MICHIGAN STATE UNIVERSITY

09/05: Project Plan

The Capstone Experience

Dr. Wayne Dyksen
Department of Computer Science and Engineering
Michigan State University
Fall 2018

From Students…
…to Professionals

Project Plan

- Functional Specifications
- Design Specifications
- Technical Specifications
- Risks and Prototypes
- Schedule and Teamwork

Future Meetings

Project Plan

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Future Meetings

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 Objectives
  - Use Cases
- Not Necessarily Complete
- Understandable by End User
- Initial Problem Statement
- Usually Refined

Functional Specifications

- Amazon
  - Leverage Growing Internet Video Watching
  - Market Amazon Products in Contextual and Personalized Ways
- MSUFCU
  - Visualize MSUFCU Members' Spending Habits
  - Send Alerts About Unusual Account Activity
- Whirlpool
  - Annotate and Validate Images of Recipe Ingredients
  - Apply Crowdsourcing and Gamification
  - Target Whirlpool's Yummly App

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
- • Risks and Prototypes
- • Schedule and Teamwork

Future Meetings

Design Specifications

- What's the user experience (UX)?
  - How does a user use it?
  - How does it look and fee?
- Includes
  - Business Process Flow
  - Specific Features
  - 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

- Aptive
  - Enable Scheduling Vehicles for Use
  - Provide Real-Time Access to Vehicle Data
    Support Web, Android and Apple iOS
  - Integrate Apps Into Existing Aptiv Tool
  - Create Complete Documentation
- Meijer
  - Capture Essential Product Data
  - Select and Implement Tracking Mechanism
  - Establish Trigger/Alert Mechanisms
  - Ensure Proper Movement of Products
  - Get Close-Dated Products For Sale Quickly
  - Identify Recalled Products
  - Store Data in Blockchain
- United Airlines
  - Build Database of Complete Kits
  - Support Mobile Device Cameras
  - Apply Computer Vision
  - Send Notifications
  - Provide Companion Administrative Web Portal

Mostly Understandable by End User

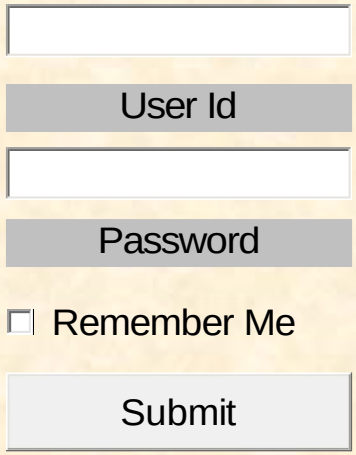
Screen Mockups

- 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…
- NOT Screen Captures of Other Software

