

21 days

to

PDR



Schedule

This schedule shows the main events for SDP20. Please note that the schedule is subject to change.

September 2019

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3 First day of classes	4	5	6	7
8	9 Lecture 1: Introduction	10	11	12	13	14
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October 2019

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13	14 Holiday	15 Lecture 4 Analyzing experiments	16	17	18	19

SDP20

Design Process and Team Management

Department of Electrical and Computer Engineering
Lecture 2



Rationale

- 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!

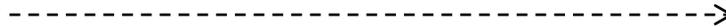
Objectives

- 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 Product

- Do great projects just happen?

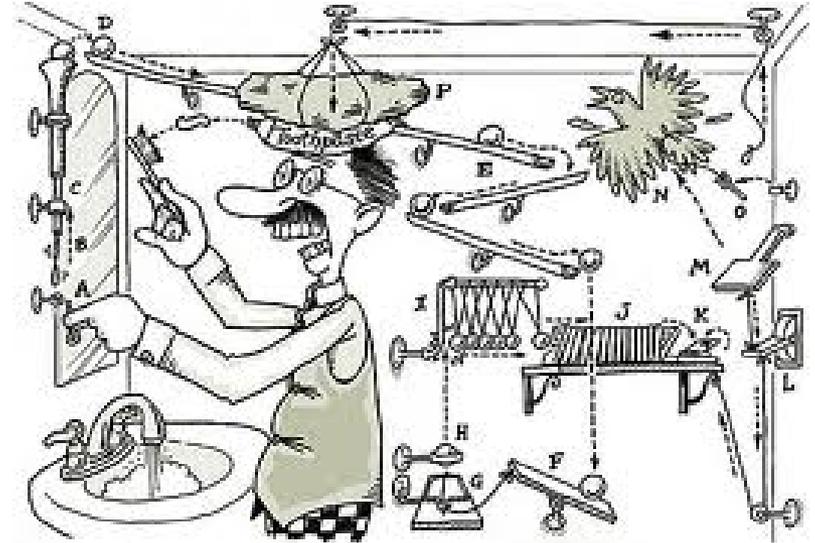
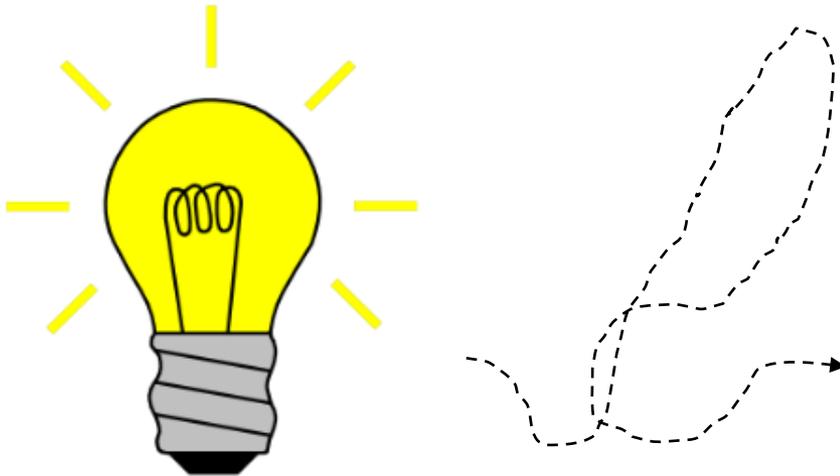


- Unfortunately, no!
- They require planning, design, execution, testing, redesign, and more testing

