09/04: Project Plan

The Capstone Experience

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Project Plan

- 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
• Starting With
  ▪ Shared Vision?
  ▪ No Formal Documents?
  ▪ Minimal Documents?
  ▪ Incomplete Problem Statement?

• Understandable by End User
• Initial Problem Statement
• Usually Refined
Functional Specifications

• Auto-Owners
  ▪ Manage Independent Insurance Adjusters
  ▪ Handling Claims Resulting from Catastrophes
    o Hurricanes
    o Tornados
    o Earthquakes
  ▪ Remotely, At Site of Catastrophe

• GM
  ▪ Provide Information About a Particular Car
    o Make and Model
    o Manufacturer’s Suggested Retail Price
    o Available Options
    o Location of Nearest Dealer
  ▪ By Pointing Mobile Phone or Tablet Camera

• MSUFCU
  ▪ Enable Mini MSUFCU Branch
  ▪ At Local Elementary and Middle Schools
  ▪ Accept Deposits from Students
  ▪ Run by Parent Volunteers

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

• 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

- Boeing
  - 3-D Graphical Visualization
  - First Person View of Assembly Workers
  - Inverse Kinematic Algorithms
  - Quality Metrics
- TechSmith
  - Collect Information Via
    - TechSmith Smart Player
    - Web Browser Add-On
    - Microsoft User Interface Automation
  - User Provided Activity Hints
  - Shareable Activity Lists
  - Learning Activity Reporting Web Site
- Whirlpool
  - Native Apple iPad and Google Android Tablet Apps
  - Use Geolocation and Geofencing
  - Support Various SmartZones
    - Vacation
    - Comfort
    - AlertMe
    - RemindMe
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 Mockups Example
Screen Mockup Example

[Diagram of screen mockup example]
Design Specifications
Interactions With Your 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

• GM
  ▪ Argon Web Browser
  ▪ ARToolKit
  ▪ ATOMIC Authoring Tool
  ▪ ArUco
  ▪ IQ Engines
  ▪ PAR Works

• Spectrum Health
  ▪ CSS, HTML5
  ▪ JavaScript, Ajax
  ▪ jQuery, jQuery Mobile
  ▪ Microsoft C#, ASP.NET MVC 4.0
  ▪ Microsoft Internet Information Services (IIS) 7.0
  ▪ RESTful Web Services

• Whirlpool
  ▪ Apple iOS 6.x or Higher
  ▪ Android Jelly Bean 4.2 or Higher
  ▪ PhoneGap (Optional)
  ▪ Mapping APIs (for Showing Locations of Geofenced SmartZones)
  ▪ Whirlpool Connected Appliance APIs

Probably Not Understandable by End User
System Architecture Example

- **Mobile App**
  - Generates token
  - Requests events
  - Registers device

- **MSUFCU Server**
  - Confirms user’s privilege

- **Web App**
  - Handles information

- **Database**

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The Capstone Experience

Project Plan
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
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• 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

• 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.
    o Get agreement with client.
    o Include as first part of project plan.
  ▪ Do design specifications.
    o Get agreement with client.
    o Include as 2nd part of project plan.
  ▪ Do technical specifications.
    o Get agreement with client.
    o 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

• Approach
  ▪ Make Skeleton Document Immediately
    o Will Get You Organized and Focused
    o Include “Under Construction” Sections (Totally Empty)
  ▪ Develop In Parallel When Possible But...
    o Complete Functional First
    o Complete Design Second
    o Complete Technical Third
  ▪ Refine As Needed
  ▪ Assign Sections to Team Members
  ▪ Share with Client
    o Ask For (Specific) Feedback
    o Highlight What’s New
    o Tricky Balance
      ❖ Not Enough?
      ❖ Too Much?

