MICHIGAN STATE UNIVERSITY

09/07: 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 your client’s problem?
  - What’s your solution?
- Includes
  - List of Features
  - Use Cases
- Not Necessarily Complete
- Understandable by End User
- Initial Problem Statement
- Usually Refined

Functional Specifications

- Amazon
  - Provide Personal Shopping Assistant
  - To Amazon
  - Via Messaging Apps
- MSUFCU
  - Add Ratings and Reviews Features
  - Of MSUFCU Products and Services
  - By MSUFCU Members
- Spectrum Health
  - Create Online Community Connecting
  - Homebound People in Need
  - With Volunteer Helpers

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

- What's the user experience (UX)?
  - How does a user use it?
  - How does it look and fee?
- 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
  - Provide Attendee Functionality
    - Build Personal Profile
    - Register for Events
    - Access Event Materials
    - Provide Feedback
    - View Newsfeeds
  - Support Administrative Functionality
    - Build, Edit and Update Events
    - Send Email and Text Messages
    - Build and Administer Event Surveys
    - Generate Reports
- Quicken Loans
  - Support Timed and Untimed Tests
  - Present Results Textually and Graphically
  - Align Test Outcomes with Internal Roles
  - Leverage
    - Data Science and Business Intelligence
    - Progressive Random Matrices
- Rook
  - Improve Performance of Windows Agent
  - Design and Build New Agents
    - For Linux and Apple OS X
    - Based on Windows Agent Features
  - Add Encryption to Communication and Storage
  - Support Remote Updates