**"Place and Paste"
SDP12**

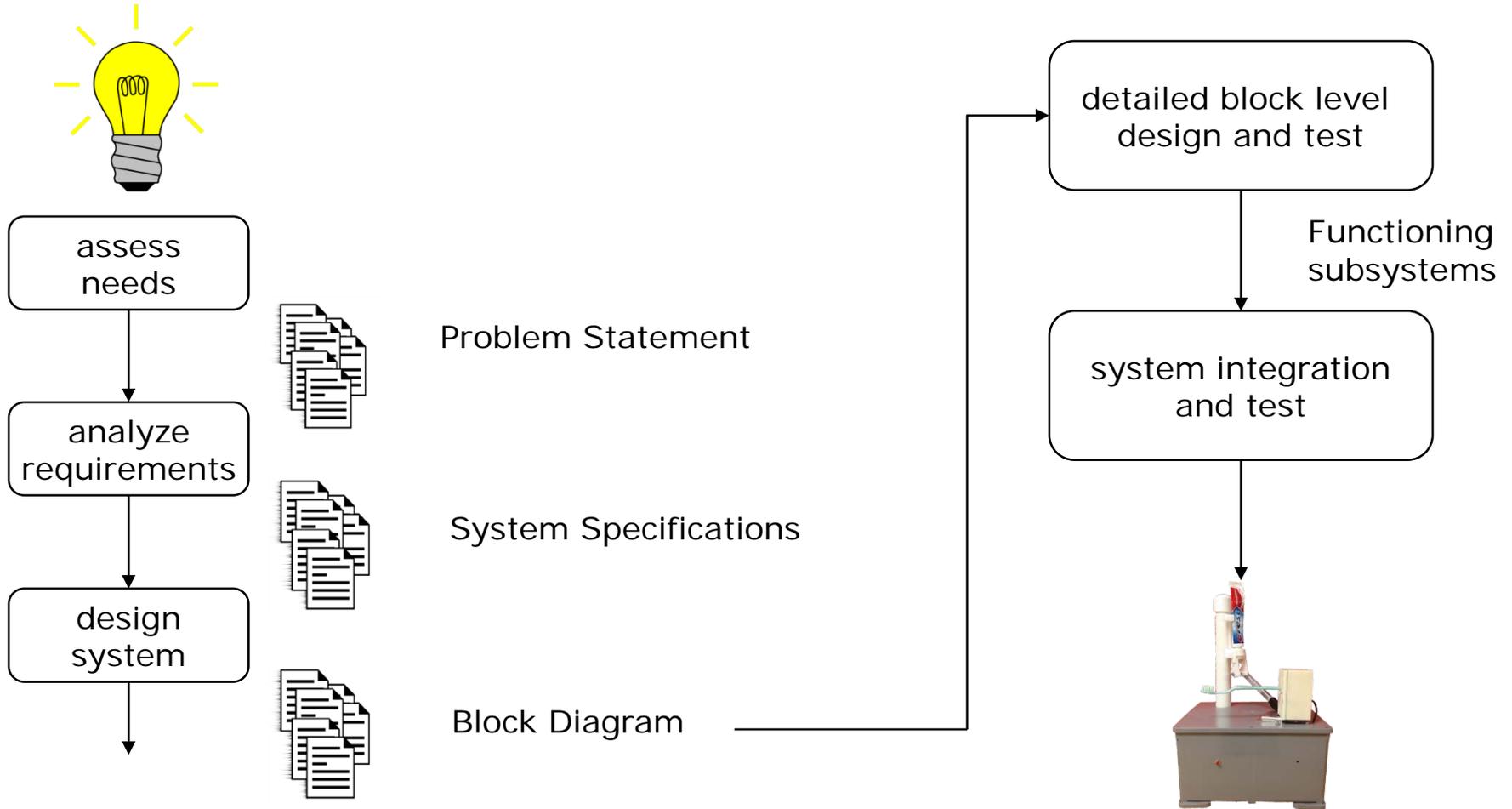
How to Avoid a Big Mess

- 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



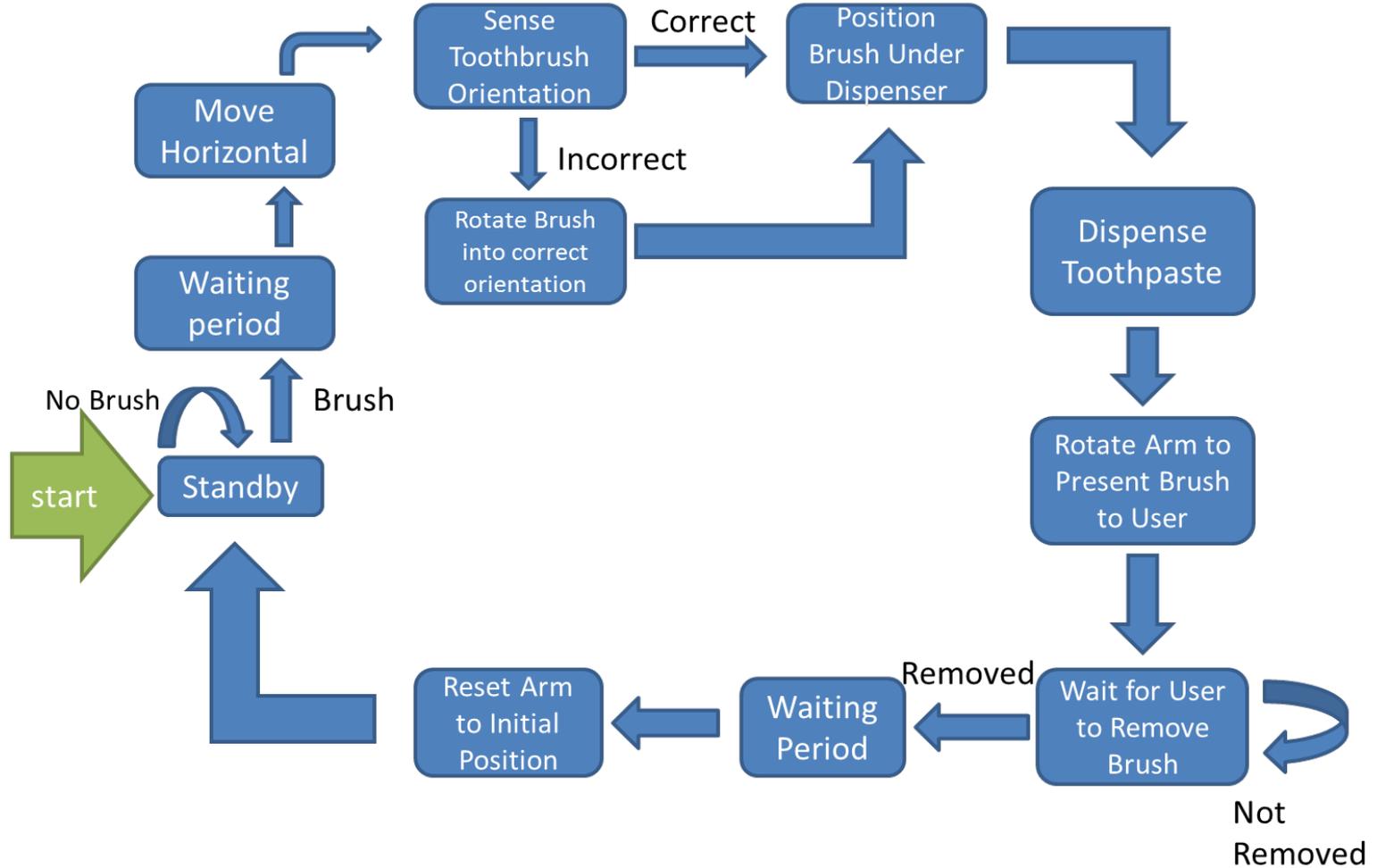
Students with severe disabilities face many challenges with tasks that we perform every day with little thought. For one student in the “Life Skills” program in West Springfield schools, his limited fine motor skills make it impossible for him to squeeze tooth paste onto his toothbrush. Our “Place and 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)