“Is this what you had in mind?”
How To’s

• Schedule
  ▪ Dictated by Course
  ▪ See Major Milestones
    o 09/11: Status Report Presentations
    o 09/16: Project Plan Presentations
    o 10/14: Alpha Presentations
    o 11/11: Beta Presentations
    o 12/02: Project Videos
    o 12/04: All Deliverables
    o 12/05: Design Day Setup
    o 12/06: 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
• “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
    o Operating Systems
    o Programming Languages and Environments
    o Web Technologies
    o Etc...
  ▪ Legacy

• Milestones

• Etc...

(You may explore and propose other ideas.)
Nota Bene: Project Plan

• 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
  ▪ Noon, Monday, September 16
  ▪ Less Than 2 Weeks  Panic!

• In Class Formal Presentations
  ▪ September 16 – September 25
  ▪ PowerPoint Template Provided
Resources on the Web

• Other Links > Downloads
  ▪ Team Auto-Owners
  ▪ Team Meijer
  ▪ Team Spectrum Health

• Other Links > Online Resources
  ▪ W3 Schools
  ▪ iPhone Programming
  ▪ Apache Subversion
  ▪ Etc...

• High Resolution Sponsor Logo
  www.capstone.cse.msu.edu/2013-08/projects/<sponsor>/images/originals/sponsor-logo.png
  www.capstone.cse.msu.edu/2013-08/projects/auto-owners/images/originals/sponsor-logo.png
Project Plan

✓ Functional Specifications
✓ Design Specifications
✓ Technical Specifications

- Risks
- Prototypes
- Schedule

Future Meetings
What’s ahead?

- Team Photos
  - Informal: After Meeting Today
  - Formal: After Each Project Plan Presentation
- Setup
  - Team Machines
    - Dell Server (Ask Malcolm)
    - Apple iMac, MacBook Pro
  - Team Software
    - Microsoft Office
      - Word and PowerPoint
      - Microsoft Windows Version
    - Web Server
    - Code Repository
    - SDK’s
    - Etc.

Required. Get From Malcolm
What’s ahead?

• All-Hands Meetings
  ▪ M, 09/09: Risks and Prototypes
  ▪ W, 09/10: Team Status Reports
  ▪ M, 09/16: Team Project Plan Presentations
  ▪ W, 09/18: Team Project Plan Presentations
  ▪ M, 09/23: Team Project Plan Presentations
  ▪ W, 09/25: Team Project Plan Presentations
  ▪ M, 09/30: Resume Writing and Interviewing
  ▪ W, 10/02: Career Gallery
What’s ahead?

- Team Status Report Presentations
  - **PowerPoint Template**
  - Due Midnight, Tuesday, September 10
  - Less Than One Week
  - Email to Dr. D.
    - Subject: Team <Company Name>: Status Report
    - Subject: Team Auto-Owners: Status Report
    - Attachment: team-<company-name>-status-report-presentation.ppt
    - Attachment: team-urban-science-statue-report-presentation.ppt

- Dr. D. Will Combine Into Single PowerPoint
  - To Speed Things Up During Meeting
  - Do NOT Modify Master Slide Page

- Each Team Presents
  - Using Dr. D.’s Laptop
  - At Most 5 Minutes (Rehearse Timing)
  - Single or Multiple Presenters (Your Choice)
What’s ahead?

• Project Plan Presentations
  ▪ PowerPoint Template
    o Download Now
    o Read the Read Me Slide (Over and Over and Over…)
  ▪ Submission
    o Both Project Plan Document and PowerPoint Slide Deck
    o Due Midnight, Sunday, September 15
    o See Submission Instructions in Template
  ▪ Presenting
    o 3 Teams Per Meeting Over 4 Meetings
    o Schedule Posted Sunday Evening
    o Strict 15 Minute Time Limit
    o Use Team Member Laptop
      ❖ Bring Power Cord
      ❖ Test In Meeting Room (in Advance)
    o Rehearse
    o 5% of Final Grade
    o Business Casual Dress
  ▪ Formal Team Photos
    o Immediately Following Meeting
    o In Capstone Lab

Panic!