

# 01/10: Project Plan

## The Capstone Experience

Dr. Wayne Dyksen

Department of Computer Science and Engineering

Michigan State University

Spring 2019



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

# Project Plan

---

- Functional Specifications
  - Design Specifications
  - Technical Specifications
  - Risks and Prototypes
  - Schedule and Teamwork
- } Future Meetings



# Project Plan

## ➤ Functional Specifications

- Design Specifications
- Technical Specifications

• Risks and Prototypes

• Schedule and Teamwork

} 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
  - Provide Customer Support
  - Utilize Collaborative Browser Sharing
- MSUFCU
  - Provide Budgeting Assistance
  - Utilize Chatbot Technologies
- Union Pacific
  - Build Game Hosting System
  - Target Railroad Training Games

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 feel?
- 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

- Evolutio
  - Build a User-Friendly Web Application
  - Support Export and Import of Configurations
  - Provide Environment Migration Utility
  - Support Both New and Existing Environments
  - Explore Use of Natural Language Processing
- Michigan State University ITS
  - Organize Groups Based on Calendars
  - Find Available Meeting Times
  - Support Various Messaging Platforms
  - Provide Cloud Storage for Collaboration
  - Build Infrastructure Using Amazon Web Services
  - Deliver Production Ready System
- United Airlines
  - Web and Apple iOS Apps
  - Enable Course Request by Location
  - Track Instructor Times and Student Attendance
  - Provide Class List of Students
  - Optimize Course Scheduling
    - Number of Classes Per Location
    - Instructor Travel and Overtime
    - Fixed Courses
  - Implement Various Roles

