

25 days

to

PDR



Schedule

This schedule shows the main events for SDP18. Please note that the schedule is subject to change.

September 2017						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2
3	4	5 First day of classes	6	7 Lecture 1: Introduction	8	9
10	11	12	13	14 Lecture 2: Problem Specification and Team Management	15	16
17	18	19 Advisors due	20	21 Lecture 3: PDR	22	23
24	25	26 Benchside meetings	27	28 Benchside meetings	29	30

October 2017						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	4	5	6	7
8	9 Holiday	10 PDR	11 PDR	12 PDR	13 PDR	14
15	16 PDR	17 PDR	18 PDR	19 PDR	20 PDR	21
22	23	24	25	26	27	28
29	30	31 Benchside Meetings	1	2 Benchside Meetings	3	4

SDP18

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!

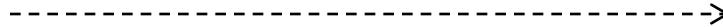
Objectives

- 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 Design

- Do great projects just happen?

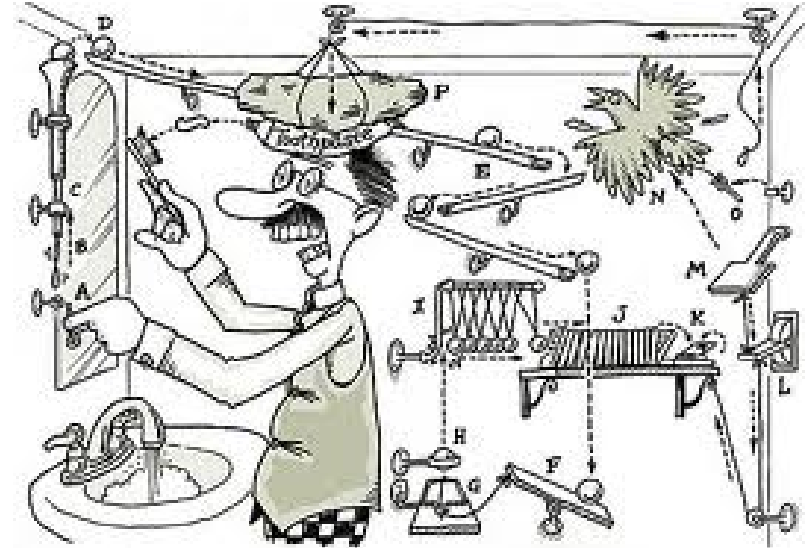
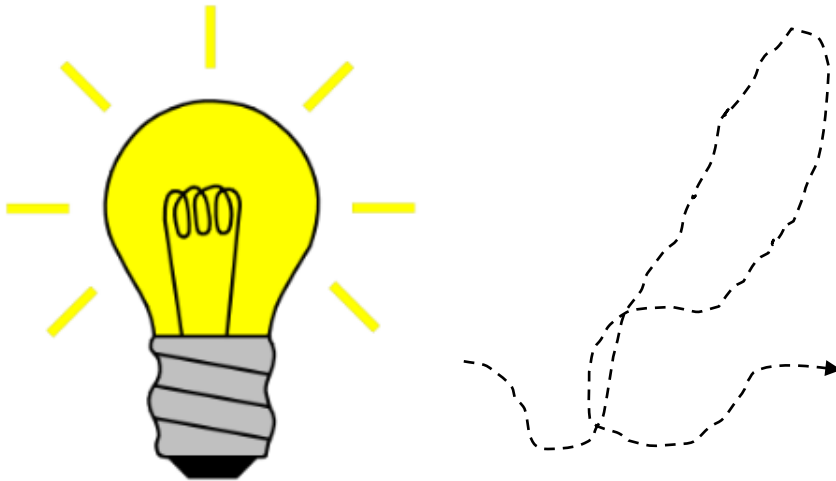


