MICHIGAN STATE UNIVERSITY

01/11: Project Plan

The Capstone Experience

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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
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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
  - Play Podcasts
  - Show Listeners Related Amazon Products
  - Support Listener's Favorite Content Producer
- MSUFCU
  - Offer Personalized Financial Coaching Services
  - Use Digital Assistant
- Yello
  - Evaluate Video Interview Automatically
  - Include Sentiment and Emotional Analysis

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

- Auto-Owners
  - Support Image Import From Spherical Camera
  - Classify the Environment
  - Detect and Identify Objects
  - Create Virtual Environment
  - Provide Playback, Navigation and Inspection
  - Build and Display Inventory View
- Dow
  - Support Two Levels of Difficulty
  - Handle Various Scenarios
  - Manage Player Points
  - Enable Interaction with Game Objects
  - Use Audio to Indicate When Action Needed
  - Simulate Different Weather Conditions
  - Provide Feedback to Player at Game End
- Urban Science
  - Handle Various Arm Controls
  - Provide Voice Control
  - Implement Self-Leveling with Calibration
  - Support Apple iOS and Google Android
  - Collect Usage Statistics

Mostly Understandable by End User

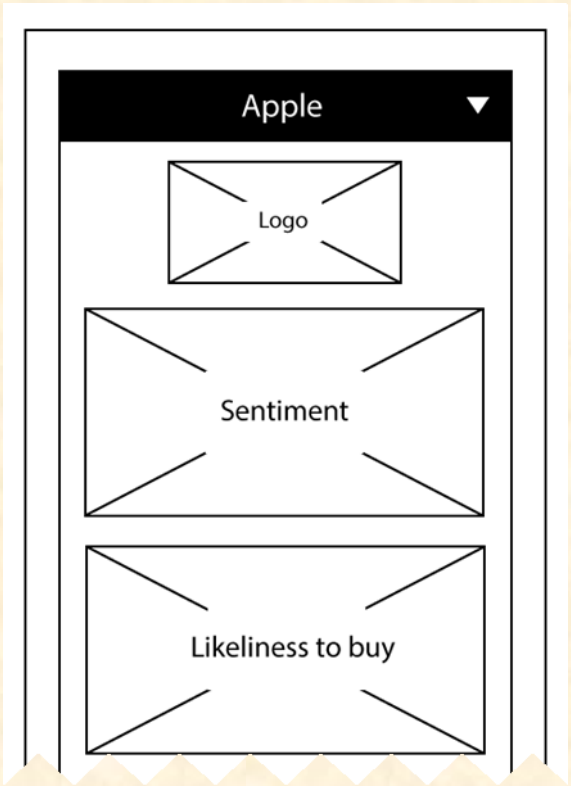
Screen Mockups

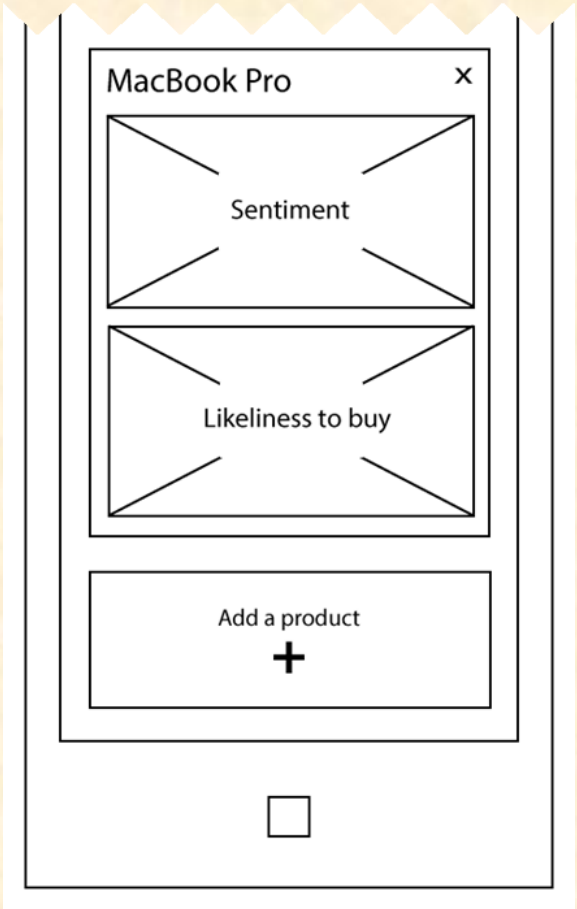
- User Interface Only
  - Shows Layout, Buttons, Pull-Downs, Etc…
  - Non-Functional
  - No Back End
- Helpful for Developing
  - Functional Specifications
  - Look-and-Feel
  - Use Cases
- Can Create with…
  - Pencil and Paper
  - PowerPoint (Developer View)
  - Photoshop
  - Etc…
- NOT Screen Captures of Other Software

