MICHIGAN STATE UNIVERSITY

01/09: Project Plan

The Capstone Experience

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From Students…
…to Professionals

Project Plan

➢Functional Specifications

• Design Specifications

• Technical Specifications

Functional Specifications

- ## What does it do?
  (Not "how" does it do it?)
    - What's the problem?
    - What's your solution?

- ## Short List of Features

- ## Not Necessarily Complete

- ## Starting With
    - Shared Vision?
    - No Formal Documents?
    - Minimal Documents?
    - Incomplete Problem Statement?

- ## Understandable by End User

- ## Initial Problem Statement

- ## Usually Refined

Functional Specifications

- Boeing
  - Factory Simulation Game
  - Build Paper and Model Airplanes
  - By Team of Humans and Robots
  - Player is Factory "Floor Captain"
- GM
  - Enable Impromptu Meetings
  - In Empty Conference Rooms
    - Find or Check Status
    - Book
  - Using Mobile Devices
- TechSmith
  - Learn and Teach American Sign Language
  - Using Microsoft Surface Tablet App
  - Learner
    - Watches YouTube Videos
    - Records Themselves Signing
  - Teacher
    - Watches Learner's Video
    - Responds with a Critique

Understandable by End User

Functional Specifications Interactions With Your Client

- Derived With/From Client

- Documented For Client

- Presented to Client

- Agreed Upon With Client

- Your Job to Capture the Client's Intent!

Project Plan

✓ Functional Specifications

➢ Design Specifications

• Technical Specifications

Design Specifications

- How does it look and feel?
- Includes
  - "Business" Process Flow
  - Use Cases
  - Screen Mockups
  - Data Flow Diagrams
  - Data Organization
  - Etc…
- Identifies All the Parts and Their Interactions
- (Mostly) Understandable by End User
- Usually Refined

Design Specifications

- Auto-Owners
  - Display Event Information
  - Register for Open Events
  - Respond to Invitations to Restricted Events
  - Provide Mapping and Directions
- Dow
  - Display Corporate News
  - Add and Modify Links
  - Share Document Library
  - Integrate Outlook Tasks or MySite Tasks
  - Display RSS Feeds
  - Information Based on 13 Core Businesses and 5 Functions
- MSUFCU
  - User Experience (UX)
    - Easy-to-Use
    - Useable by Wide Variety of Users
  - Includes a Calendaring Tool
    - Sign Up
    - Send Text Message Reminders

Mostly Understandable by End User
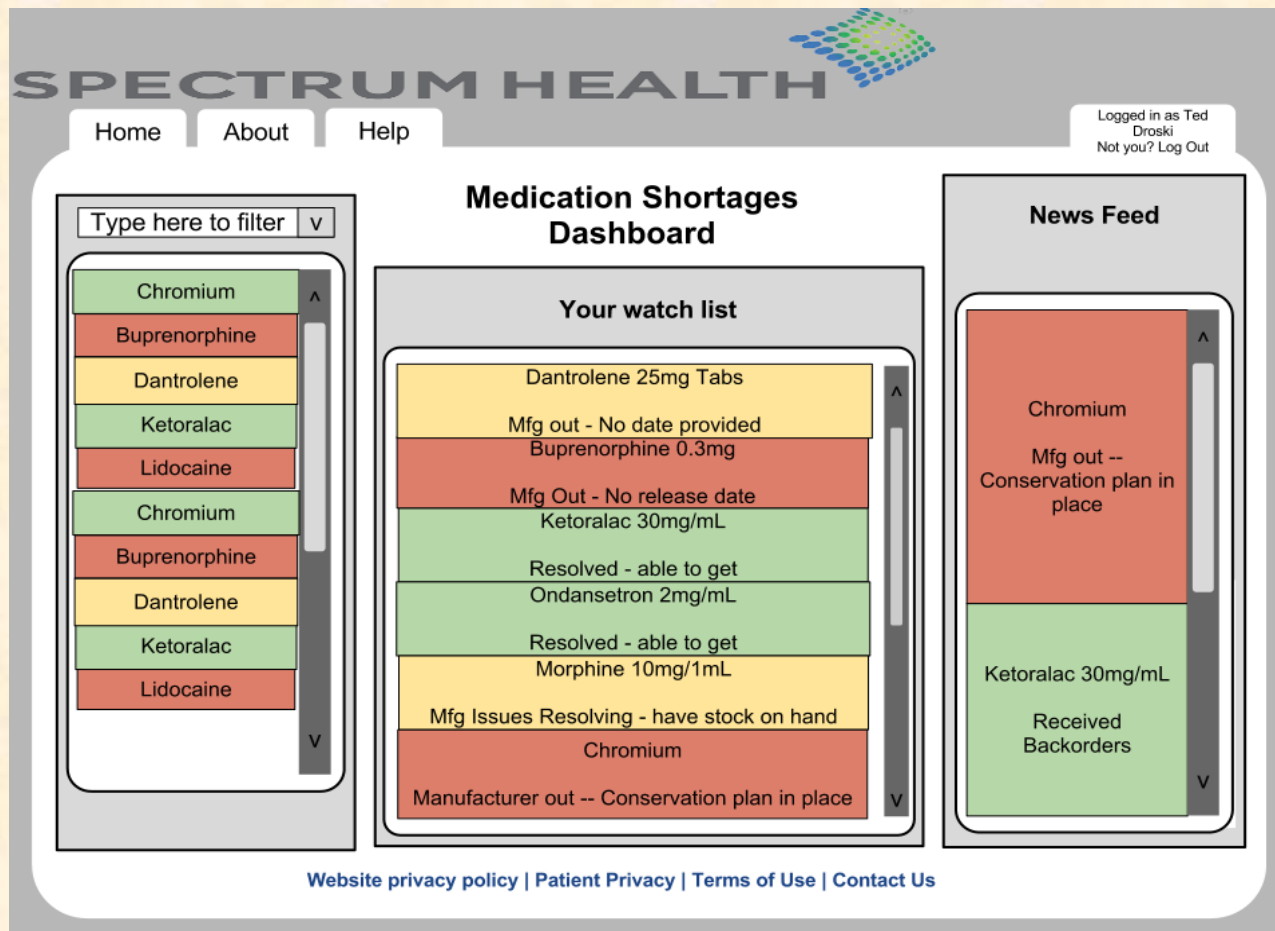
Screen Mockups

