

**MICHIGAN STATE**  

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**U N I V E R S I T Y**

# 09/09: Project Plan

## The Capstone Experience

Dr. Wayne Dyksen  
Department of Computer Science and Engineering  
Michigan State University  
Fall 2015



*From Students...  
...to Professionals*

# Project Plan

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## ➤ 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
- Understandable by End User
- Initial Problem Statement
- Usually Refined



# Functional Specifications

- Amazon
  - Amazon Echo Companion
  - For Amazon Sellers
  - To Interact with Amazon Seller Forums
  - Hands-Free By Voice Using Alexa
- MSUFCU
  - Promote Financial Education of Children Everywhere
  - By Expanding Dollar Dog Program
    - From Limited Physically Branch-Based
    - To Unlimited Virtually Mobile and Web-Based
- Spectrum Health
  - Optimize Patient Care Service Delivery
  - For Patients By Identifying Facilities with Shortest Wait Times
  - For Spectrum Health By Predicting Staffing Needs In Advance

Understandable  
by End User



# Functional Specifications Interactions With Your Client

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- Derived With/From Client
- Documented For Client
- Presented to Client
- Agreed Upon With Client
- Your Job to Capture the Client's Intent!

# Project Plan

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✓ Functional Specifications

➤ Design Specifications

• Technical Specifications



# Design Specifications

- How does a user use it?  
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
  - Support Multiple Input Methods
  - Manage Entire Application Workflow Process
  - Handle Referrals by Existing Auto-Owners Associates
  - Use Google Analytics
- Quicken Loans
  - Model Initiatives
  - Show Interdependencies and Roadmaps
  - Provide Search Capabilities
  - Generate Reports
- Symantec
  - Require User to Enter Only Userid and Password
  - Send Six-Digit “Second” Factor
    - Without Direct User Interaction
    - Using Symantec VIP SDK
  - Demonstrate on Both Android and iPhone