Mostly Understandable by End User

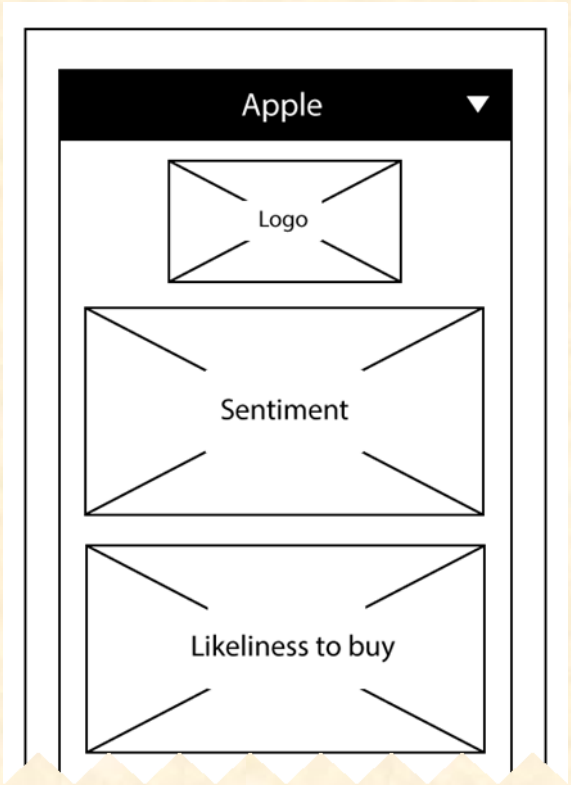
Screen Mockups

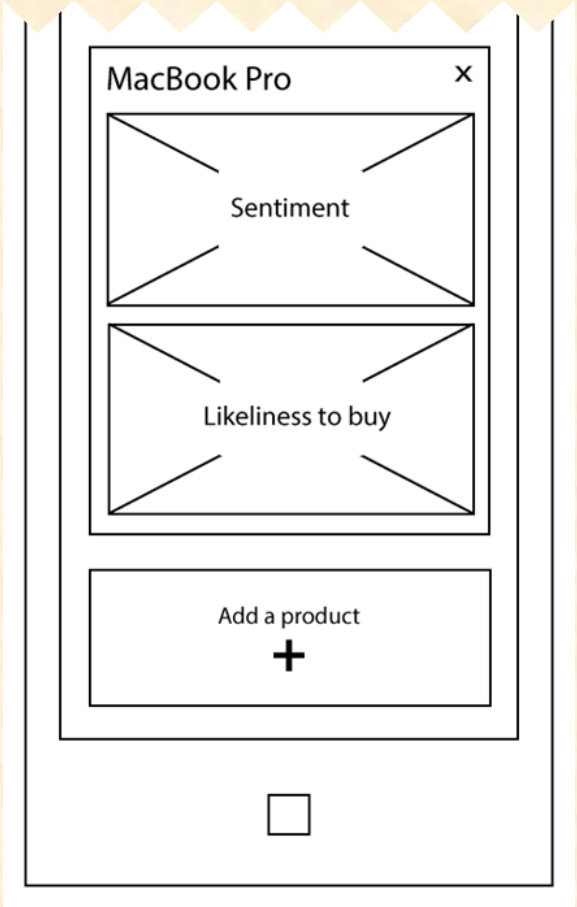
- User Interface Only
  - Shows Layout, Buttons, Pull-Downs, Etc…
  - Non-Functional
  - No Back End
- Helpful for Developing
  - Functional Specifications
  - Look-and-Feel
  - Use Cases
- Can Create with…
  - Pencil and Paper
  - PowerPoint (Developer View)
  - Photoshop
  - Etc…