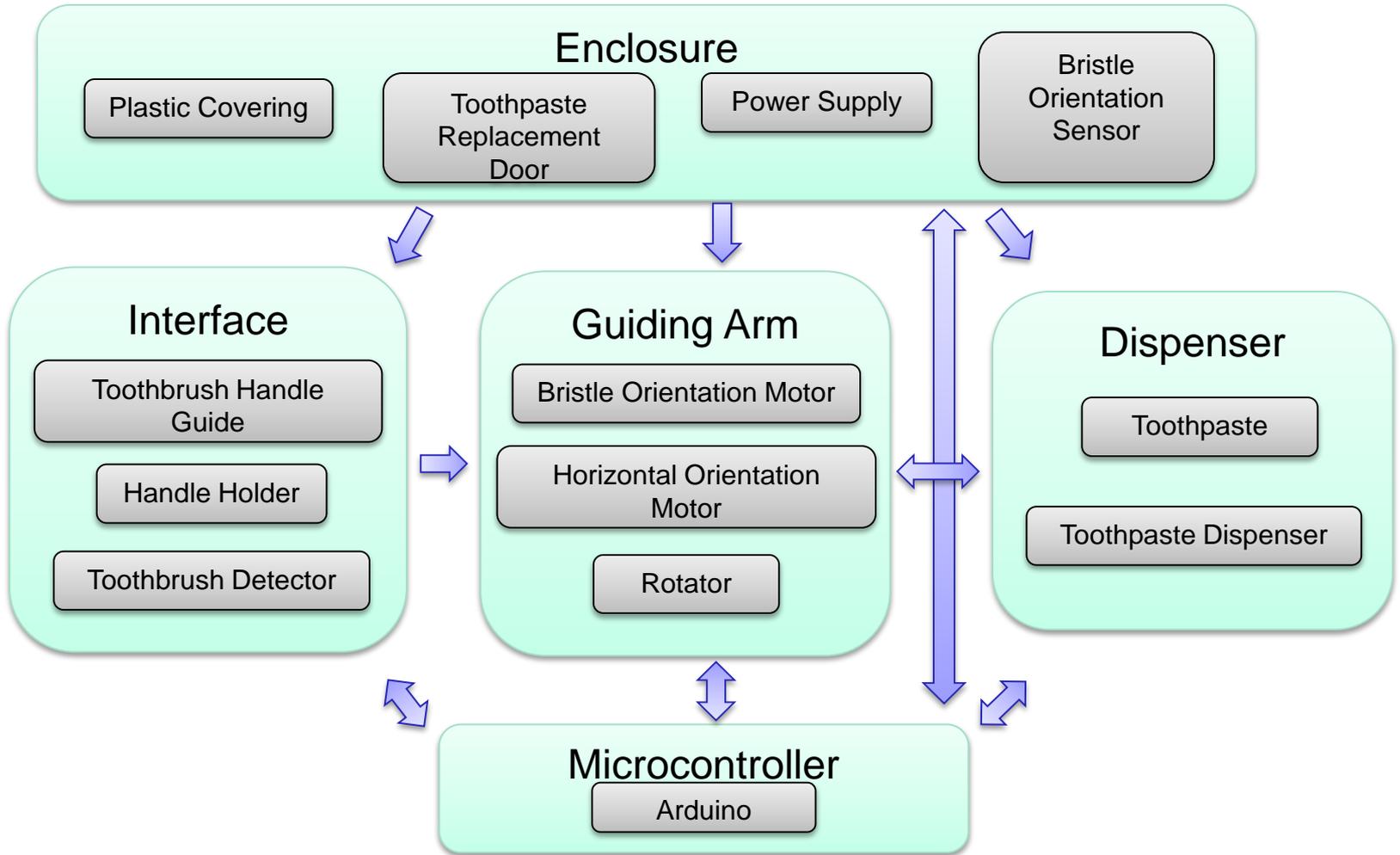
- The **system specifications** can be thought of as a technical version of the problem statement. *It should not propose a solution.*