Screen Mockups

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

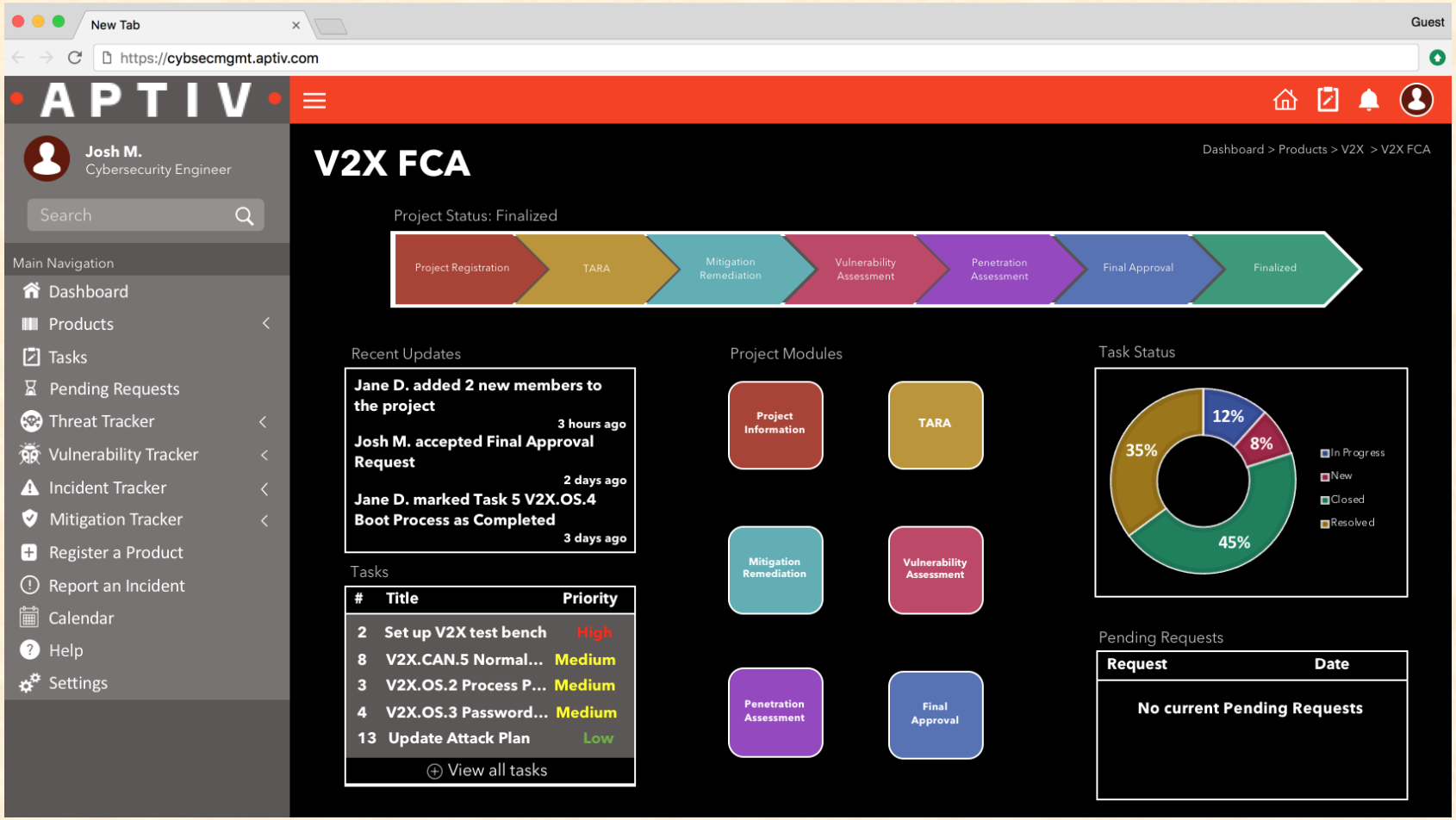
Login Page



Landing Page

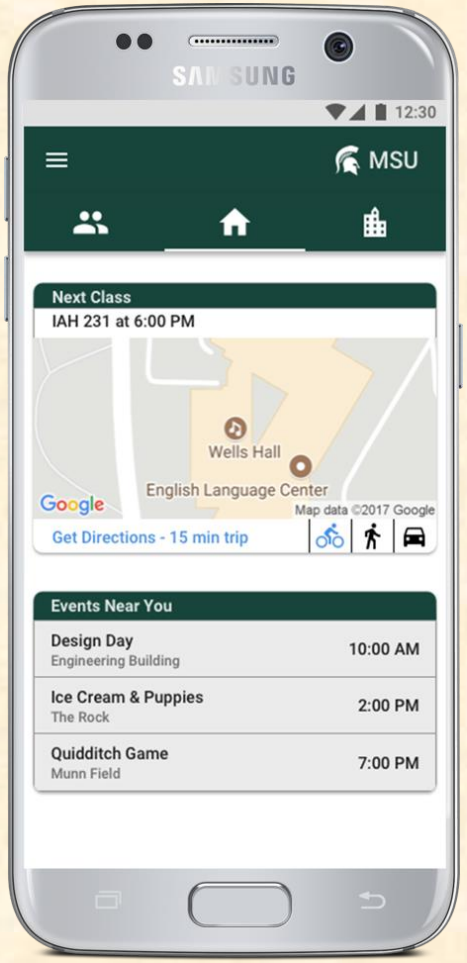
Welcome to Our App

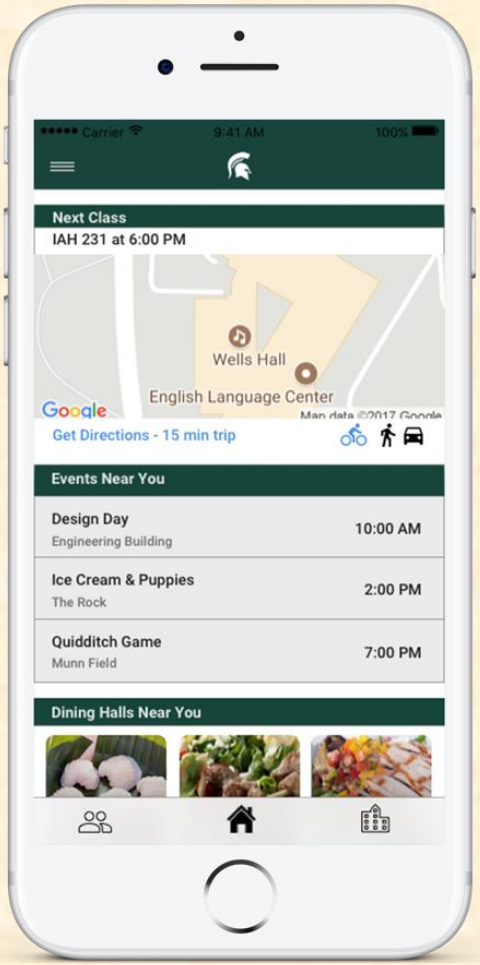
Screen Mockup Example



Screen Mockups Example

Screen Mockups Example





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Project Plan

✓Functional Specifications

✓Design Specifications