**"Place and Paste"
SDP12**

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

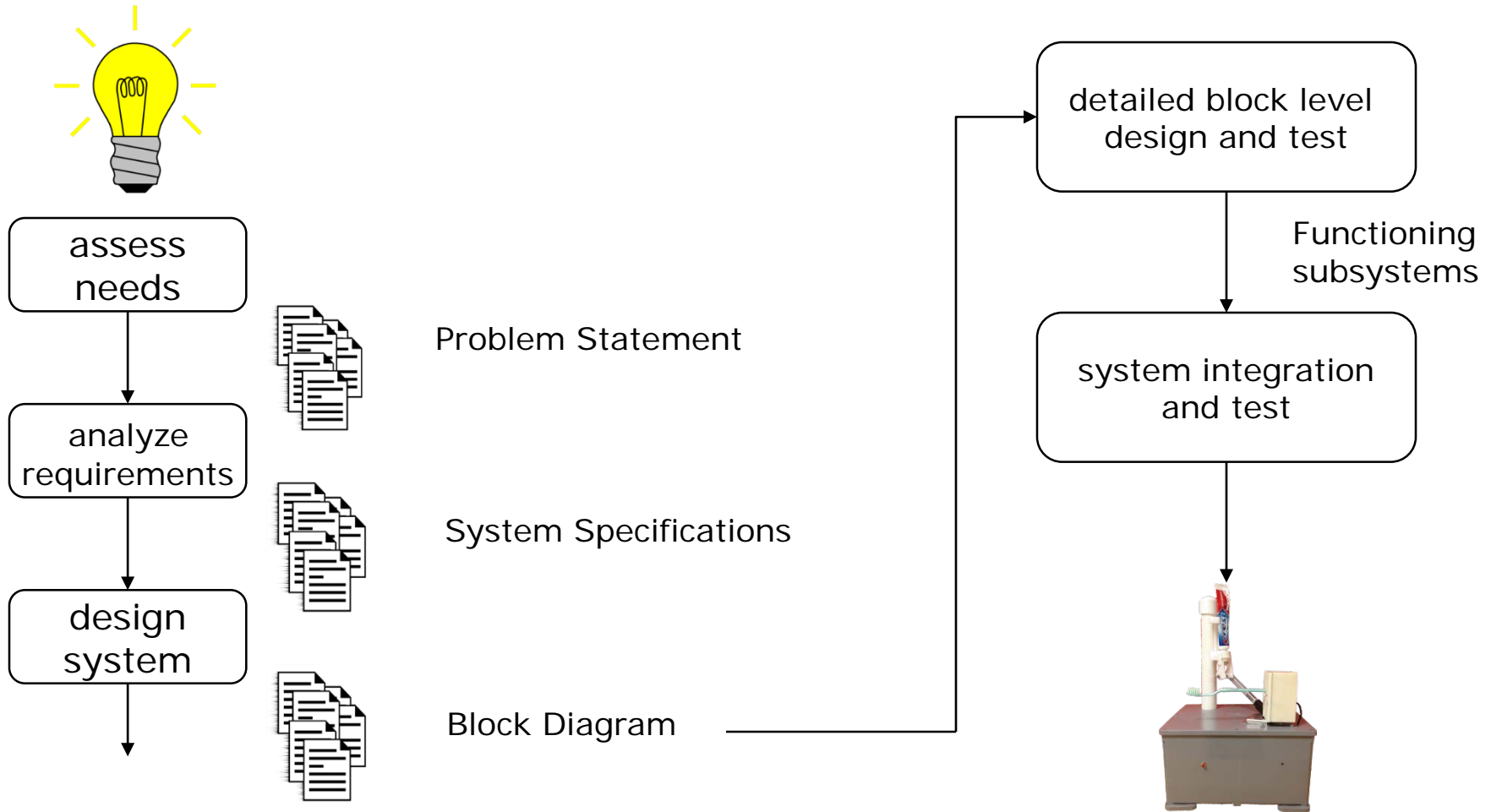
How to Avoid a Big Mess

- 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



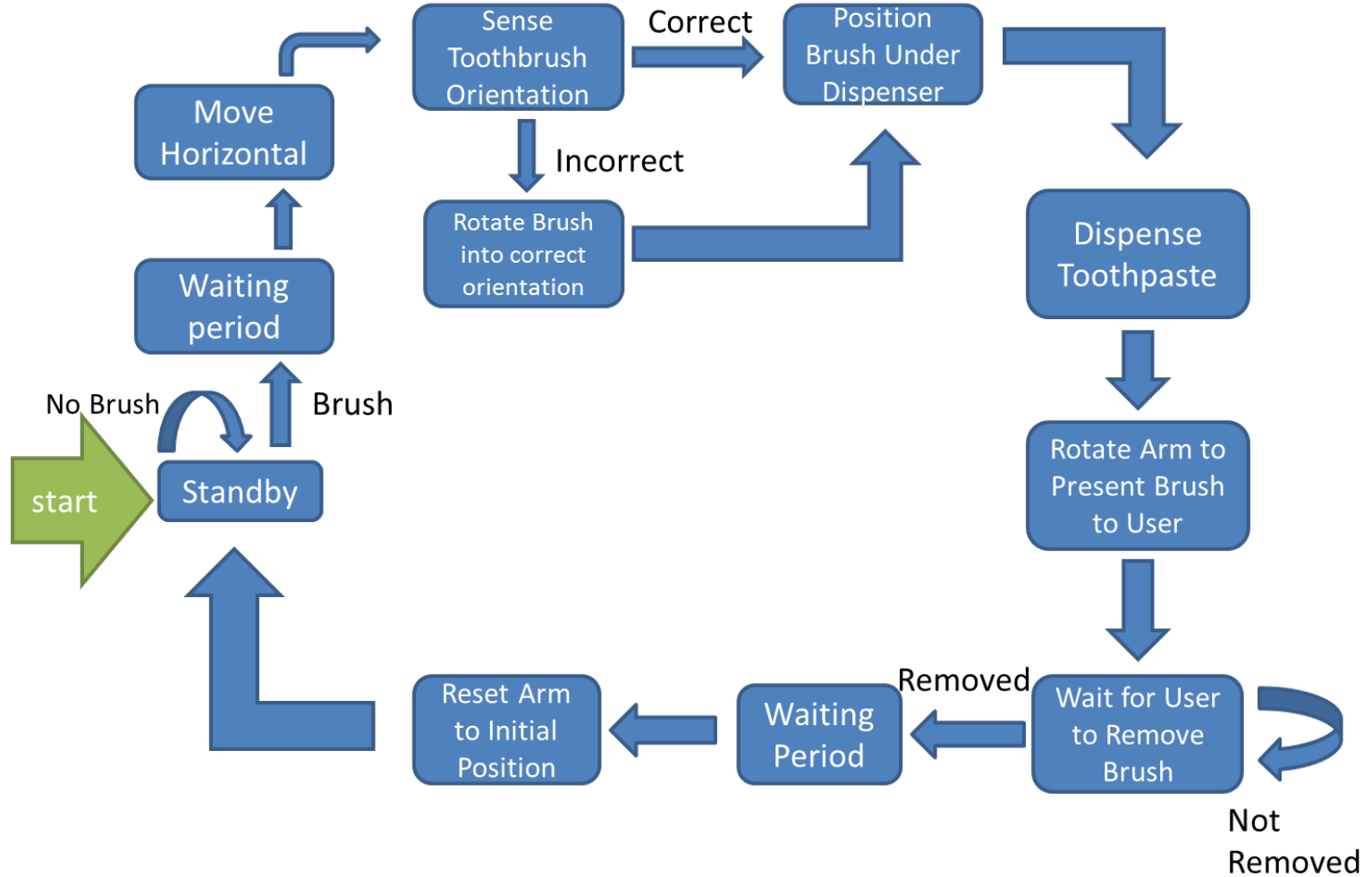
Students with severe disabilities face many challenges with tasks that we perform every day with little thought. For one student in the “Life Skills” program in West Springfield schools, his limited fine motor skills make it impossible for him to squeeze tooth paste onto his tooth brush. Our “Place and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

