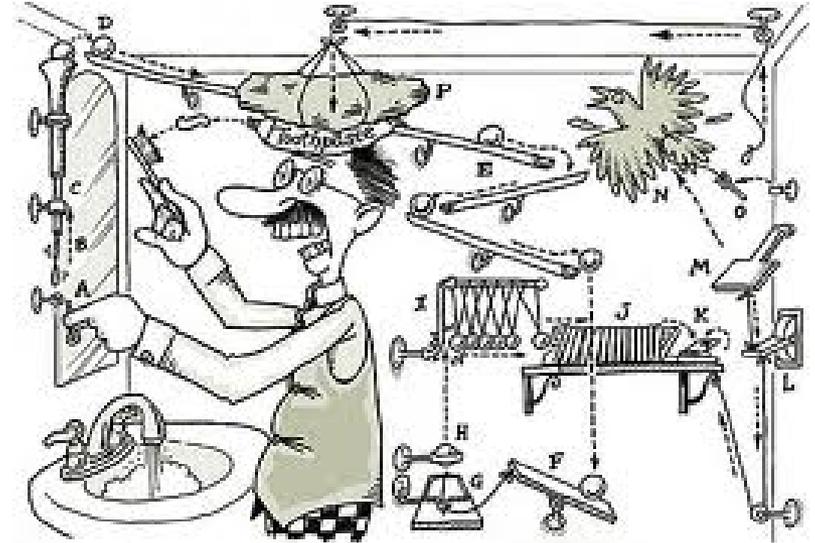
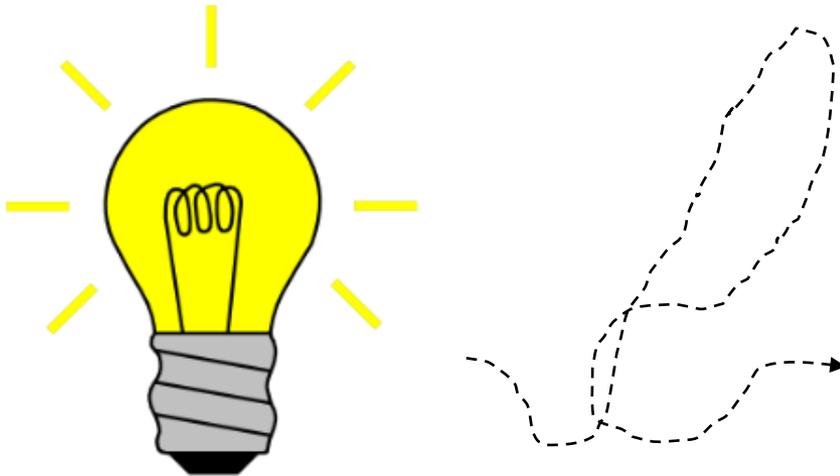


- Unfortunately, no!
- They require planning, design, execution, testing, redesign, and more testing