- 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

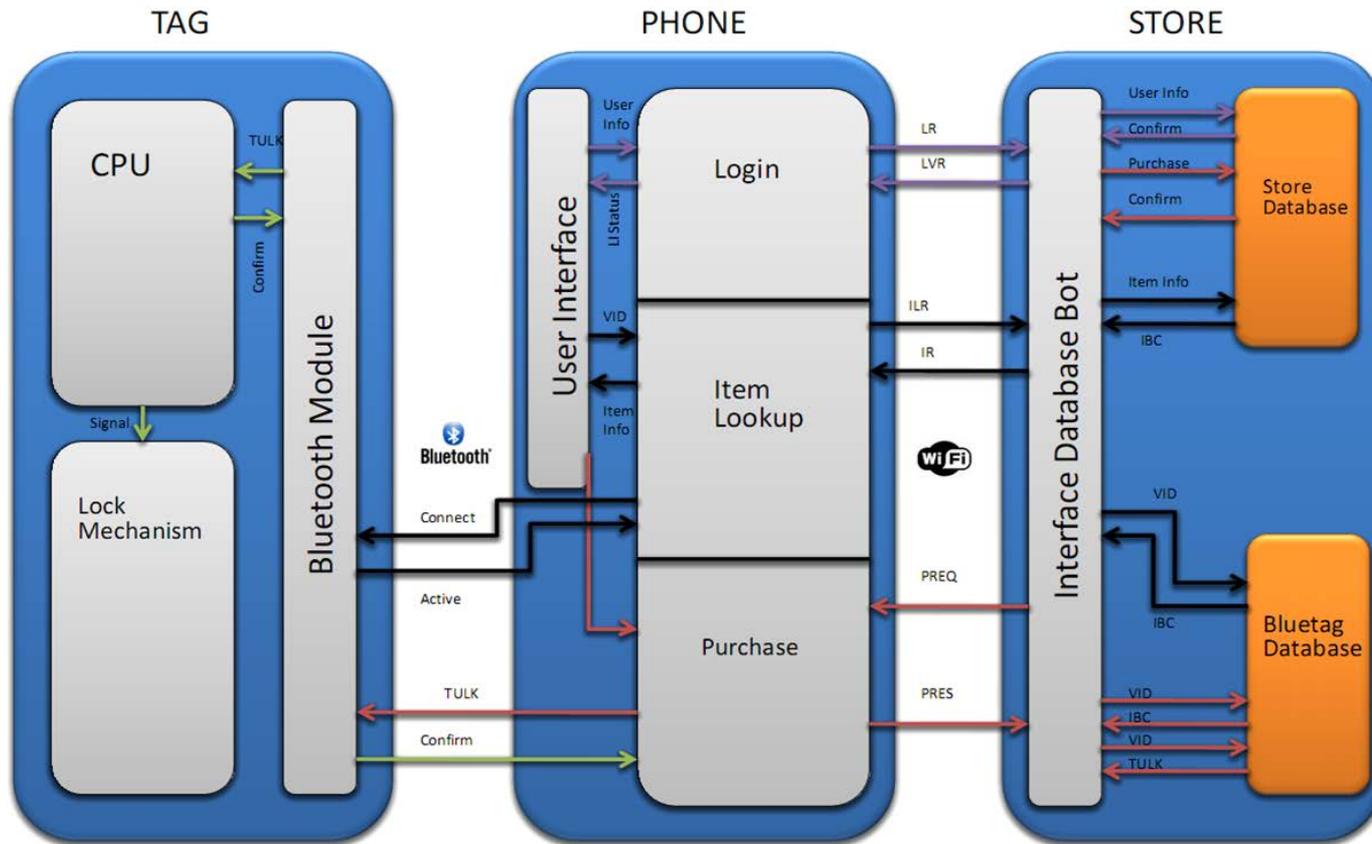
Design: State Machine



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



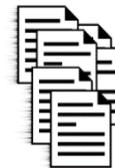
design
system



Problem Statement



System Specifications



Block Diagram

- relatively nontechnical
- language of the customer
- straightforward

technical restatement
of the problem statement

design is an
iterative process

Benchside Meetings

- Benchside Meetings
 - M(23rd), W(25th), F(27th) September'19
 - Schedule forthcoming

- One-pager for benchsides
 - Problem Statement, Specifications and Block Diagram

Place 'n Paste (Team 17)

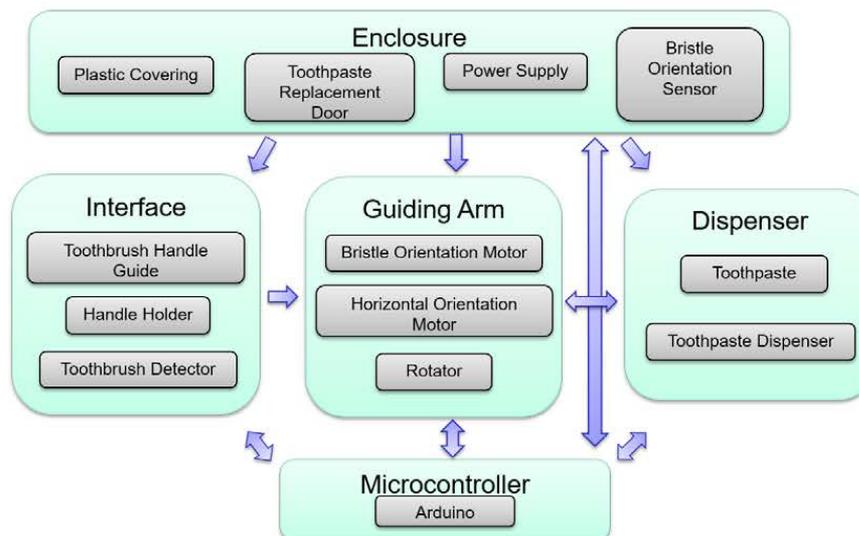
Team Member 1, Team Member 2, Team Member 3, Team Member 4

25th September 2019

Problem Statement: 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.

System Specifications:

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Block Diagram:

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

Summary

- 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

- Sign up for a lab bench (Marcus Hall, Rm 9A)
- Converge to a project idea
- Connect with a Faculty Adviser (due 20th Sept'19)
- Register for M5 membership (required)
- Nominate up to 7 faculty members for your evaluators, due Monday, 23rd Sept'19
- Select a team manager
- One-pager: Problem Statement/Specifications/Block Diagram due at benchside meetings (23rd, 25th, 27th Sept)



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