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

---

User Id

Password

☐ Remember Me

Submit



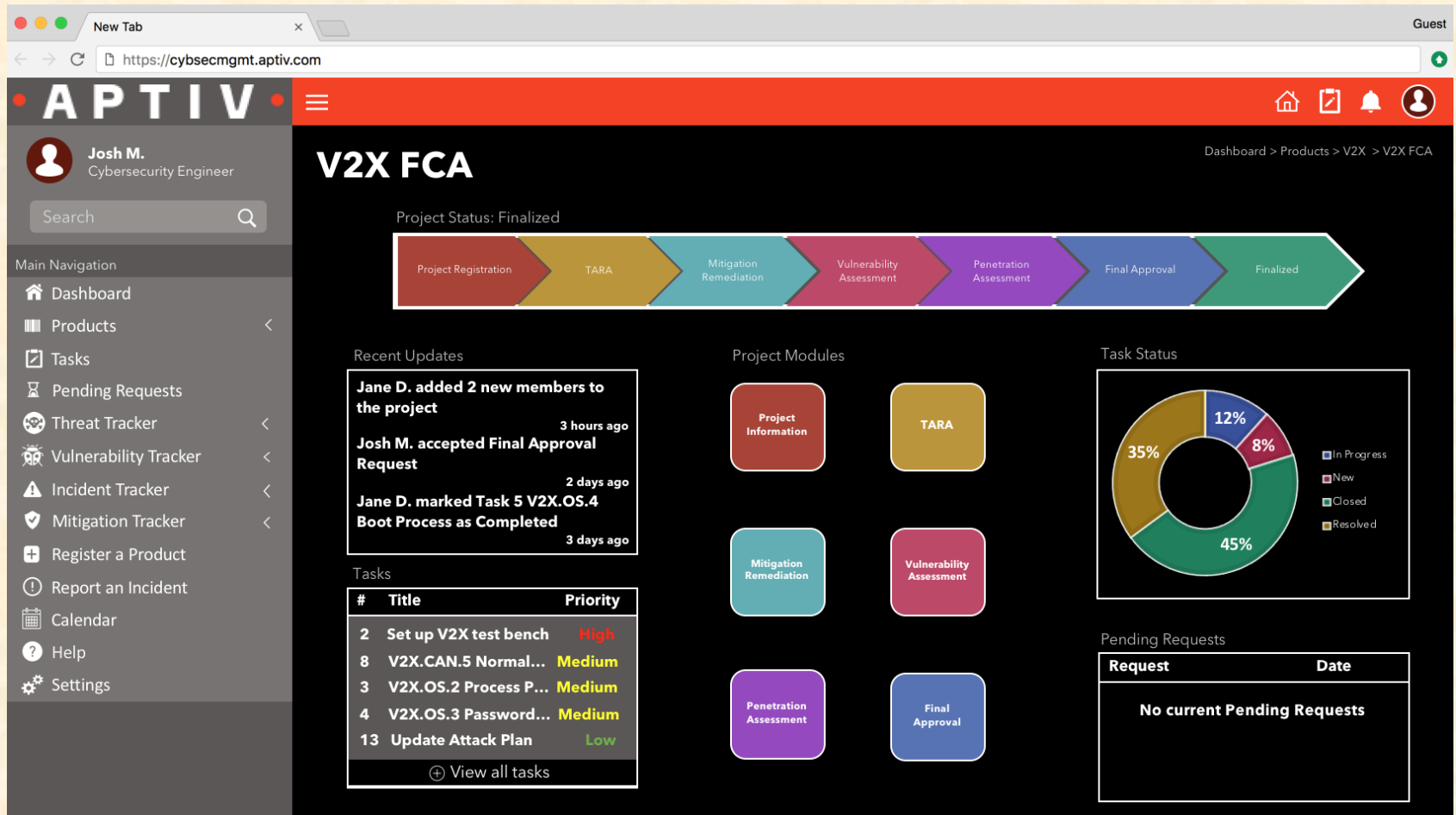
# Landing Page

---

**Welcome to Our App**



# Screen Mockup Example

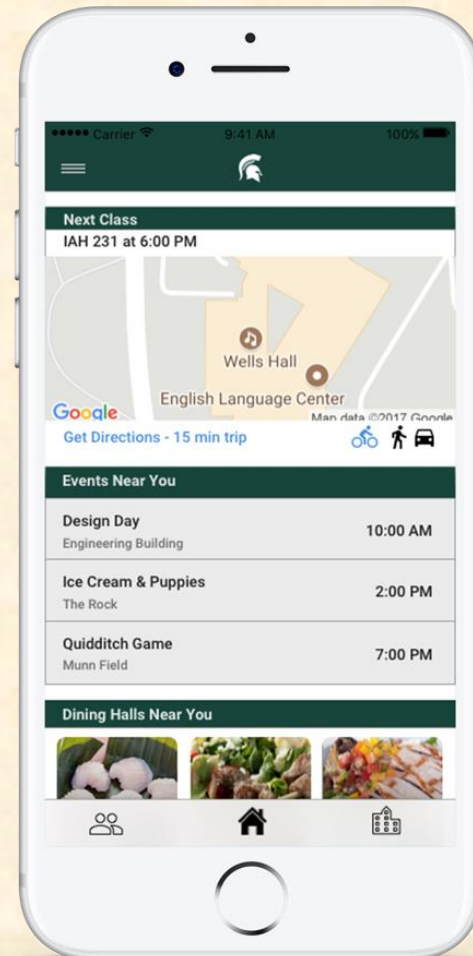
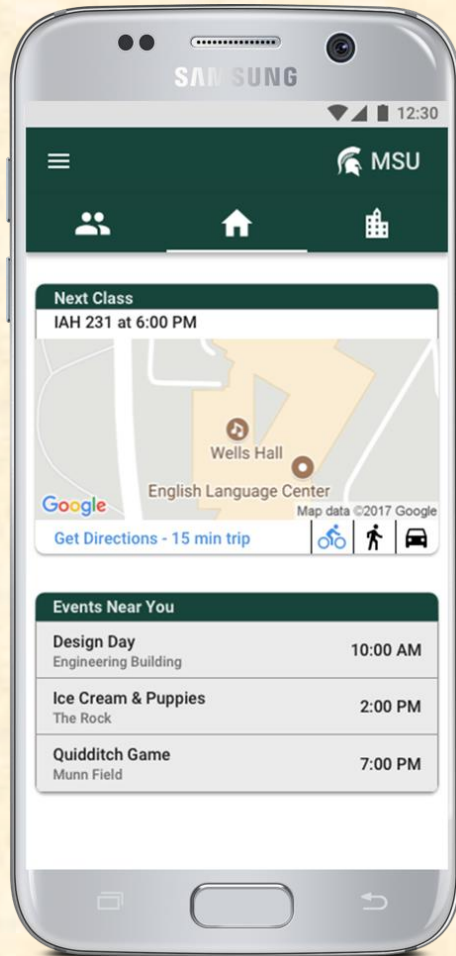