➢Technical Specifications

- Risks and Prototypes
- Schedule and Teamwork

Future Meetings

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

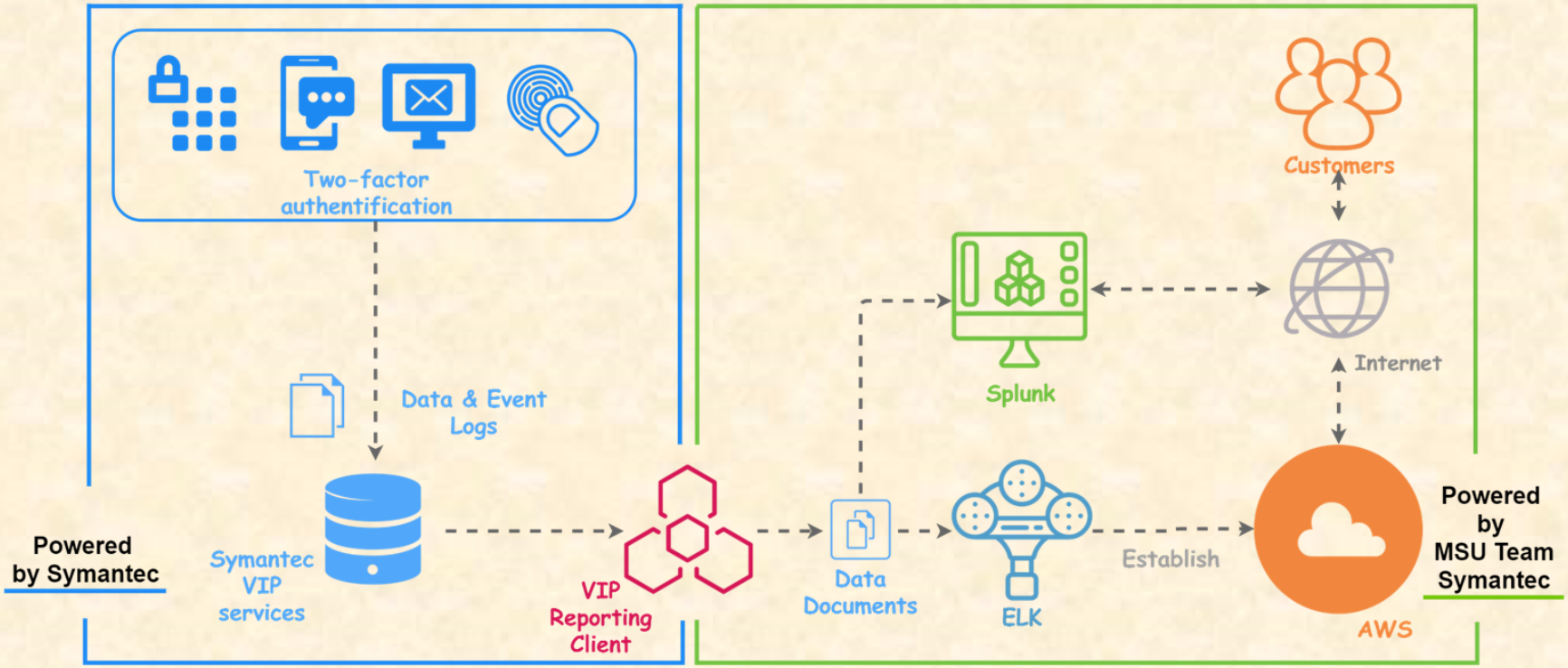
- Includes Things Like…
  - Object Models and Class Diagrams
  - UML Diagrams
  - Pseudo Code
  - Function Prototypes
  - Schedule
  - Test Plan
  - Risk Analysis
  - Etc…
- Probably Not Understandable by End User
- Usually Refined