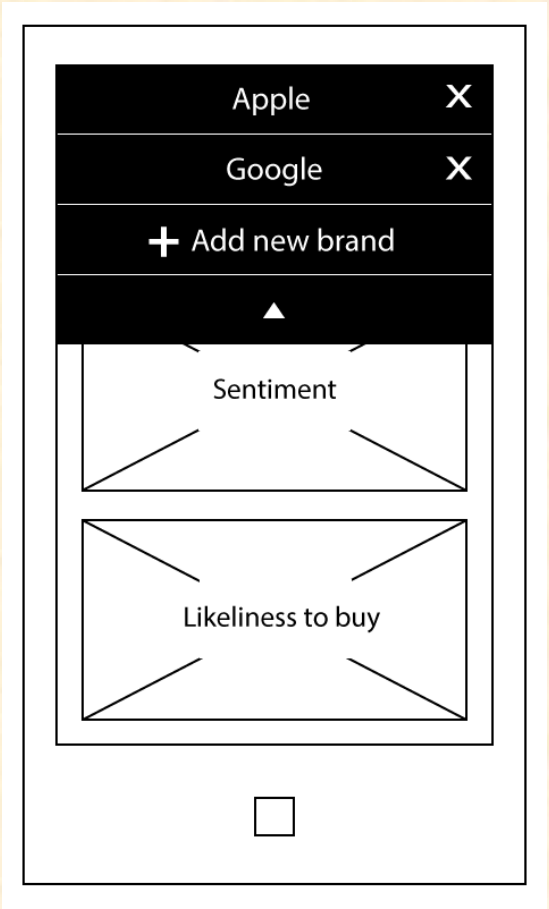
Screen Mockups

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

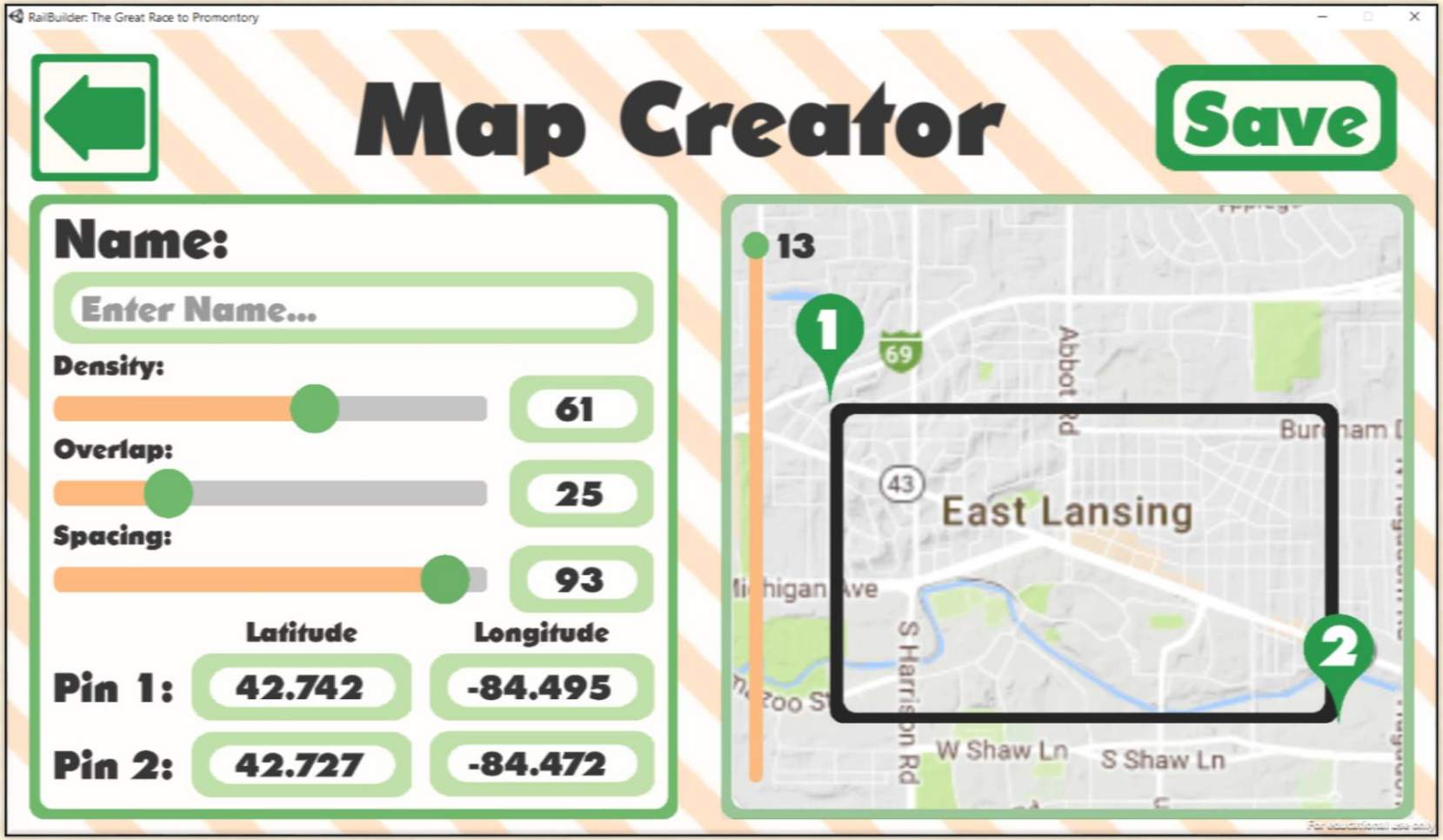
Screen Mockup Example



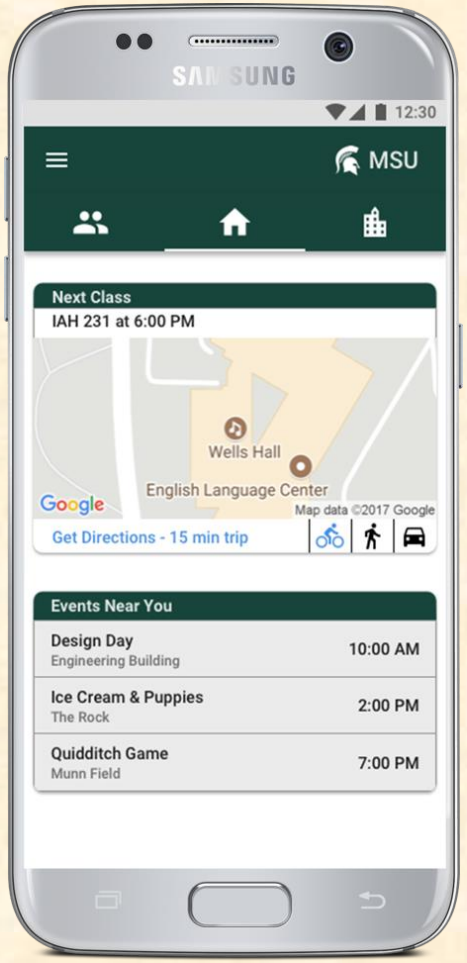