**"Place and Paste"  
SDP12**

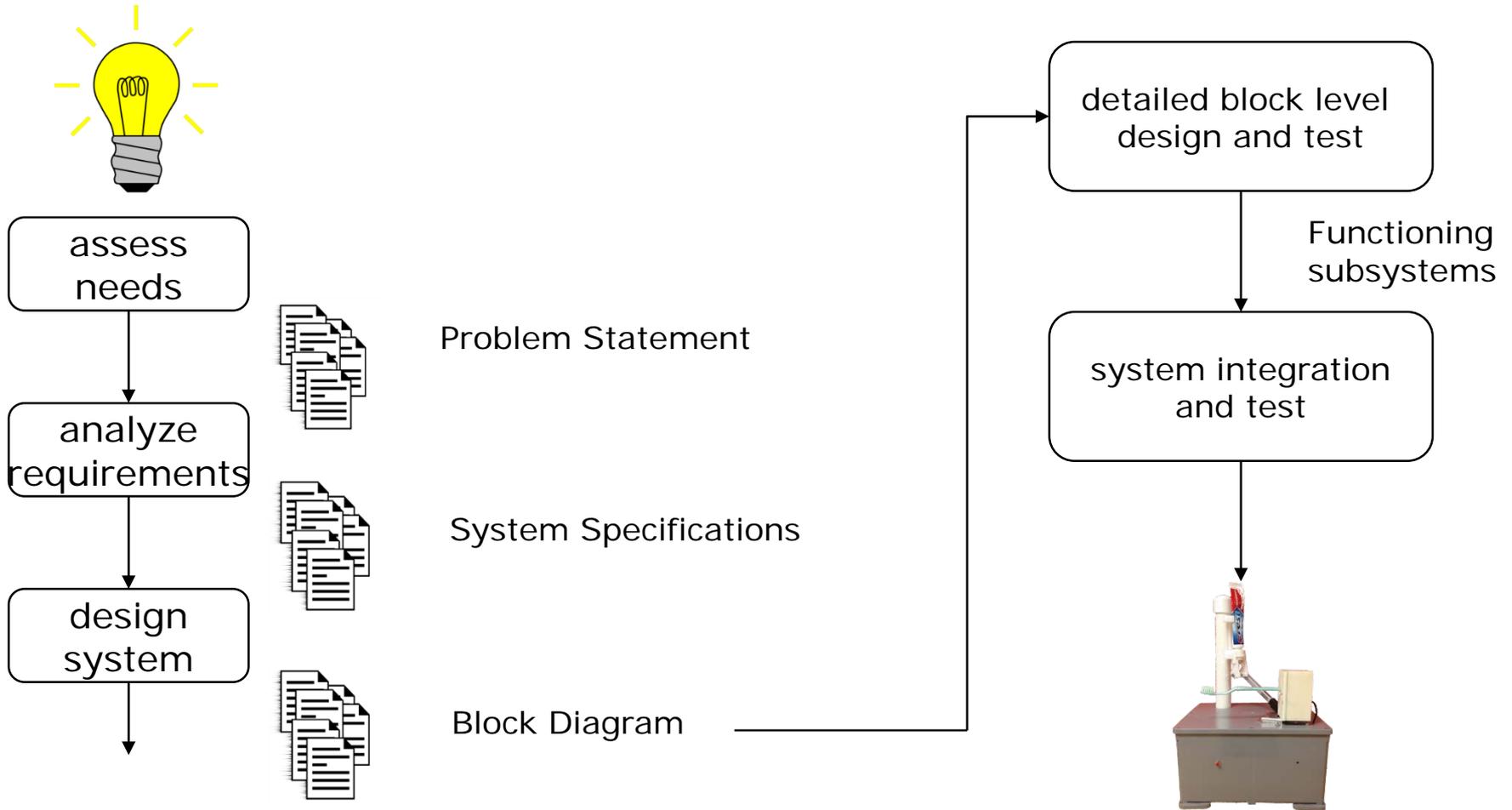
# How to Avoid a Big Mess

- Many great ideas go off track



- How does this happen?
  - No open and honest discussion
  - No decision making
  - No planning
  - Lots of procrastinating

# Design Process: Set Intermediate Goals



# Assess needs (Problem statement)

- The problem statement has the following attributes:
  - Relatively nontechnical
  - Language of the customer
  - Straightforward
  
- Example: Place and paste
  - Students cannot properly squeeze toothpaste
  - Unable to apply appropriate amount of toothpaste
  - Teachers must assist students every time they need to brush
  - Students must be independent in maintaining their daily hygiene

# Assess needs (Problem statement)

- Techniques for arriving at a problem statement:
  1. Question the customer
  2. Differentiate needs and wants
  3. Explore project boundaries
  4. Input/output analysis
  5. Preview the user interface
  6. Identify conflicting needs
  7. Prepare a draft users manual

# Assess needs (Problem statement)

- Sections of the problem statement:
  1. Background
  2. The design
  3. Deliverables of the design project
  
- Place and paste
  1. Difficult for disabled people to brush their teeth without assistance
  2. Automated system that doesn't make a mess. Easy to use
  3. Functioning system that can easily be used by a disabled person without external assistance