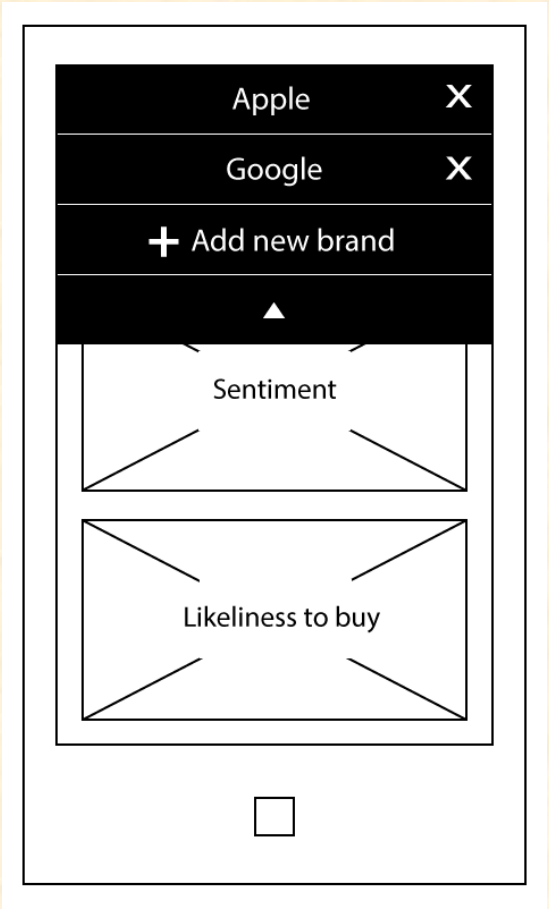
Screen Mockups

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

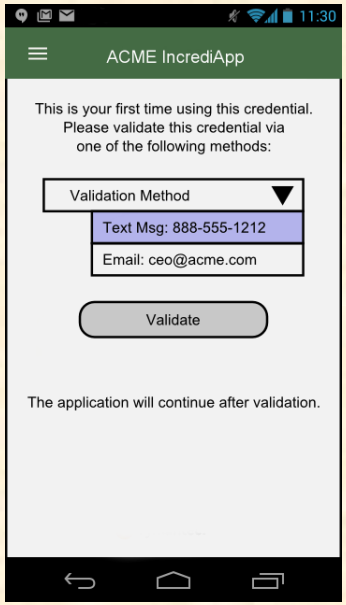
Screen Mockup Example

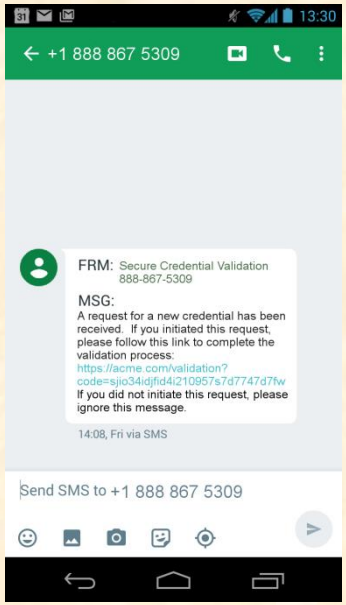