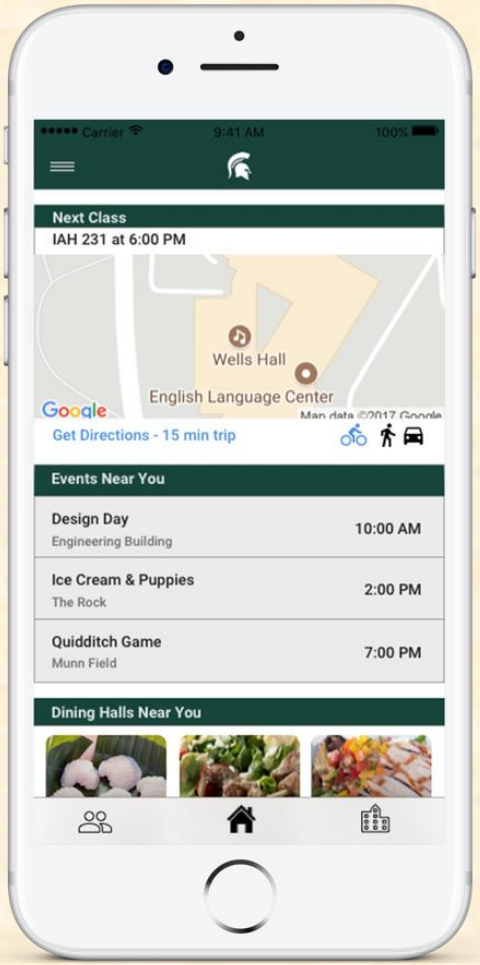


Screen Mockups Example



Screen Mockups Example





Design Specifications
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Project Plan