# Screen Mockups Example





# Screen Mockups Example





# Design 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



# 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



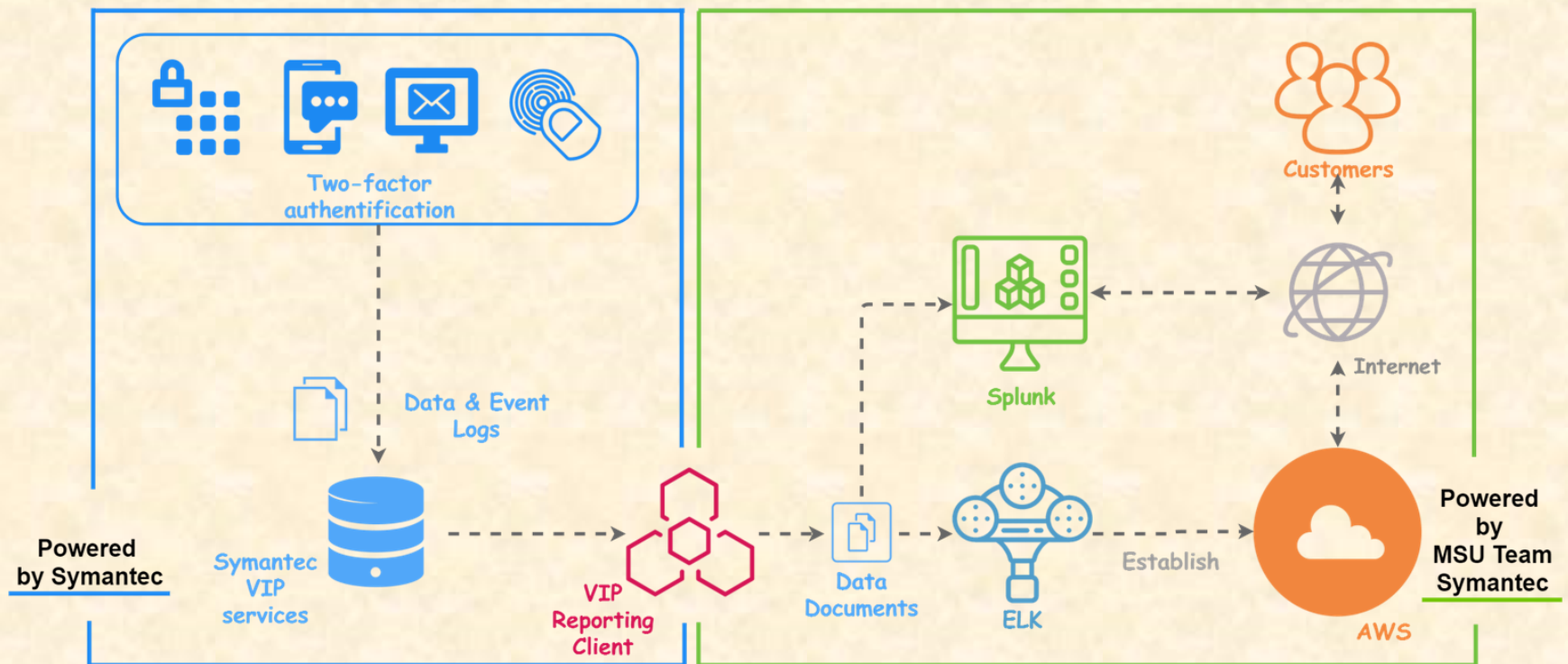
# Technical Specifications

- Ford
  - OAuth 2.0
  - Amazon Cognito
  - Apple iOS and Google Android
  - CSS / HTML / JavaScript / PHP
  - Snipe-IT
  - Raspberry Pi
  - Apache Kafka
  - Amazon Web Services (AWS) Kinesis
  - RGB Light Strip
  - 12V Actuated Lock
- Mozilla / Firefox
  - Fluent
  - DTD / .properties Files
  - JavaScript / Wasm (Web Assembly)
  - XUL / XBL / HTML
  - Rust
  - Mercurial
  - IRCCloud (IRC)
  - Bugzilla
  - Phabricator
  - Windows / macOS / Linux
- Proofpoint
  - Cuckoo (Malware Sandboxing)
  - Suricata (Intrusion Detection System)
  - Steganography
  - Malware Machine Learning
  - Operating Systems and Compilers
  - Reverse Engineering
  - CSS / HTML / JavaScript / PHP
  - Python
  - MySQL