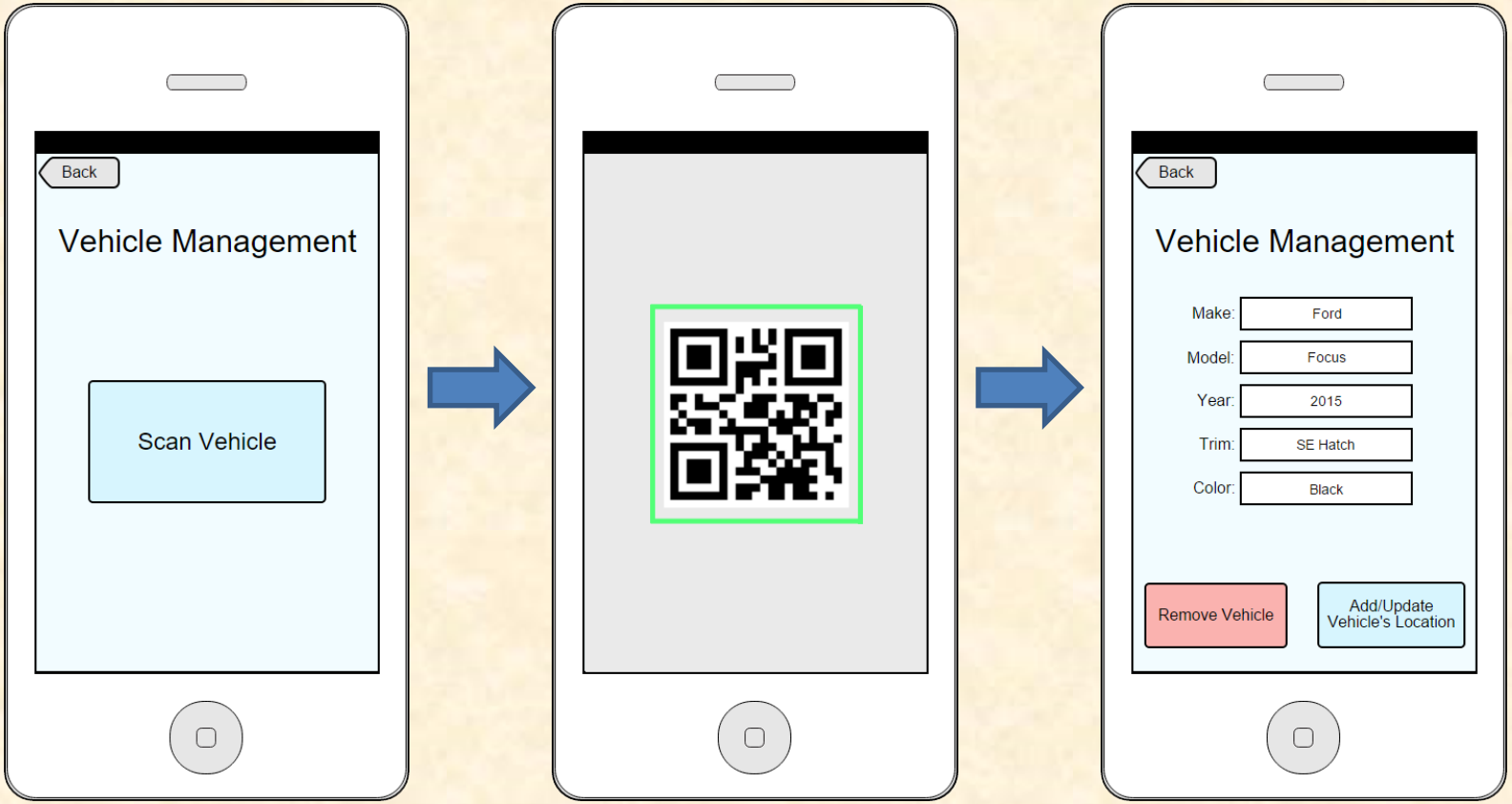


Screen Mockups Example





Screen Mockups Example



Design Specifications
Interactions With Your Client

- Derived With/From 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

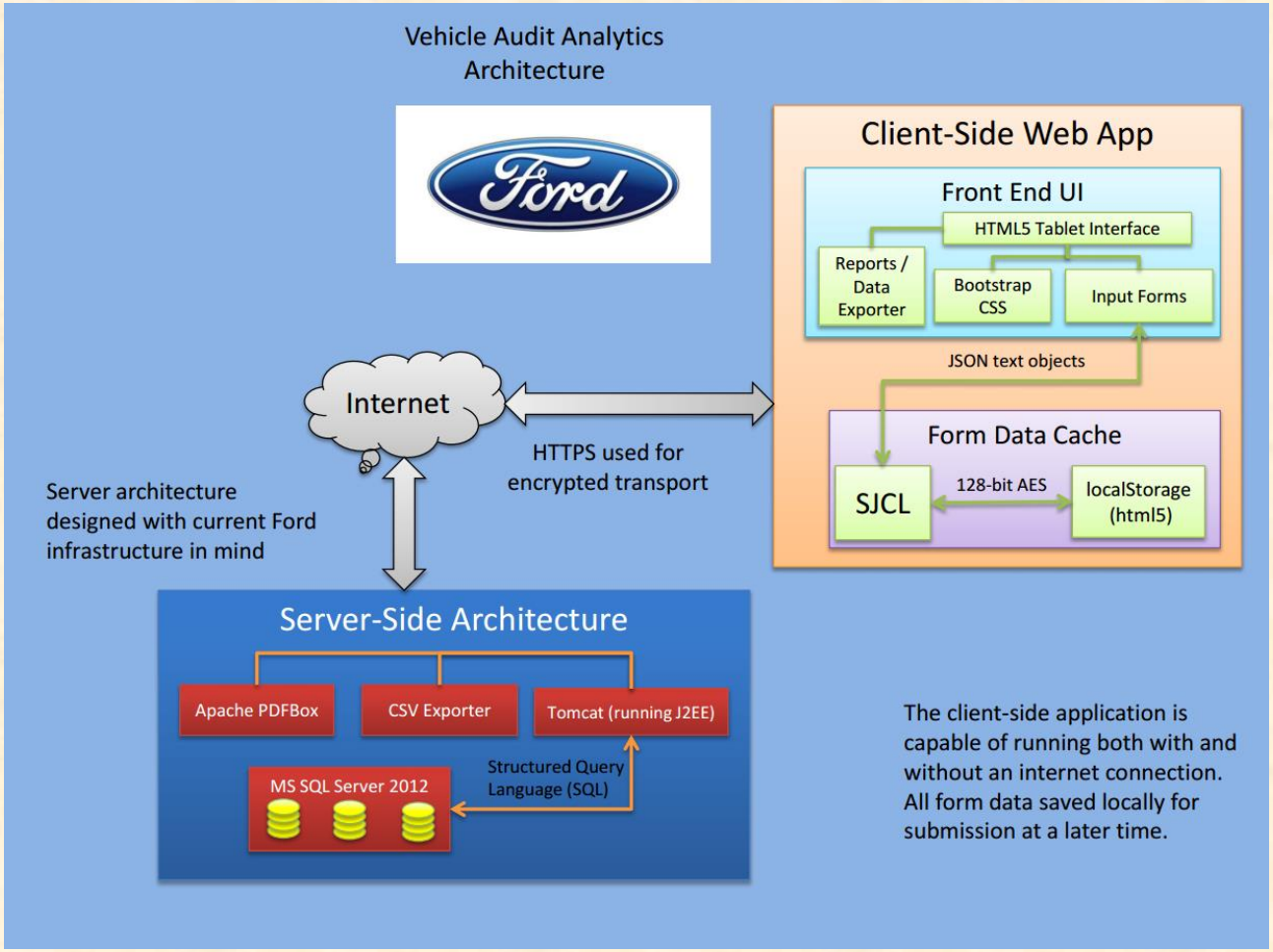
- Includes Things Like…
  - Object Models and Class Diagrams
  - UML Diagrams
  - Pseudo Code
  - Function Prototypes
  - Schedule
  - Test Plan
  - Risk Analysis
  - Etc…
- Probably Not Understandable by End User
- Usually Refined