- User Interface Only
  - Shows Layout, Buttons, Pull-Downs, Etc...
  - Non-Functional
  - No Back End
- Helpful for Developing
  - Functional Specifications
  - Look-and-Feel
  - Use Cases
- Can Create with...
  - Pencil and Paper
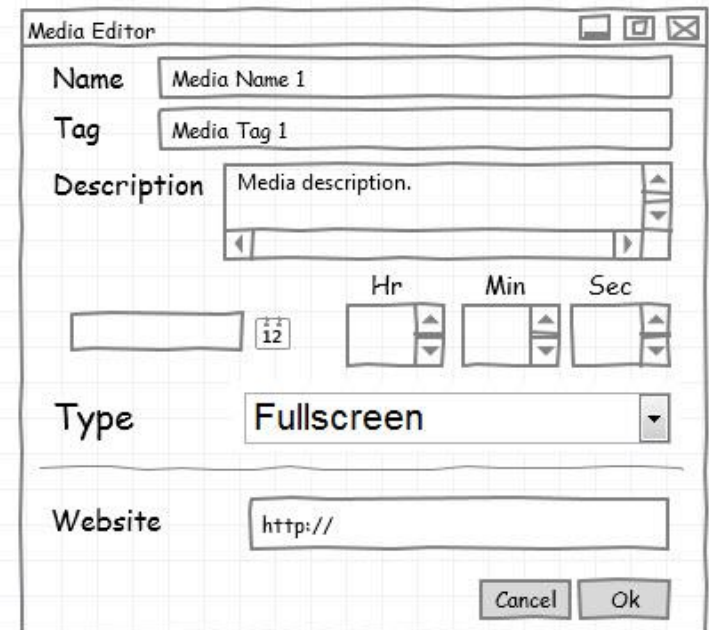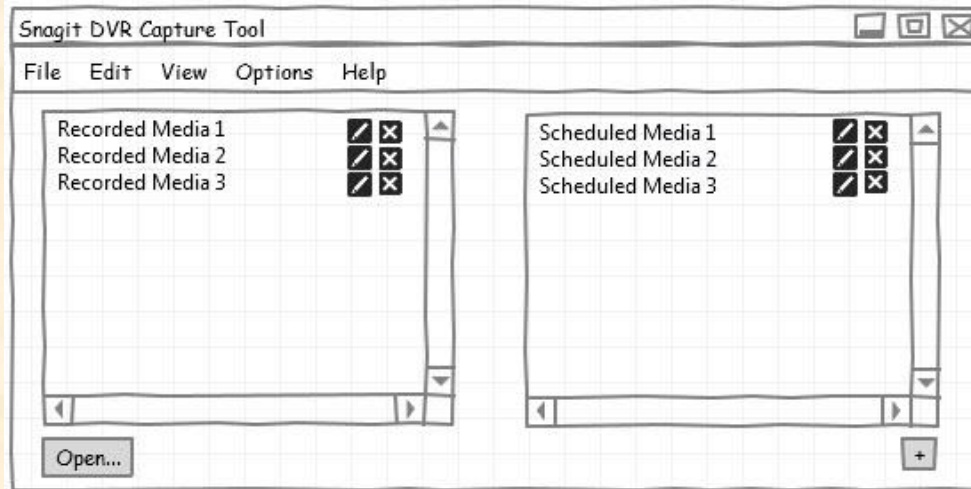 - PowerPoint (Developer View)
  - Photoshop
  - Etc...