Mostly  
Understandable  
by End User





# Screen Mockups

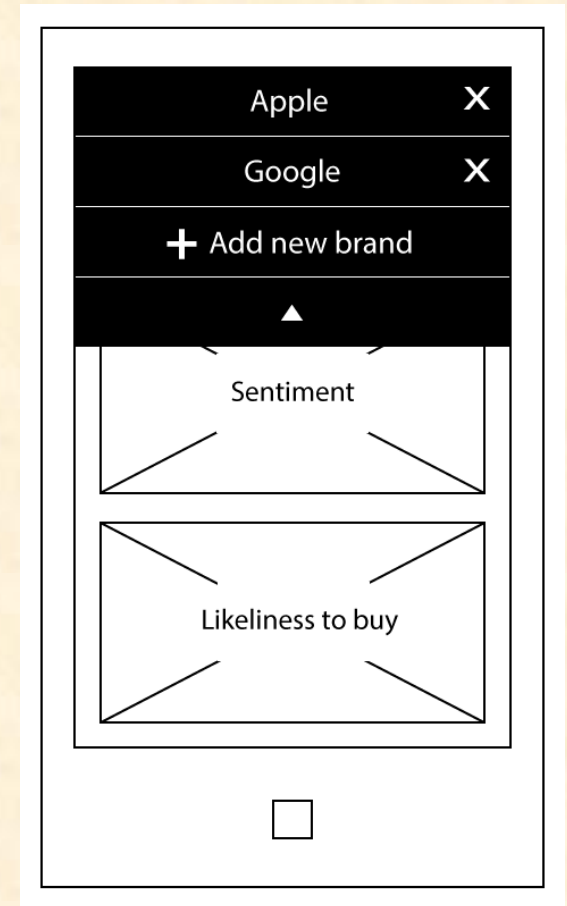
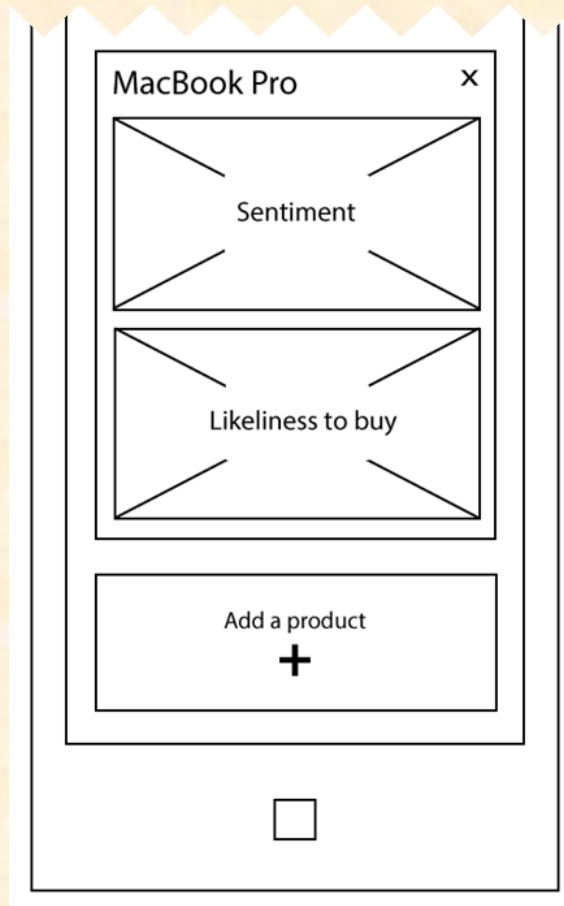
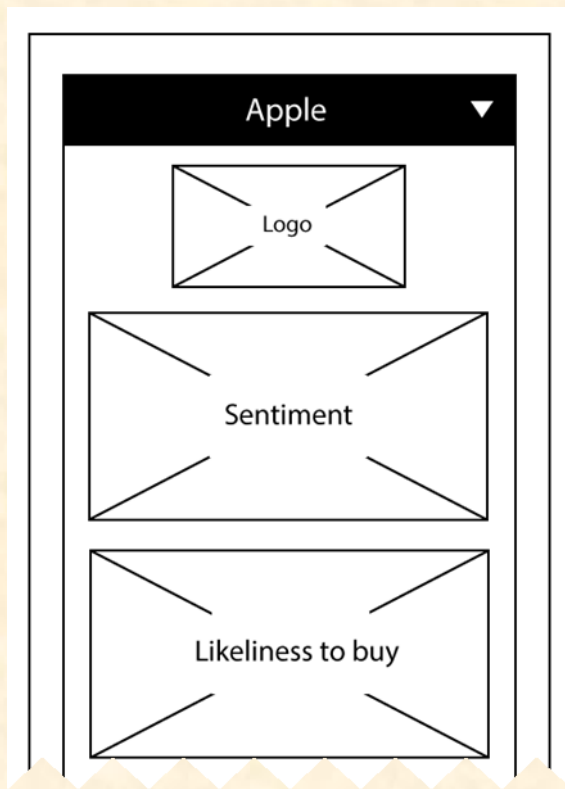
- User Interface Only
  - Shows Layout, Buttons, Pull-Downs, Etc...
  - Non-Functional
  - No Back End
- Helpful for Developing
  - Functional Specifications
  - Look-and-Feel
  - Use Cases
- Can Create with...
  - Pencil and Paper
  - PowerPoint (Developer View)
  - Photoshop
  - Etc...