✓Functional Specifications

✓Design Specifications

➢Technical Specifications

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- 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

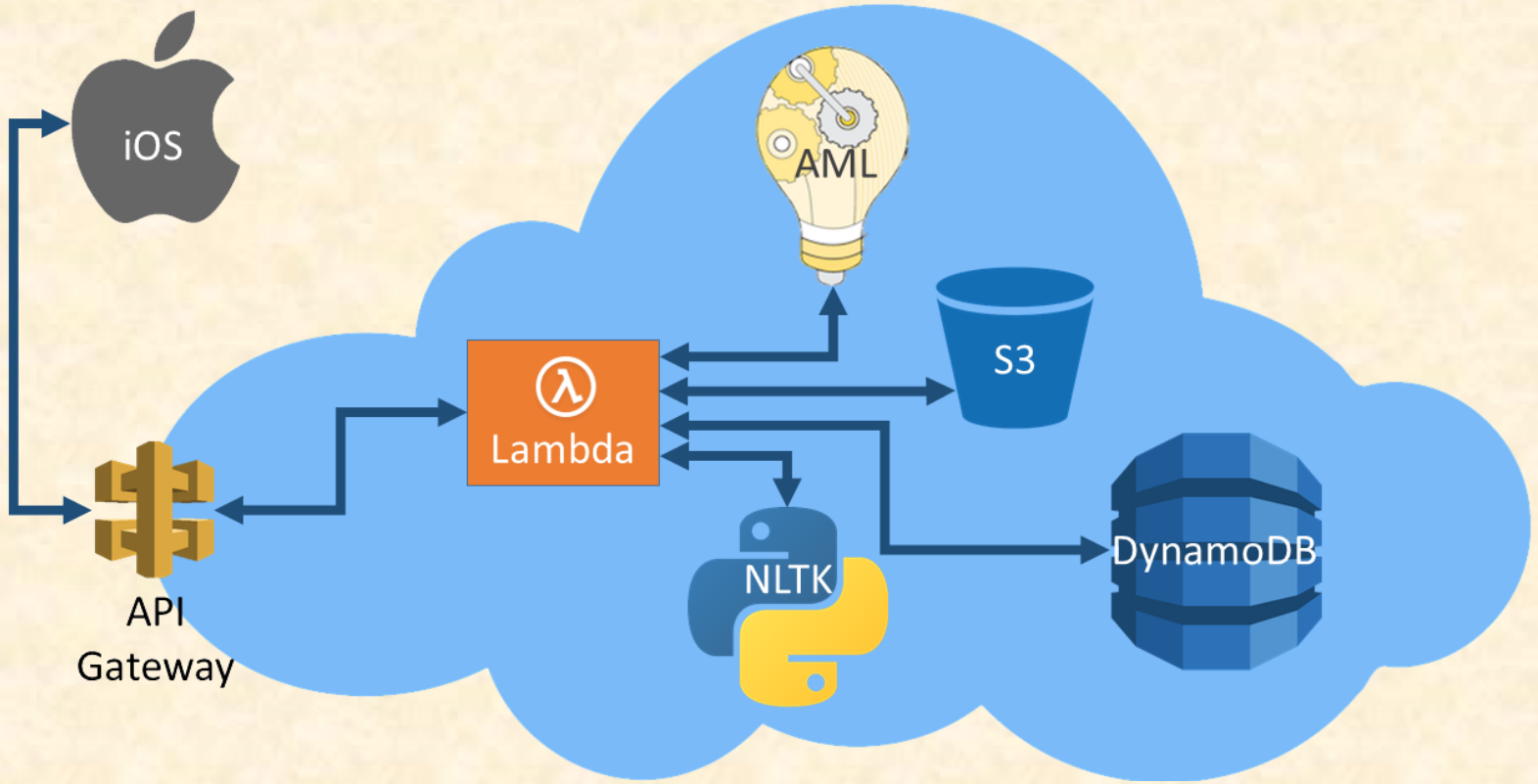
- Includes Things Like…
  - Object Models and Class Diagrams
  - UML Diagrams
  - Pseudo Code
  - Function Prototypes
  - Schedule
  - Test Plan
  - Risk Analysis
  - Etc…
- Probably Not Understandable by End User
- Usually Refined