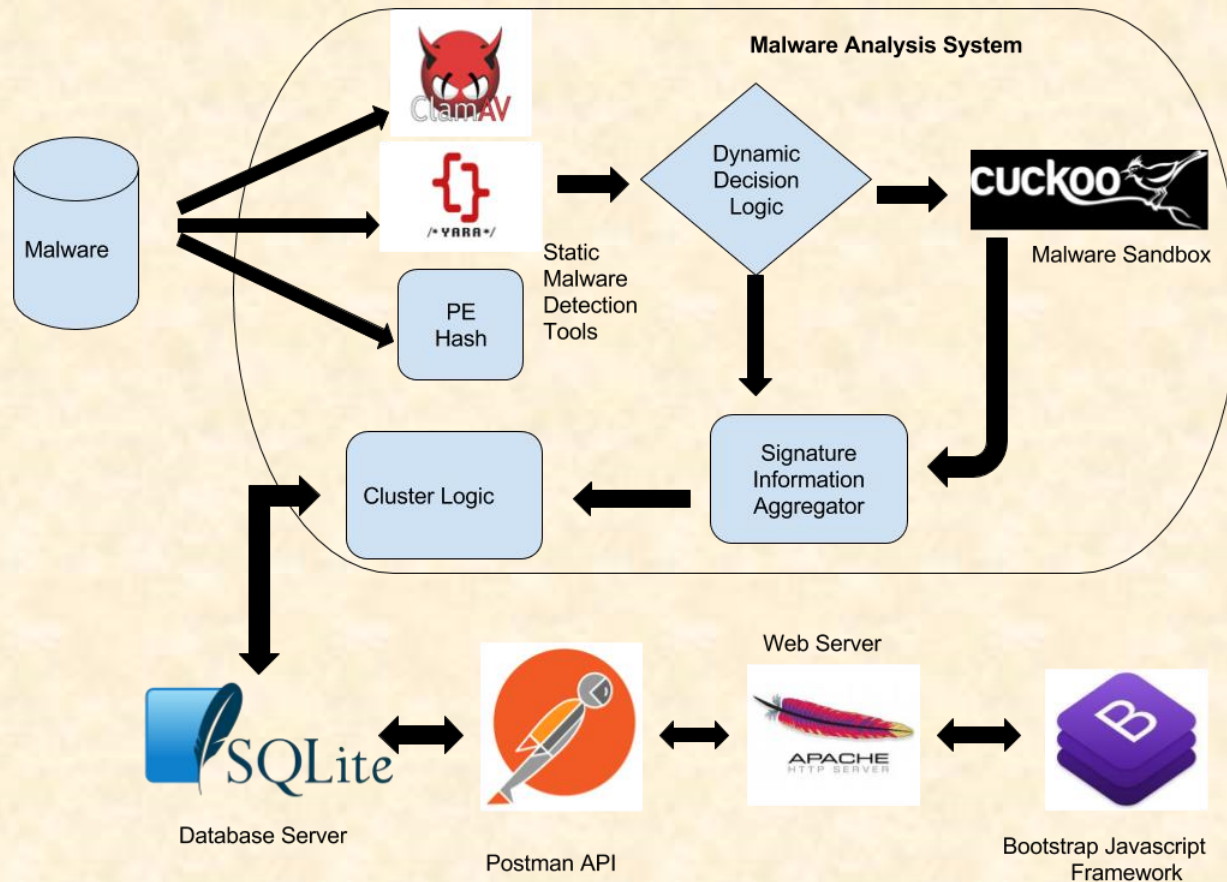
Probably Not  
Understandable  
by End User