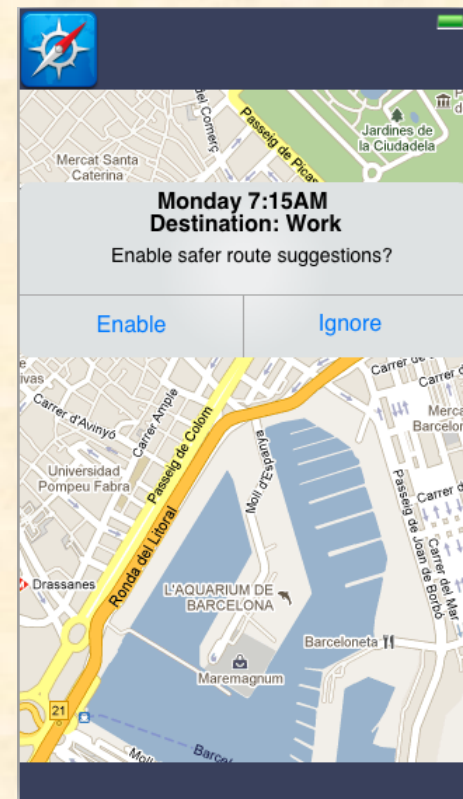
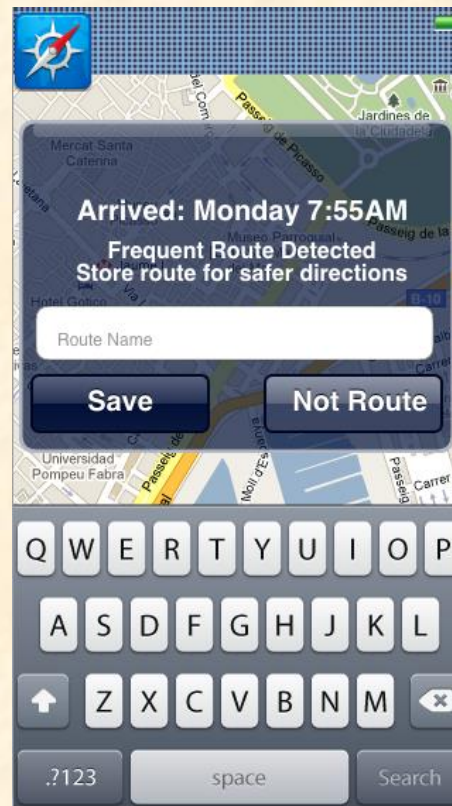
# Screen Mockups

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

# Screen Mockup Example



# Screen Mockups Example



# Design Specifications Interactions With Your Client

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# Project Plan

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✓ 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