## Problem Statement Example: Paste and Place

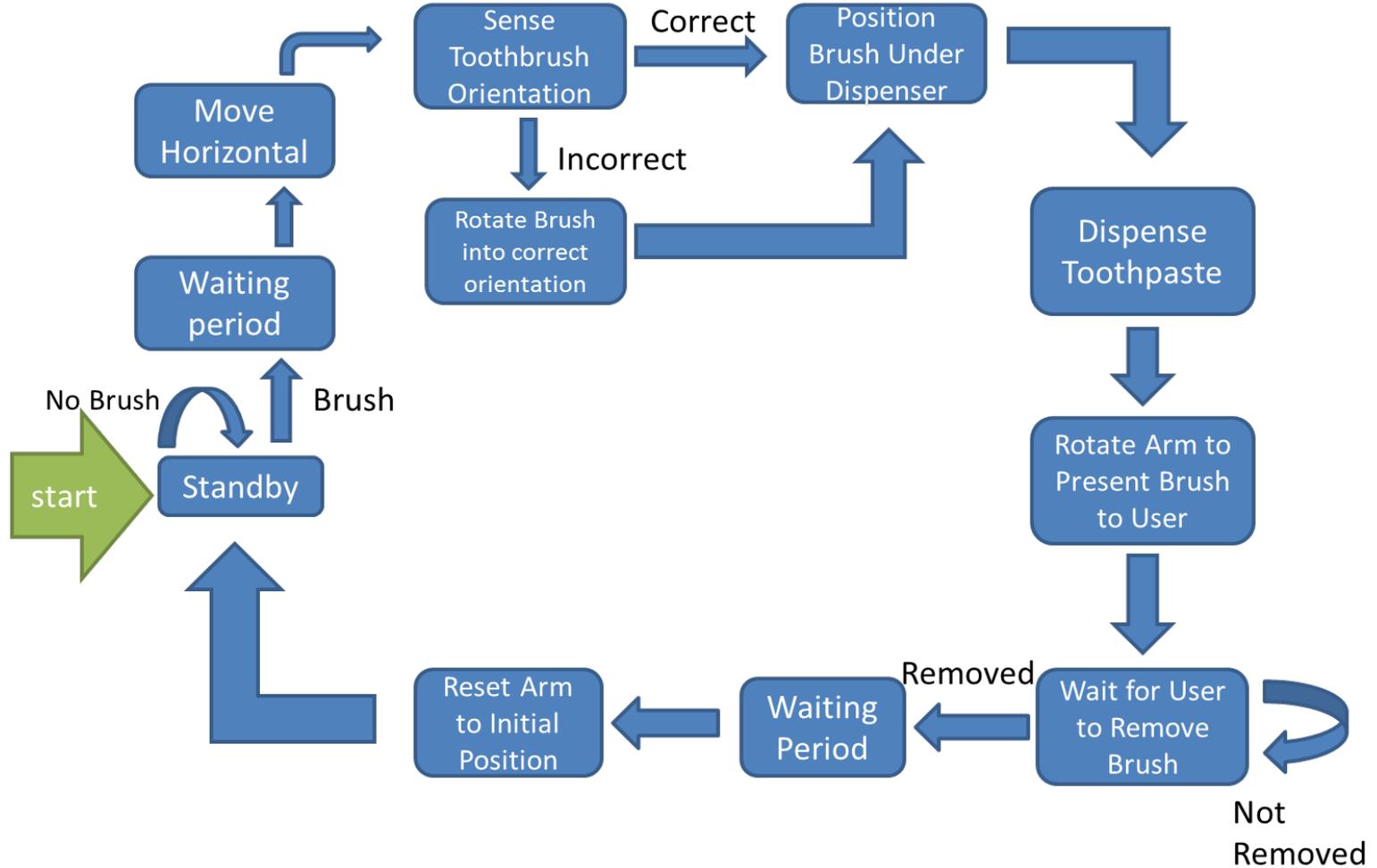


Students with severe disabilities face many challenges with tasks that we perform every day with little thought. For one student in the “Life Skills” program in West Springfield schools, his limited fine motor skills make it impossible for him to squeeze tooth paste onto his tooth brush. Our “Place and Paste” system will offer him independence by allowing him to brush his teeth without assistance. An easy-loading system will secure the toothbrush, move it under the toothpaste, squeeze the toothpaste, and present the toothbrush for use.