Screen Mockups

- "Use" with Clients
  - Show to Clients
  - Go Through Use Cases with Clients
- "Cruder" may be better.
  - What?
  - Why?

Screen Mockups Example

Screen Mockup Example

Design Specifications Interactions With Your Client

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Project Plan

✓Functional Specifications

✓Design Specifications

➢Technical Specifications

Technical Specification

- How does it do it?
- Identifies All the Parts and Their Interactions
- Everything a Developer Needs to Write the Code
- Includes Things Like…
  - Overall System Architecture
  - Machine Architectures
  - Software Technologies
  - Production Environments
  - Development Environments
  - SDK's (Software Development Kits)
  - Network Topology
  - Database Schema
  - Continued…

Technical Specification

- Includes Things Like…
  - Object Models and Class Diagrams
  - UML Diagrams
  - Pseudo Code
  - Function Prototypes
  - Schedule
  - Test Plan
  - Risk Analysis
  - Etc…
- Probably Not Understandable by End User
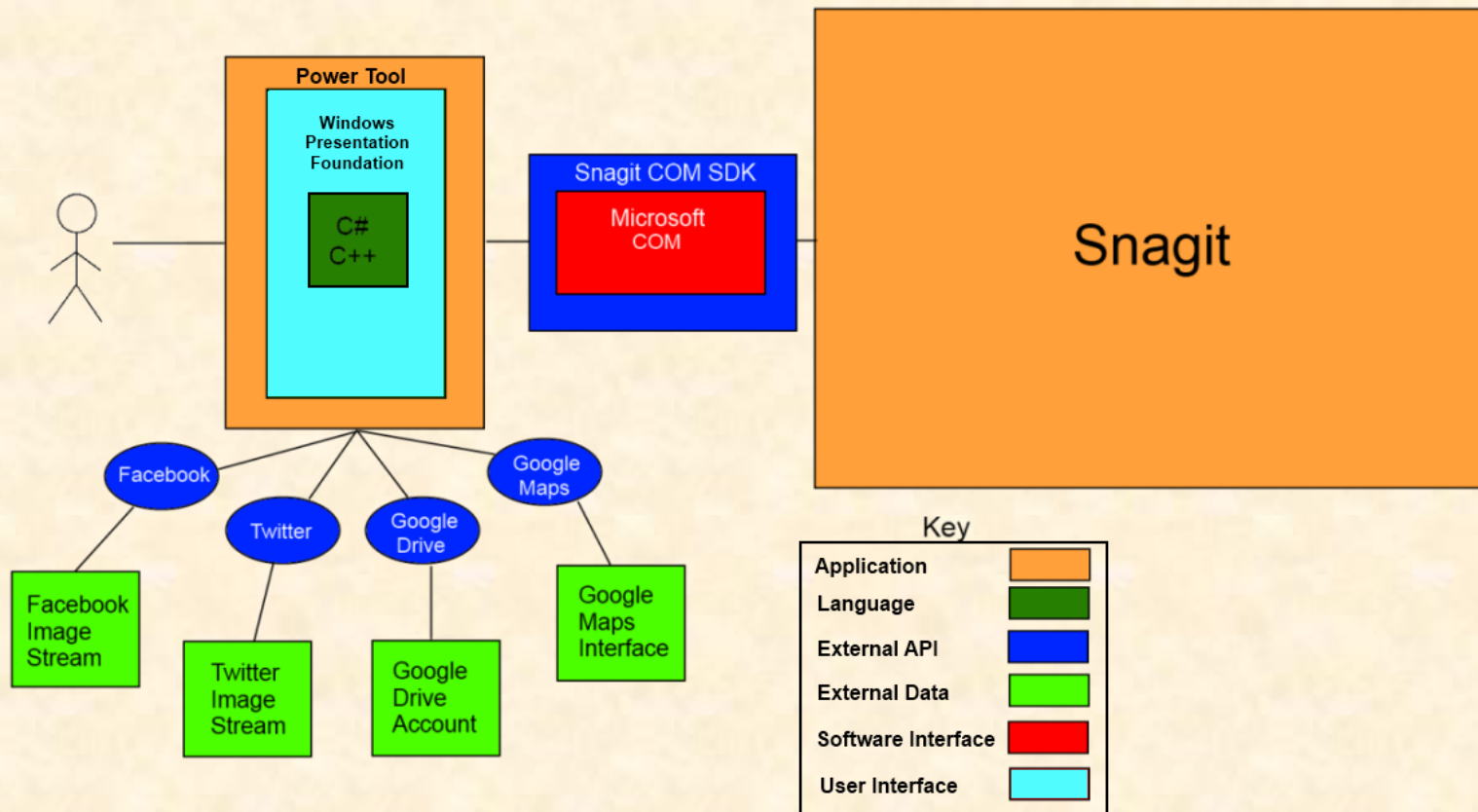- Usually Refined
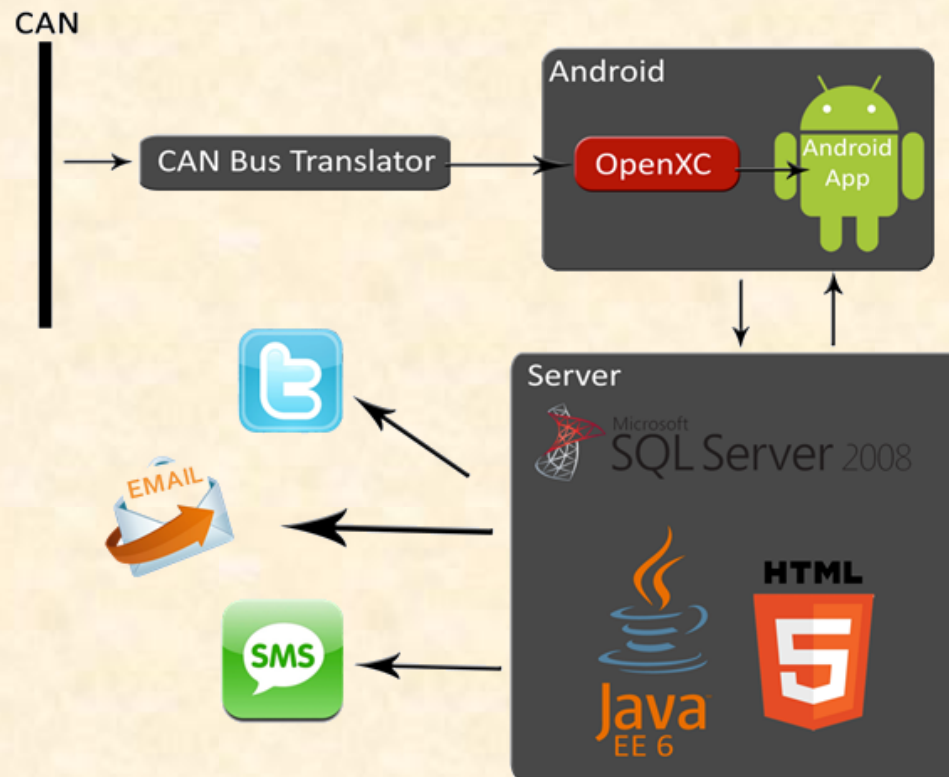
Technical Specifications

- EA
  - C++ and C#
  - Android SDK
  - HTML5
  - JavaScript
  - PHP
  - webRTC
- Meijer
  - CSS, HTML5
  - JavaScript, jQuery, jQuery UI
  - Microsoft .NET, ASP.NET, C#
  - Microsoft Communication Foundation (WCF)
  - Microsoft Internet Information Services (IIS)
  - SQL Server
- Whirlpool
  - Java
  - JavaScript
  - SQLite and MySQL
  - HTML5, CSS3
  - PHP or Ruby
  - RESTful Web Services

Probably <u>Not</u> Understandable by End User

System Architecture Example

System Architecture Example

Approach

- Break Big Problems Into Smaller Problems
- Identify Constraints
- Identify "Risks"—Things You Don't…
  - …Know
  - …Understand
  - …Know How To Do
- Consider Tradeoffs
- Select Appropriate Technologies
- Identify Core Features for a Prototype

Technical Specifications Interactions With Your Client

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Cannot be emphasized enough!