# System Architecture Example

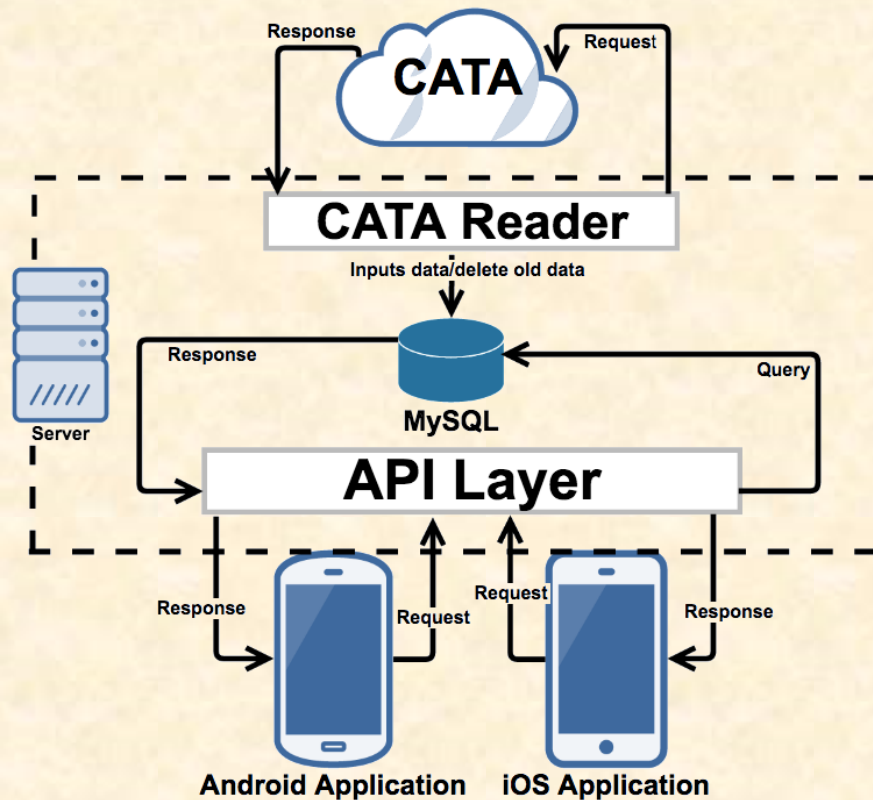


# System Architecture Example





# 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

# Technical 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!

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

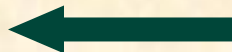
[1 of 4]

- 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
    - 01/17: Status Report Presentations
    - 01/29: Project Plan Presentations
    - 02/19: Alpha Presentations
    - 04/02: Beta Presentations
    - 04/23: Project Videos
    - 04/24: All Deliverables
    - 04/25: Design Day Setup
    - 04/26: Design Day
    - 05/02: 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...

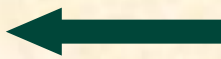
- Requirements
  - Functional
  - Design
  - Technical Requirements
    - Operating Systems
    - Programming Languages and Environments
    - Web Technologies
    - Etc...
  - Legacy
- Milestones
- Etc...

(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., Thursday, January 29 (Think Monday night.)
  - ~ 2.5 Weeks
- In Class Formal Presentations  Get on it, now!
  - January 29 – February 7
  - PowerPoint Template Provided



# Resources on the Web

- Other Links > Downloads

## Project Plan Examples

- Spring 2018

- Team Herman Miller
- Team Proofpoint

- Fall 2018

- Team Herman Miller
- Team Proofpoint

- High Resolution Sponsor Logo

[www.capstone.cse.msu.edu/2019-01/projects/<sponsor>/images/originals/sponsor-logo.png](http://www.capstone.cse.msu.edu/2019-01/projects/<sponsor>/images/originals/sponsor-logo.png)

<http://www.capstone.cse.msu.edu/2019-01/projects/auto-owners/images/originals/sponsor-logo.png>



# Project Plan

---

✓ Functional Specifications

✓ Design Specifications

✓ Technical Specifications

• Risks and Prototypes

• Schedule and Teamwork

} Future Meetings



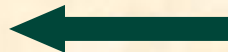
# What's ahead?

[1 of 3]

- Team Photos
  - Informal
    - After Meeting Today: Teams Amazon – Michigan State University HPCC
    - After Meeting Monday: Teams Michigan State University ITS – Volkswagen
  - Formal
    - After Each Project Plan Presentation
    - Dress code for presenting teams is business casual.
- Setup
  - Team Machines
    - Dell Server If Needed (Ask TAs)
    - Apple iMacs (with Windows 10 VM)
  - Team Software
    - Microsoft Office
      - ❖ Word and PowerPoint
      - ❖ Microsoft Windows Version
    - Web Server
    - Code Repository
    - SDK's
    - Etc.

Required.

Use Windows 10 VM.