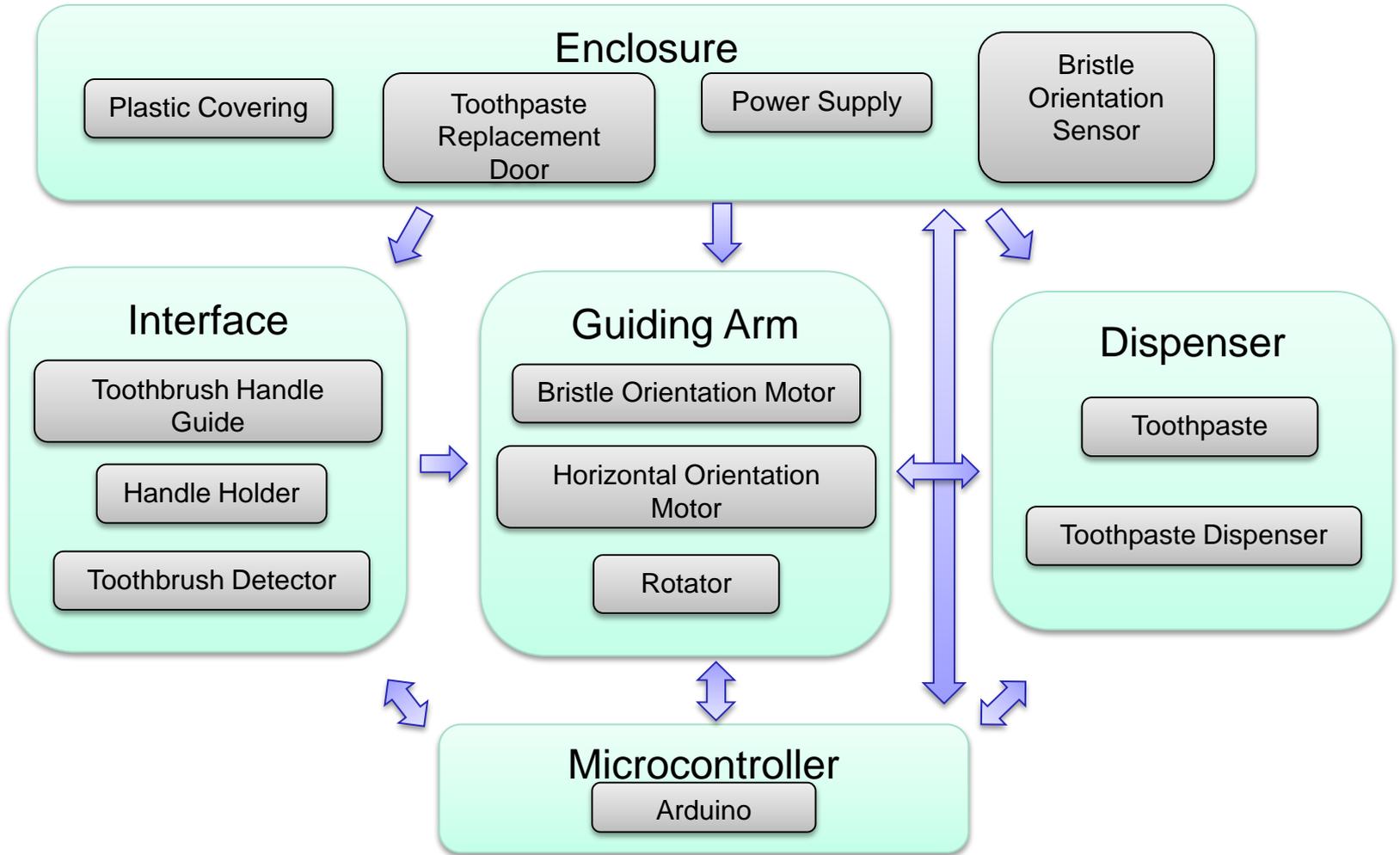
# Analyze Requirements (System Specifications)

- The **system specifications** can be thought of as a technical version of the problem statement. *It should not propose a solution.*
  
- Place and Paste
  1. Dispense pea-sized toothpaste onto brush
  2. Will hold toothbrush such that the machine and toothbrush will stay sanitary
  3. Toothbrush will be placed in a way such that users lacking fine motor skills can insert toothbrush
  4. Product will take no longer than 20 seconds from when toothbrush is correctly inserted to return loaded toothbrush
  5. Product size will not obstruct normal use of school's single occupancy bathroom
  6. Product will be designed such that it will guide toothbrush motion once it is placed into holder