Project Plan Summary

- Specifications
  - Functional: What does it do?
  - Design: How does it look and feel?
  - Technical: How does it do it?
- Testing Plan
- Schedule

How To's

- Quickly identify…
  - …what you don't know,
  - …what you don't understand, and
  - …what you don't know how to do.
- Conceptually…
  - Start with functional specifications.
    - Get agreement with client.
    - Include as first part of project plan.
  - Do design specifications.
    - Get agreement with client.
    - Include as 2nd part of project plan.
  - Do technical specifications.
    - Get agreement with client.
    - Include as 3rd part of project plan.
  - Do schedule.
  - Do development, testing, and deployment.
- In CSE498, must do all three in parallel (and iterate).

- Approach
  - Make Skeleton Document Immediately
    - Will Get You Organized and Focused
    - Include "Under Construction" Sections (Totally Empty)
  - Develop In Parallel When Possible But...
    - Complete Functional First
    - Complete Design Second
    - Complete Technical Third
  - Refine As Needed
  - Assign Sections to Team Members
  - Share with Client
    - Ask For (Specific) Feedback ⬅ "Is this what you had in mind?"
    - Highlight What's New
    - Tricky Balance
      - ❖ Not Enough?
      - ❖ Too Much?

- Schedule
  - Dictated by Course
  - See Major Milestones
    - 01/23: Status Report Presentations
    - 01/28: Project Plan Presentations
    - 02/18: Alpha Presentations
    - 04/01: Beta Presentations
    - 04/22: Project Videos
    - 04/24: All Deliverables
    - 04/25: Design Day Setup
    - 04/26: Design Day
  - Other Milestones By Educated Guesses
  - Track To It At Least Weekly at Triage Meetings
  - Revisit Often and Revise If Necessary
  - Delivery Slippage == Graduation Slippage

How To's

- "Living Document"
- Make Sure Your Project Plan Has…
  - Cover Page
  - Title
  - Table of Content
  - Page Numbers
  - Headers and Footers
  - Etc…
  (That is, make sure your plan looks professional.)

Interactions With Client

- Client May Specify…
- Requirements
  - Functional
  - Design
  - Technical Requirements
    - Operating Systems
    - Programming Languages and Environments
    - Web Technologies
    - Etc…
  - Legacy
- Milestones
- Etc…

(You may explore and propose other ideas.)

Nota Bene: Project Plan

- How many…
  - …drafts will you write? Many.
  - …drafts will you share with your client? A Couple.
  - …final documents will you submit for CSE498? One
- Due Date
  - Noon, Monday, January 28
  - Less Than 3 Weeks ⬅ Panic!
- In Class Formal Presentations
  - January 28 – February 6
  - PowerPoint Template Provided

Resources on the Web

- Other Links > Downloads
  - Team Auto-Owners
  - Team Meijer
  - Team Spectrum Health
- Other Links > Online Resources
  - W3 Schools
  - iPhone Programming
  - Apache Subversion
  - Etc...
- High Resolution Sponsor Logo

  www.capstone.cse.msu.edu/2013-01/projects/<sponsor>/images/originals/sponsor-logo.png
  www.capstone.cse.msu.edu/2013-01/projects/auto-owners/images/originals/sponsor-logo.png

Project Plan

✓Functional Specifications

✓Design Specifications

✓Technical Specifications

- Risks

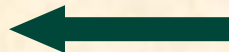- Prototypes ⊢ Future Meetings

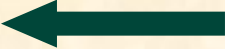- Schedule

What's ahead?

- Team Photos
  - Informal: After Meeting Today
  - Formal: After Each Project Plan Presentation
- Setup
  - Team Machines
    - Dell Server (Ask Meredith)
    - Apple iMac, MacBook Pro
  - Team Software
    - Microsoft Office ⬅ Required.
      - Word and PowerPoint   Get From Meredith
      - Windows Version
    - Web Server
    - Code Repository
    - SDK's
    - Etc.
- Think About Team Status Report

What's ahead?

- Team Status Report Presentations
  - PowerPoint Template
  - Due Midnight, Tuesday, January 22
  - Less Than Two Weeks ⬅ Panic!
  - Email to Dr. D.
    - Subject: Team <Company Name>: Status Report
      Subject: Team Auto-Owners: Status Report
    - Attachment: team-<company-name>-status-report-presentation.ppt
      Attachment: team-urban-science-statue-report-presentation.ppt
- Dr. D. Will Combine Into Single PowerPoint
  - To Speed Things Up During Meeting
  - Do NOT Modify Master Slide Page
- Each Team Presents
  - Using Dr. D.'s Laptop
  - At Most 5 Minutes (Rehearse Timing)
  - Single or Multiple Presenters (Your Choice)

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01/14: Risks and Prototypes

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