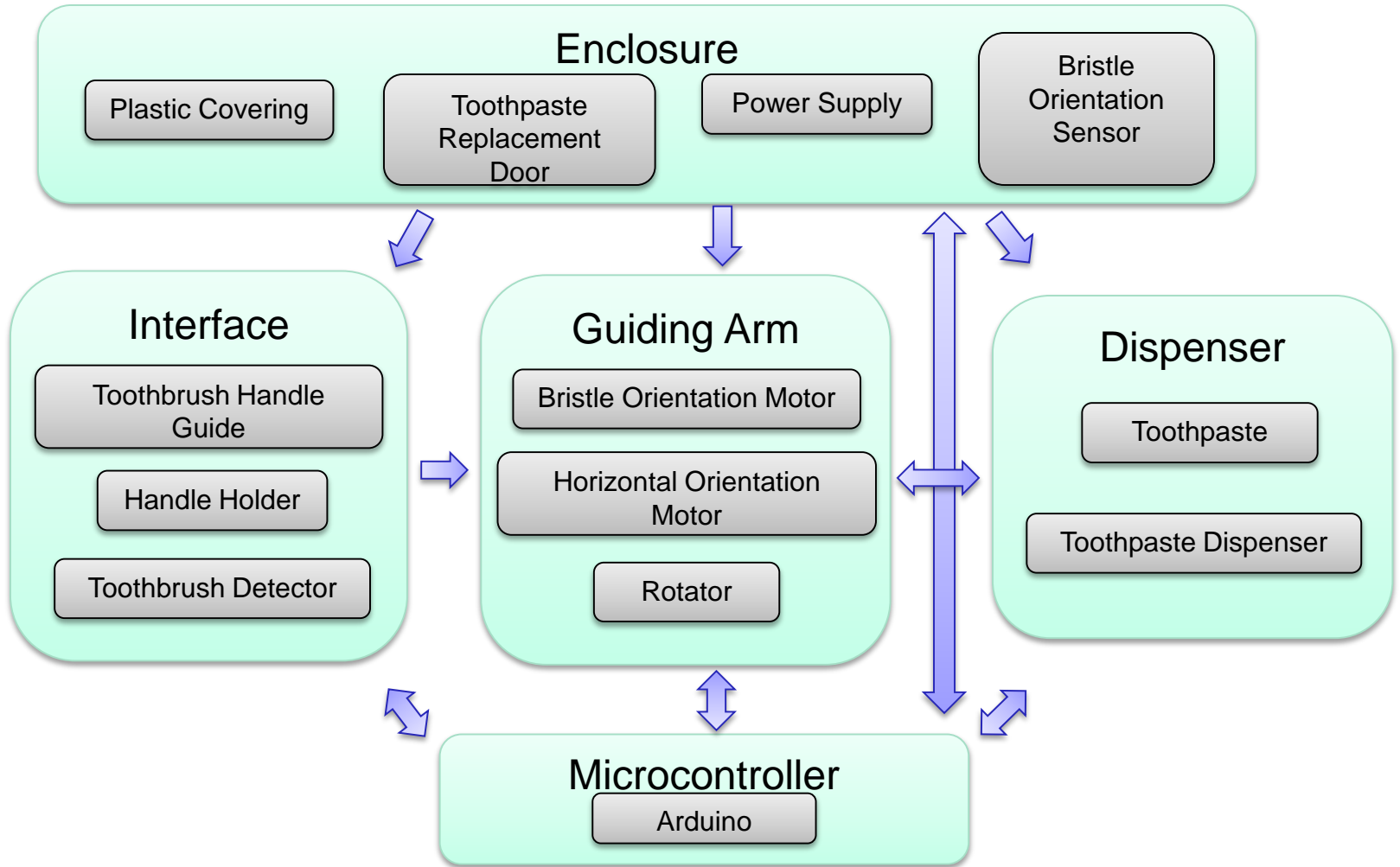
- The **system specifications** can be thought of as a technical version of the problem statement. *It should not propose a solution.*

