01/09: 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

• Boeing
  ▪ Factory Simulation Game
  ▪ Build Paper and Model Airplanes
  ▪ By Team of Humans and Robots
  ▪ Player is Factory “Floor Captain”

• GM
  ▪ Enable Impromptu Meetings
  ▪ In Empty Conference Rooms
    ▪ Find or Check Status
    ▪ Book
  ▪ Using Mobile Devices

• TechSmith
  ▪ Learn and Teach American Sign Language
  ▪ Using Microsoft Surface Tablet App
  ▪ Learner
    ▪ Watches YouTube Videos
    ▪ Records Themselves Signing
  ▪ Teacher
    ▪ Watches Learner’s Video
    ▪ Responds with a Critique

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 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
  ▪ Display Event Information
  ▪ Register for Open Events
  ▪ Respond to Invitations to Restricted Events
  ▪ Provide Mapping and Directions

• Dow
  ▪ Display Corporate News
  ▪ Add and Modify Links
  ▪ Share Document Library
  ▪ Integrate Outlook Tasks or MySite Tasks
  ▪ Display RSS Feeds
  ▪ Information Based on 13 Core Businesses and 5 Functions

• MSUFCU
  ▪ User Experience (UX)
    ○ Easy-to-Use
    ○ Useable by Wide Variety of Users
  ▪ Includes a Calendaring Tool
    ○ Sign Up
    ○ Send Text Message Reminders

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 Mockups Example
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

• EA
  - C++ and C#
  - Android SDK
  - HTML5
  - JavaScript
  - PHP
  - webRTC

• Meijer
  - CSS, HTML5
  - JavaScript, jQuery, jQuery UI
  - Microsoft .NET, ASP.NET, C#
  - Microsoft Communication Foundation (WCF)
  - Microsoft Internet Information Services (IIS)
  - SQL Server

• Whirlpool
  - Java
  - JavaScript
  - SQLite and MySQL
  - HTML5, CSS3
  - PHP or Ruby
  - RESTful Web Services

Probably Not Understandable by End User
System Architecture Example

Key:
- Application: orange
- Language: green
- External API: blue
- External Data: yellow
- Software Interface: red
- User Interface: cyan
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
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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

• 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
  - 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
  - Highlight What’s New
  - Tricky Balance
    - Not Enough?
    - Too Much?

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

• Schedule
  ▪ Dictated by Course
  ▪ See Major Milestones
    ○ 01/23: Status Report Presentations
    ○ 01/28: Project Plan Presentations
    ○ 02/18: Alpha Presentations
    ○ 04/01: Beta Presentations
    ○ 04/22: Project Videos
    ○ 04/24: All Deliverables
    ○ 04/25: Design Day Setup
    ○ 04/26: 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

• “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, January 28
  - Less Than 3 Weeks

- In Class Formal Presentations
  - January 28 – February 6
  - PowerPoint Template Provided

Panic!
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/2013-01/projects/<sponsor>/images/originals/sponsor-logo.png
  www.capstone.cse.msu.edu/2013-01/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
    o Dell Server (Ask Meredith)
    o Apple iMac, MacBook Pro
  ▪ Team Software
    o Microsoft Office
      ❖ Word and PowerPoint
      ❖ Windows Version
    o Web Server
    o Code Repository
    o SDK’s
    o Etc.

• Think About Team Status Report
What’s ahead?

• Team Status Report Presentations
  ▪ PowerPoint Template
  ▪ Due Midnight, Tuesday, January 22
  ▪ Less Than Two Weeks
  ▪ 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)

The Capstone Experience
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