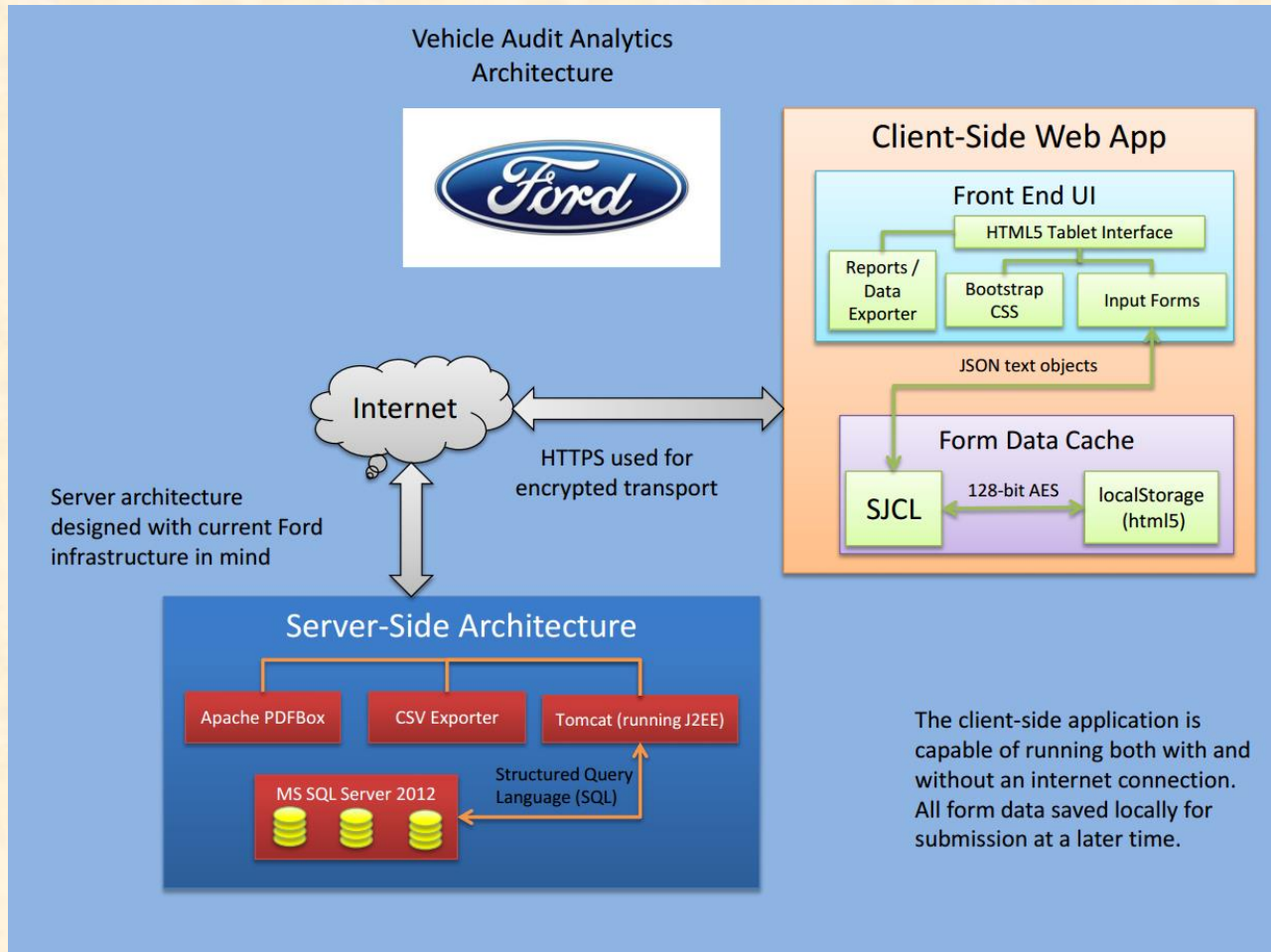
# Technical Specifications

- Ford
  - RESTful Web Services
  - Cloud Services (Microsoft Azure)
  - MQTT
  - JSON
  - XML
  - AMQP
- Meijer
  - Apple iPhones (iOS) / Swift or Objective-C
  - Xamarin or PhoneGap
  - Microsoft .NET Framework / C# / ASP.NET / Azure Mobile Services
  - SQL Server 2012
  - Meijer Web Services
  - Crashlytics
  - GitHub
- Whirlpool
  - Google Android Tablets and Phones / Java
  - Apple iPads and iPhones (iOS) / Swift or Objective-C
  - Google Maps SDKs (for iOS and Android)
  - Google Enterprise Authentication
  - Micello JavaScript API
  - SQL Server
  - Custom XML Parser
  - RESTful Web Services