Technical Specifications

- Michigan State University
  - Apple iOS / Swift
  - Google Android / Java or Kotlin
  - Amazon Web Services (AWS)
  - iBeacons
- Mozilla / Firefox
  - CSS
  - JavaScript
  - Python
  - XUL / XBL / HTML
  - Mercurial
  - IRCCloud
  - Bugzilla
  - Review Board
  - Microsoft Windows
  - Apple macOS
  - Linux
- Phoenix Group
  - CSS / HTML / PHP / JavaScript
  - Google Android Tablets and Phones / Java
  - Microsoft Bot Framework
  - Microsoft Language Understanding Intelligent Service (LUIS)
  - Docker
  - Kuberenetes
  - MongoDB
  - Optical Character Recognition (OCR)

Probably Not Understandable by End User

System Architecture Example



System Architecture Example

Update each week

Converts to element tree

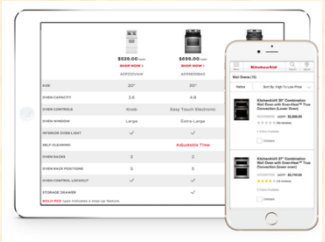
Product catalog

Parse into SQL server

Server Architecture

- SQL Based
- Catalog Table
- Secured by SSH

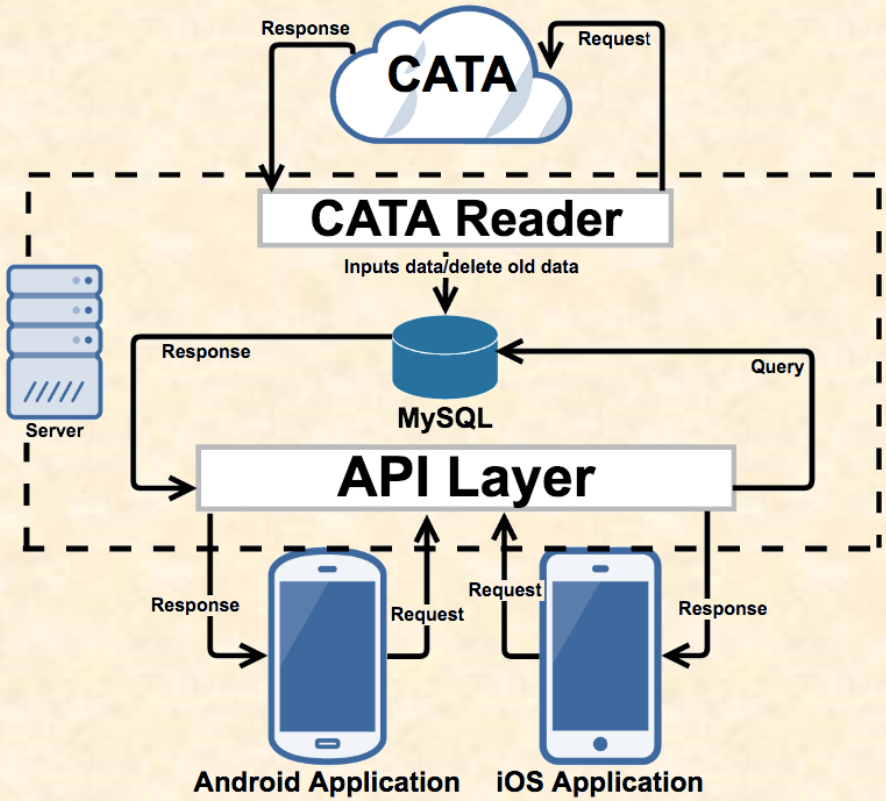
Mobile Devices



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

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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
    - 01/18: Status Report Presentations
    - 01/30: Project Plan Presentations
    - 02/20: Alpha Presentations
    - 04/03: Beta Presentations
    - 04/23: Project Videos
    - 04/25: All Deliverables
    - 04/26: Design Day Setup
    - 04/27: Design Day
    - 05/03: 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
  - 4:00 a.m., Tuesday, January 30
  - ~ 2.5 Weeks
- In Class Formal Presentations ← Get on it, now!
  - January 30 – February 8
  - PowerPoint Template Provided

Resources on the Web

- Other Links > Downloads
  Project Plan Examples
  - Fall 2016
    - Team Amazon
    - Team Rook
    - Team Whirlpool
  - Spring 2017
    - Team Microsoft
    - Team MSUFCU
    - Team TechSmith
- High Resolution Sponsor Logo

  www.capstone.cse.msu.edu/2018-01/projects/<sponsor>/images/originals/sponsor-logo.png
  http://www.capstone.cse.msu.edu/2018-01/projects/auto-owners/images/originals/sponsor-logo.png

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