Technical Specifications

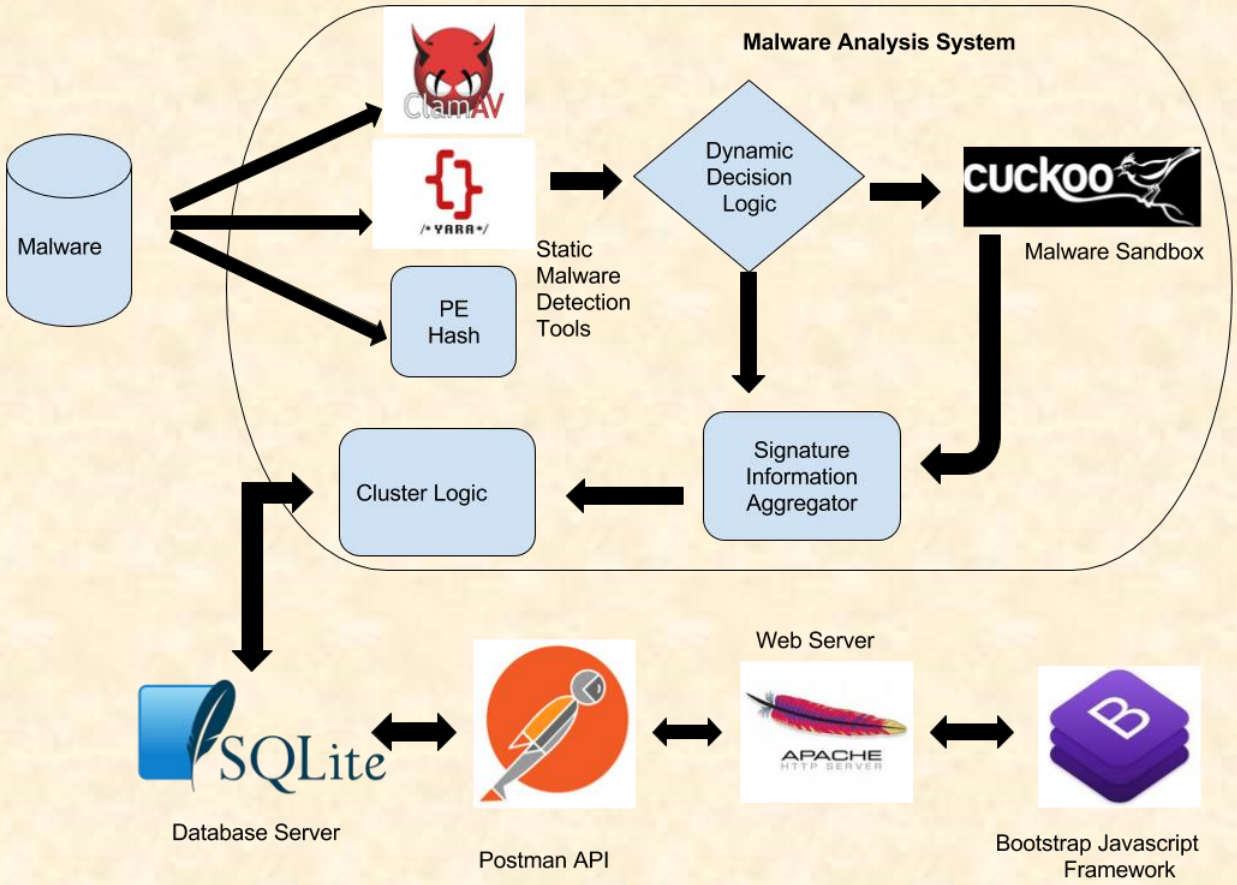
- Ford
  - Java / Spring Framework
  - Python Natural Language Toolkit
  - Slack
  - HTML5
  - RESTful Web Services
- Mozilla / Firefox
  - Firefox Code Base (~ 51M Lines)
  - CSS / XUL / XBL / HTML
  - C++ / JavaScript
  - Fluent
  - Document Type Definition (DTD)
  - Mercurial
  - IRCCloud
  - Bugzilla
  - Phabricator
  - Microsoft Windows, Apple macOS and Linux
- Proofpoint
  - Cuckoo (Malware Sandboxing)
  - Suricata (Intrusion Detection System)
  - Operating Systems and Compilers
  - Reverse Engineering
  - Python / JavaScript
  - MySQL