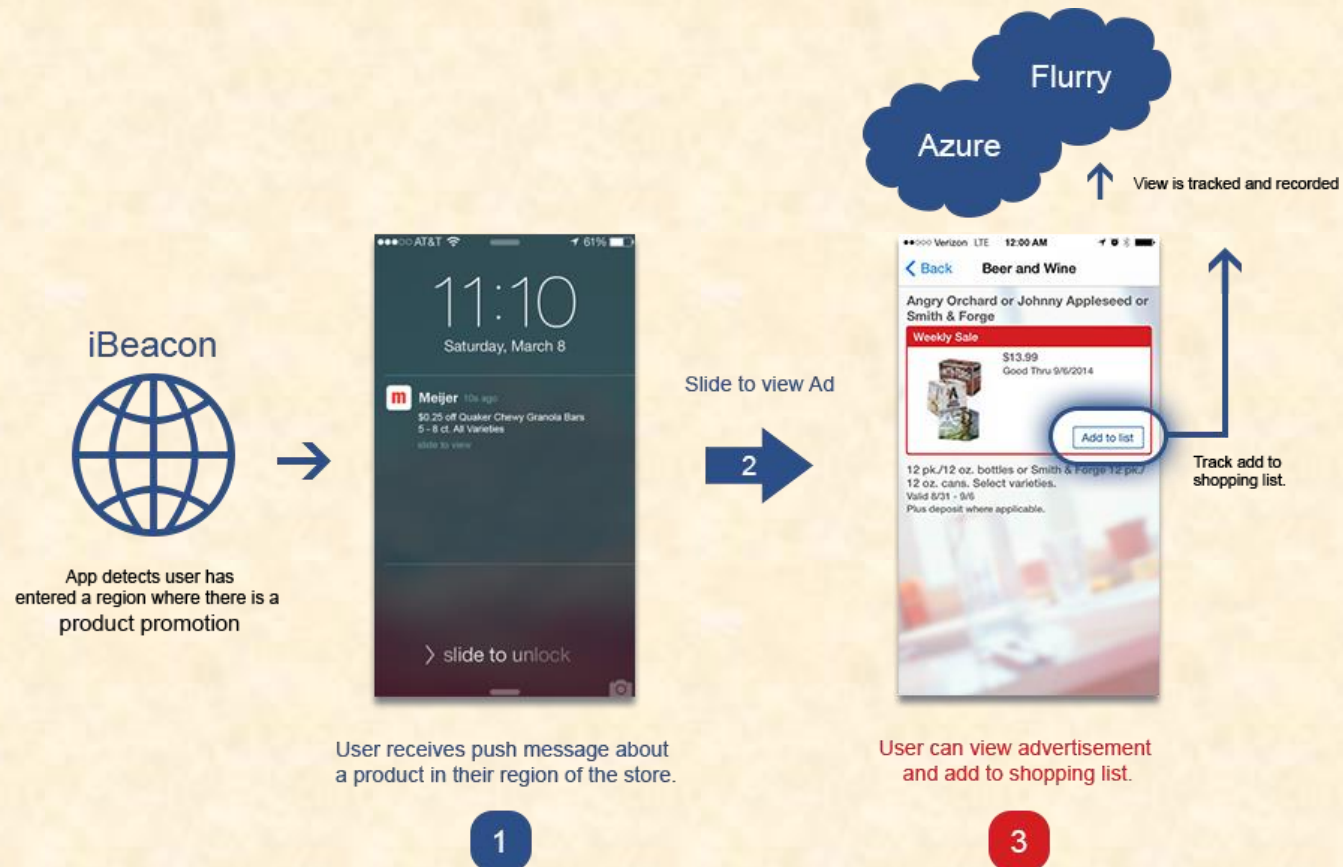
Probably Not  
Understandable  
by End User



# 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

---

- Derived With/From Client
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Cannot be emphasized enough!

# Project Plan Summary

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- 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 Major Milestones
    - 09/16: Team Status Report Presentations
    - 09/21: Team Project Plan Presentations
    - 10/19: Team Alpha Presentations
    - 11/23: Team Beta Presentations
    - 12/07: Project Videos
    - 12/09: All Deliverables
    - 12/10: Design Day Setup
    - 12/11: 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 Angie
  - Requires Windows VM.
  - 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 21
  - ~ 2.5 Weeks  Panic!
- In Class Formal Presentations
  - September 21 – October 7
  - PowerPoint Template Provided



# Resources on the Web

- Other Links > Downloads  
Project Plan Examples

- Team Meijer
- Team Quicken Loans
- Team Spectrum Health

- Other Links > Online Resources

- Apple Developer
- W3 Schools
- iPhone Programming
- Apache Subversion
- Etc...

- High Resolution Sponsor Logo

[www.capstone.cse.msu.edu/2015-08/projects/<sponsor>/images/originals/sponsor-logo.png](http://www.capstone.cse.msu.edu/2015-08/projects/<sponsor>/images/originals/sponsor-logo.png)

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# Project Plan

✓ Functional Specifications

✓ Design Specifications

✓ Technical Specifications

• Risks

• Prototypes

• Schedule

} Future Meetings