- 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

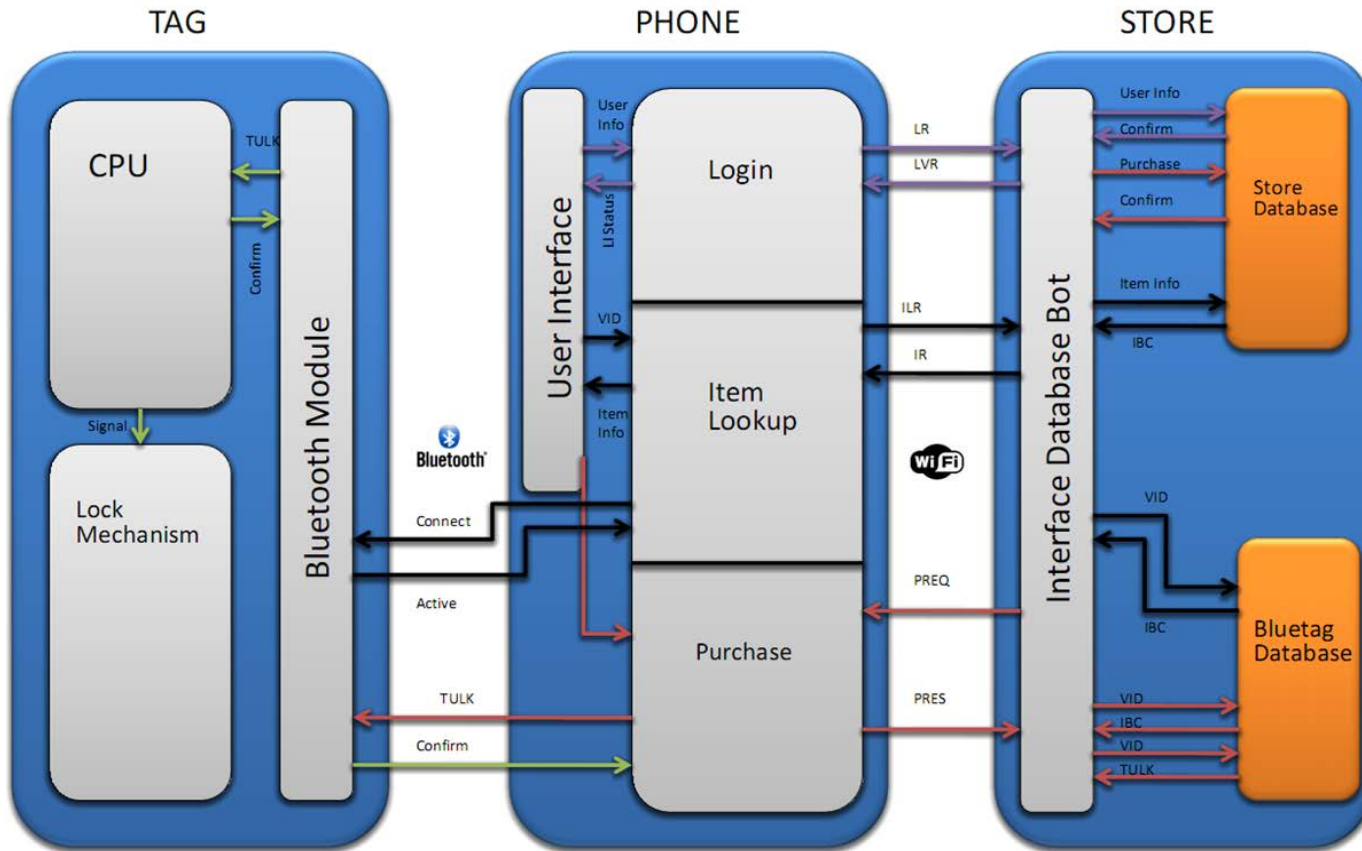
Design: State Machine



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



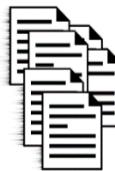
analyze
requirements



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

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 leader
 - 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

- 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

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

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