Probably Not Understandable by End User

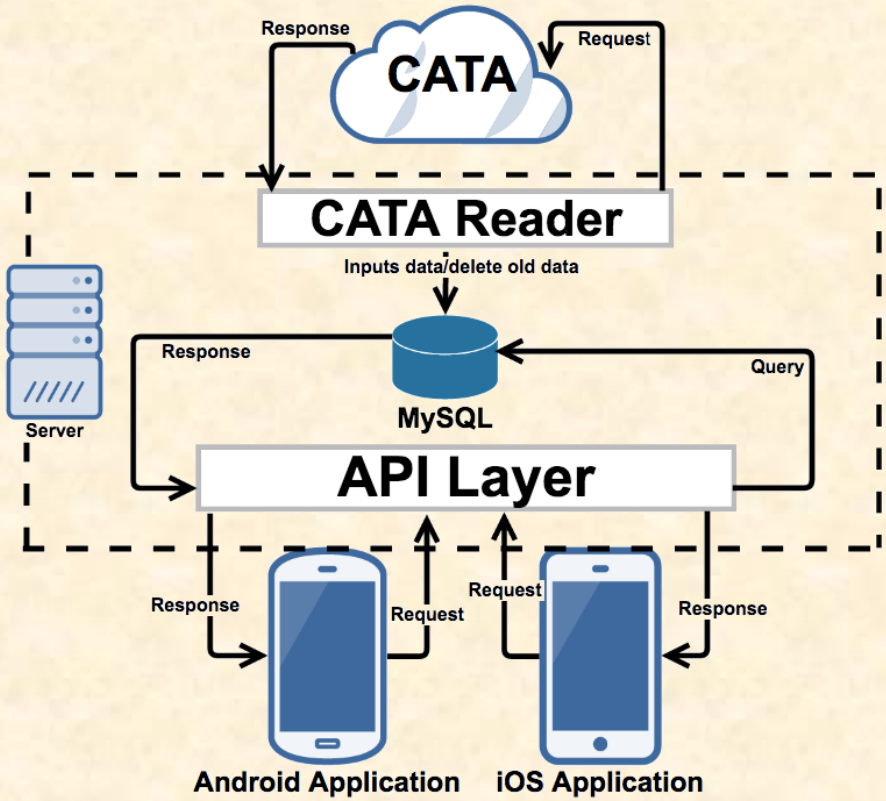
System Architecture Example



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

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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
  - Schedules > Major Milestones
    - 09/17: Status Report Presentations
    - 09/24: Project Plan Presentations
    - 10/15: Alpha Presentations
    - 11/12: Beta Presentations
    - 12/03: Project Videos
    - 12/05: All Deliverables
    - 12/06: Design Day Setup
    - 12/07: Design Day
    - 12/11: Project Videos
  - 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
  - Included with Windows 10 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
  - 12:01 a.m., Monday, September 24 (Think Sunday night.)
  - ~ 2.5 Weeks
- In Class Formal Presentations ← Get on it, now!
  - September 24 – October 3
  - PowerPoint Template Provided

Resources on the Web

- Other Links > Downloads
  Project Plan Examples
  - Fall 2017
    - Team Michigan State University
    - Team MSUFCU
  - Spring 2018
    - Team Herman Miller
    - Team Proofpoint
- High Resolution Sponsor Logo

  www.capstone.cse.msu.edu/2018-08/projects/<sponsor>/images/originals/sponsor-logo.png
  http://www.capstone.cse.msu.edu/2018-08/projects/auto-owners/images/originals/sponsor-logo.png

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