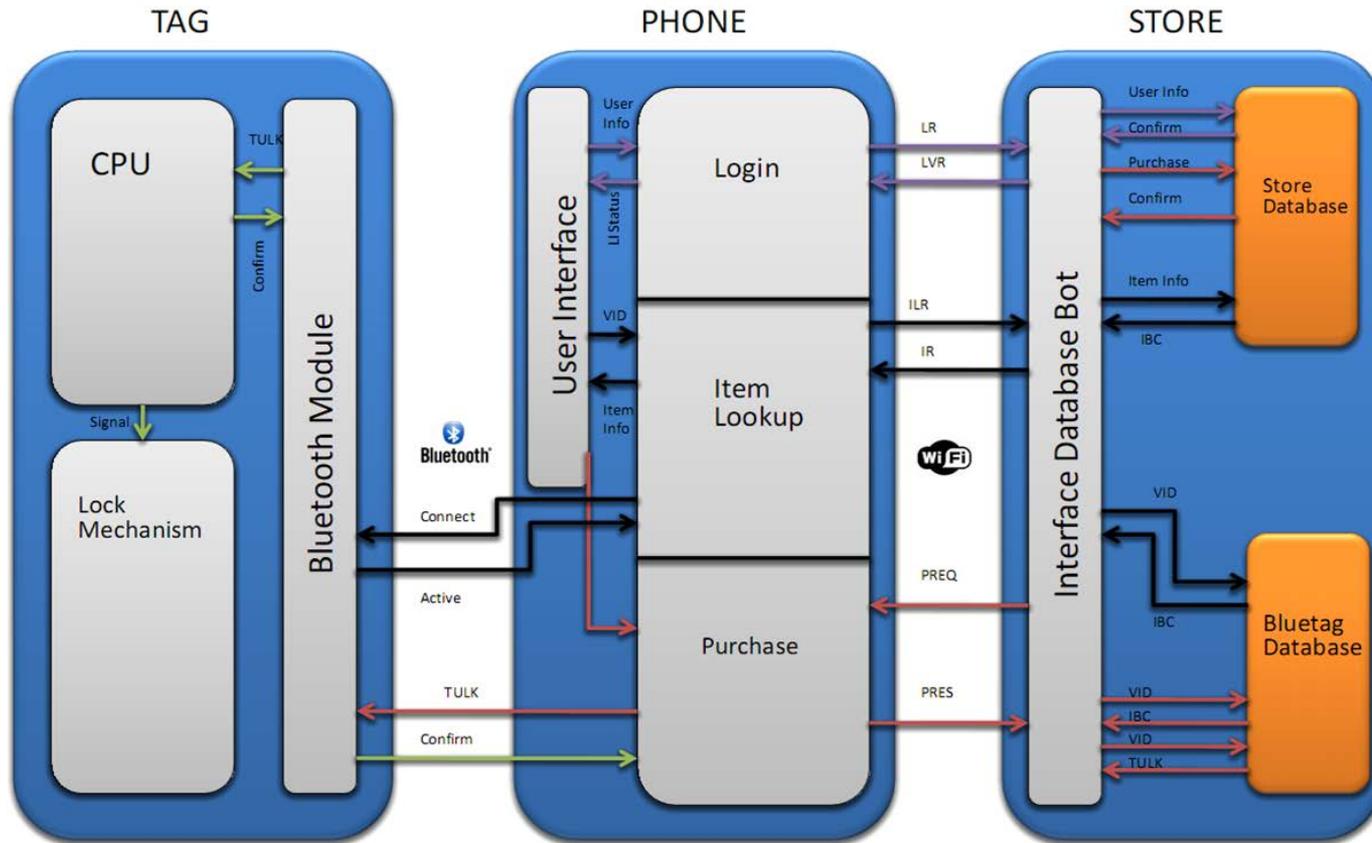
# Design: State Machine



# Design: Block Diagram



Example: Bluetag – “a system for implementing a novel 'purchase at the rack' shopping experience in modern department stores.”





# Design Process Summary

assess  
needs



analyze  
requirements



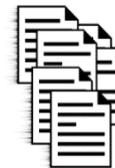
design  
system



Problem Statement



System Specifications



Block Diagram

- relatively nontechnical
- language of the customer
- straightforward

technical restatement  
of the problem statement

design is an  
iterative process

- Draft Problem Statement and Specifications due at Benchside Meetings
  - Wed, 26<sup>th</sup> Sept
  - Mon, 1<sup>st</sup> Oct

# Team Management

- Forming a team is easy. Functioning as a team can be hard
  - Most courses help define the role of project team members.
  - This course allows you to define your own roles.
- Your team needs to meet regularly. Meetings should preferably be in person but they can also be on Skype
- One student should serve as team manager
  - Organizes meetings
  - Makes sure team is on track
  - Keeps track of which student will perform which task
  - Makes sure documents/deliverables are submitted
- All students should interact with the course instructor

# Team Website

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- Developing a team web site is a requirement of the project course
  - You can have disk space on a UMass server for your web site
  - One team member should be selected as the web designer
- You have access to web design software for free as a UMass student (Adobe Dreamweaver, Microsoft Word)
  - Web sites don't have to be overly elaborate or complicated.
  - All documents and block diagrams should be posted on the web site
  - Include a picture of your team
- You should have a web site ready after MDR (10<sup>th</sup> Dec'18)

# Summary

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- Specifying a project takes a lot of work. Think carefully and get started early
- The course coordinators, faculty advisors are here to help you get started
- Come up with the problem statement and specifications first
- Move on to design alternatives block diagrams
- Identify team roles as soon as possible and meet regularly

## To Do List

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- Sign up for a lab bench (Marcus Hall, Rm 9A)
- Converge to a project idea
- Connect with a Faculty Adviser (due 21<sup>st</sup> Sept'18)
- Register for M5 membership (required)
- Nominate up to 7 faculty members for your evaluators
- Select a team manager
- Problem Statement/Specifications/Block Diagram due at benchside meetings

Senior Design Project - SDP19

Home Teams Syllabus Schedule Lectures Examples



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