# What's ahead?

[2 of 3]

- All-Hands Meetings
- ~~01/08: Capstone Overview~~
- ~~01/10: Capstone Overview~~
  - ~~Project Plan~~
  - Team Photos: Teams Amazon – Michigan State University HPCC
- 01/15: Risks and Prototypes
  - Team Photos: Teams Michigan State University ITS – Volkswagen
- 01/17: Team Status Report Presentations
- 01/22: Schedule and Teamwork
- 01/24: Team Status Report Presentations
- 01/29: Team Project Plan Presentations
- 01/31: Team Project Plan Presentations
- 02/05: Team Project Plan Presentations
- 02/07: Team Project Plan Presentations



# What's ahead?

[3 of 3]

- Team Status Report Presentations
  - [PowerPoint Template](#)
  - Due 12:01 a.m., Thursday, January 17  
(Think Wednesday night.)
  - One Week
  - Email to Dr. D.
    - Subject: Team <Company Name>: Status Report Presentation  
Subject: Team Auto-Owners: Status Report Presentation
    - Attachment: team-[team-name]-status-report-presentation.ppt  
Attachment: team-urban-science-status-report-presentation.ppt
- Dr. D. Will Combine Into Single PowerPoint
  - To Speed Things Up During Meeting
  - Do NOT Modify Master Slide
  - Must Use Windows Version of Microsoft Office
- Each Team Presents
  - Using Dr. D.'s Laptop
  - At Most 3.0 Minutes (Rehearse Timing)
  - Single or Multiple Presenters (Your Choice)

← Get on it now!





# Status Report Presentation

Team [Team Name]

The Capstone Experience

Dr. Wayne Dyksen

Department of Computer Science and Engineering

Michigan State University

Spring 2019



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



# Status Report Instructions

- Use the Microsoft Windows version of PowerPoint.
- Required Template
  - Do not edit the master slides.
  - Do not change the organization or number of slides.
  - Make your presentation fit within these four slides.
- Content
  - For the slide titles, replace [Team Name] with your company name as in “Team Auto-Owners” and [Project Title] by the project title posted online.
  - All presentations will be posted on the course web site so do not include company confidential information or anything that your client would not want posted.
  - Delete this slide from the presentation.
- Presenting
  - The order of the presentations during our meeting will be team numerical order.
  - The time limit for your presentation is 3 minutes, which will be strictly enforced. Practice your presentation to ensure that you will finish within the allotted time.
- Submission by Email ← **Read this carefully.**
  - All presentations are due via email to me and to your client by 12:01 a.m., Thursday, January 17. (Think Wednesday night.) Send your presentation to your client in a separate email; do not cc me.
  - For subject, use “Team [Team Name]: Status Report Presentation” as in “Team Urban Science: Status Report Presentation”.
  - Attach the PowerPoint source file named “team-[team-name]-status-report-presentation.pptx” as in team-auto-owners-status-report-presentation.pptx. Use all lower case and replace blanks by dashes in your filename.
  - Include some (professional) text in the body to avoid being sent to my junk folder.





# Team [Team Name]

## Status Report

[1 of 4]

### [Project Title]

- Project Overview

- Description Point 1
- Description Point 2
- Description Point 3
- Description Point 4

- Project Plan Document

- Status Point 1
- Status Point 2
- Status Point 3
- Status Point 4

Include status information.

What's the status of your project plan document?

Have you started it?

How much have you written?

What percentage complete is it?

**Delete this textbox and the brace to the left.**



# Team [Team Name]

## Status Report

[2 of 4]

### [Project Title]

- Server Systems / Software
  - Description &/or Status Point 1
  - Description &/or Status Point 2
  - Description &/or Status Point 3
- Development Systems / Software
  - Description &/or Status Point 1
  - Description &/or Status Point 2
  - Description &/or Status Point 3

Include status information.  
Are all systems up and running?  
Have you tested everything?  
**Delete this textbox and the  
brace to the left.**



# Team [Team Name]

## Status Report

[3 of 4]

### [Project Title]

- Client Contact
  - Status Point 1
  - Status Point 2
- Team Meetings
  - Status Point 1
  - Status Point 2
- Team Organization
  - Description Point 1
  - Description Point 2

Include status information.

Have you talked with/met with your client?

Have you scheduled a weekly conference call? When?

Have you scheduled an in-person meeting? When?

How many times has your team met so far?

Have you scheduled team meetings? How often?

**Delete this textbox and the brace to the left.**



# Team [Team Name]

## Status Report

[4 of 4]

### [Project Title]

#### Risks

- Risk 1
  - Description
  - Mitigation
- Risk 2
  - Description
  - Mitigation
- Risk 3
  - Description
  - Mitigation
- Risk 4
  - Description
  - Mitigation