Technical Specifications

- Ford
  - Ford Sync 3 AppLink Emulator
  - Apple iPads and iPhones (iOS) / Swift or Objective-C
  - Google Android Tablets and Phones / Java
  - Microsoft SQL Server 2012
- TechSmith
  - CSS / HTML / JavaScript / PHP
  - ASP.Net MVC
  - Microsoft C# / .NET and XAML
  - Microsoft Azure Cloud Computing
  - Windows 10 Universal Windows Platform Player
  - Windows Media Foundation
  - Microsoft Cognitive Services
- Whirlpool
  - Apple iPads and iPhones (iOS) / Swift or Objective-C
  - Google Android Tablets and Phones / Java
  - Google App Engine
  - Google Analytics
  - RESTful Web Services

Probably Not Understandable by End User

System Architecture Example



System Architecture Example

Update each week

Converts to element tree

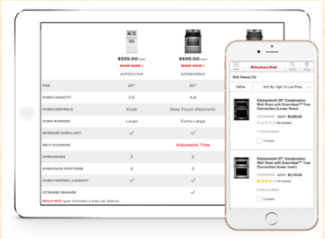
Product catalog

Parse into SQL server

Server Architecture

- SQL Based
- Catalog Table
- Secured by SSH

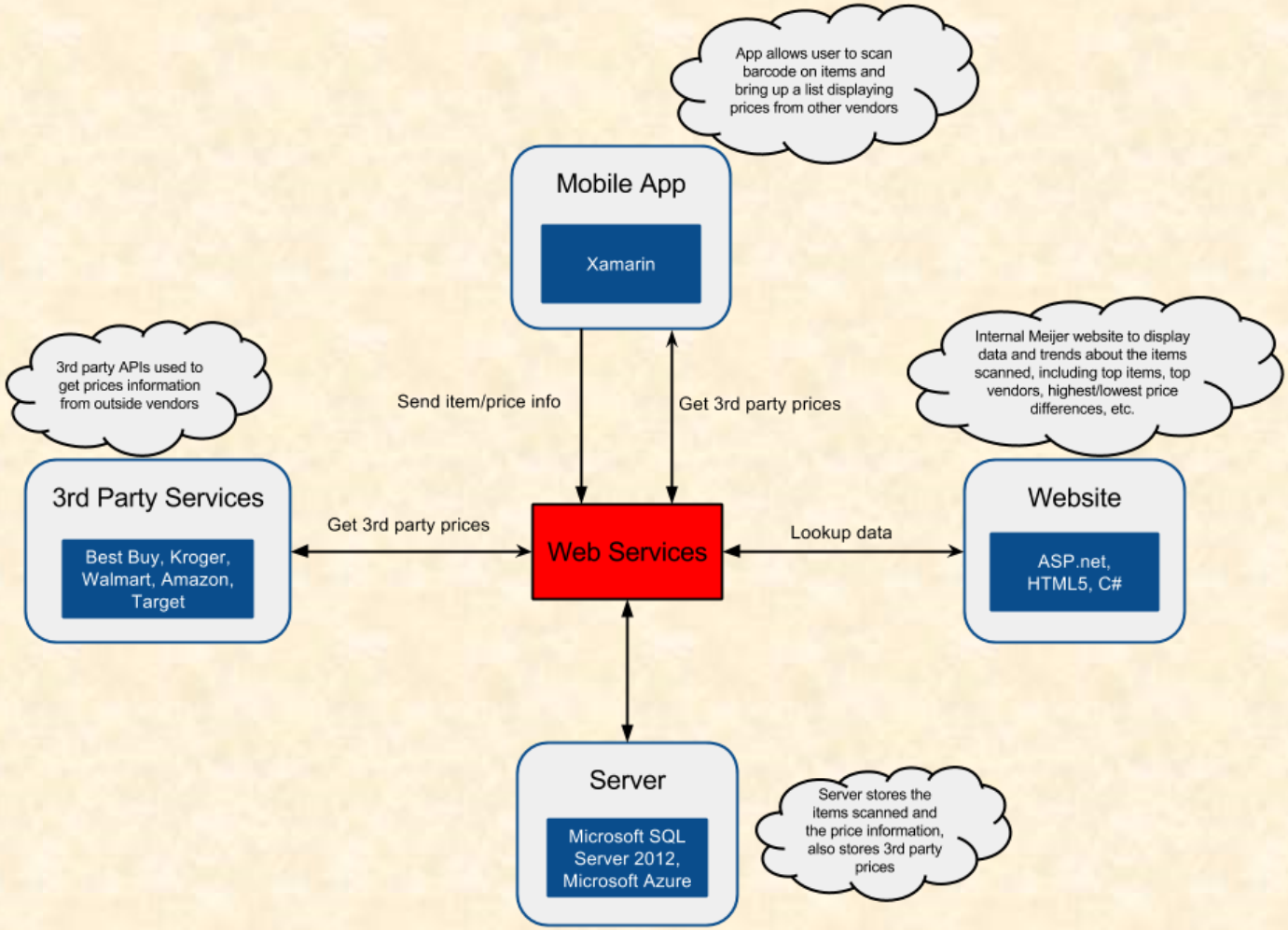
Mobile Devices



Pulled from server

Cache in device memory

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

[1 of 4]

- 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).

How To's

[2 of 4]

- 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?

How To's

[3 of 4]

- Schedule
  - Dictated by Course
  - See Schedules > Major Milestones
    - 09/14: Status Report Presentations
    - 09/19: Project Plan Presentations
    - 10/17: Alpha Presentations
    - 11/14: Beta Presentations
    - 12/05: Project Videos
    - 12/07: All Deliverables
    - 12/08: Design Day Setup
    - 12/09: 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

[4 of 4]

- "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

- Must Use Windows Microsoft Office
  - Word and PowerPoint
  - Installed by Spencer.
  - Requires Windows VM. ← Maybe
  - Get it done now!
  - (Do not attempt to use anything other than Windows Microsoft Office.)
- 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
  - 4:00 a.m., Monday, September 19
  - ~ 1.5 Weeks ← Get on it, now!
- In Class Formal Presentations
  - September 19 – October 5
  - PowerPoint Template Provided

Resources on the Web

- Other Links > Downloads
  Project Plan Examples
  - Team Auto-Owners]
  - Team MSUFCU
  - Team Urban Science
- High Resolution Sponsor Logo

  www.capstone.cse.msu.edu/2016-08/projects/<sponsor>/images/originals/sponsor-logo.png
  http://www.capstone.cse.msu.edu/2016-08/projects/auto-owners/images/originals/sponsor-logo.png

Project Plan

✓Functional Specifications

✓Design Specifications

✓Technical Specifications

- Risks
- Prototypes
- Schedule

} Future Meetings