01/14: Project Plan

The Capstone Experience

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

• Understandable by End User

• Initial Problem Statement

• Usually Refined
Functional Specifications

- **Amazon**
  - Unlock Value of Amazon’s Seller Forums Boards
    - 65,000 Questions Per Year
    - 2,100,000 Replies Per Year
  - By Identifying and Classifying Conversations

- **Boeing**
  - Transform Boeing Business Developer’s Business Processes
  - From Multiple Paper-Based Systems to Unified Tablet-Based System
  - Like Pilot’s Electronic Flight Bag

- **MSUFCU**
  - Educate MSU Students
  - On Personal Financial Matters
  - Using Web Technologies

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

- **Amazon**
  - Provide Searchable Breakdown of Topics by Day or Week
  - Track Volume of Topics and Identify Trends
  - Send Alerts When Specific Topic Volume Spikes
  - Visualize Forum Volume by Topics and Terms Over Time

- **Meijer**
  - Lookup Product Via Barcode
  - Determine Product Availability At
    - Local Store (Other Shelves, Backroom, Truck)
    - Other Stores Nearby
    - Distribution Centers
  - Provide Visual Feedback to Meijer Associate
  - Track Location of Meijer Associate in Store
  - Generate Aggregated Analytics on Usage

- **TechSmith**
  - Develop Microsoft Office/Office 365 Apps
    - Collect and Send Tin Can API Statements
      - “I know this.”
      - “I learned this.”
      - “I experienced this.”
    - Present Knowledge Views to User
  - Leverage Learning Activity
    - To Entire Enterprise
    - By Exposing Views of Learning Activity
    - Using Microsoft “Office Graph”

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 Mockup Example
Screen Mockups Example
Design Specifications
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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

• Ford
  ▪ Bluetooth Low Energy (BLE) Beacons
  ▪ iPhone and Android Development (Objective-C, Java)
  ▪ Web Development (CSS, HTML, PHP, JavaScript)
  ▪ Java 2 Platform Enterprise Edition (J2EE)
  ▪ Microsoft SQL Server

• Spectrum Health
  ▪ Web Development (CSS, HTML, PHP, JavaScript)
  ▪ Google AngularJS
  ▪ RedHat Linux and JBoss
  ▪ Microsoft ASP.net
  ▪ Microsoft Internet Information Services (IIS) 7.0
  ▪ REST and SOAP Web Service Layers
  ▪ iBeacon

• Whirlpool
  ▪ Web Development (CSS, HTML, PHP, JavaScript)
  ▪ JavaScript Object Notation (JSON)
  ▪ Responsive Design (Xamarin, C#)
  ▪ RESTful Web Services
  ▪ Whirlpool Cloud Services
  ▪ Microsoft Visual Studio
  ▪ Microsoft SQL Server

Probably Not Understandable by End User
System Architecture Example

The client-side application is capable of running both with and without an internet connection. All form data saved locally for submission at a later time.
System Architecture Example

1. iBeacon
   - App detects user has entered a region where there is a product promotion

2. Slide to view Ad
   - User receives push message about a product in their region of the store

3. User can view advertisement and add to shopping list
   - User can view advertisement and add to shopping list

Flurry
- View is tracked and recorded

Azure
- Track add to shopping list
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
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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
    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 “Is this what you had in mind?”
    o Highlight What’s New
    o Tricky Balance
      ❖ Not Enough?
      ❖ Too Much?
How To’s

• Schedule
  ▪ Dictated by Course
  ▪ See Major Milestones
    o 01/26: Team Status Report Presentations
    o 02/02: Team Project Plan Presentations
    o 02/23: Team Alpha Presentations
    o 04/06: Team Beta Presentations
    o 04/27: Project Videos
    o 04/29: All Deliverables
    o 04/30: Design Day Setup
    o 05/01: 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

- Must Use Windows Microsoft Office
  - Word and PowerPoint
  - Installed by Malcolm
  - Requires Windows 7 or 8 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., Sunday, February 2
  - ~ 2.5 Weeks
- In Class Formal Presentations
  - February 2 – February 11
  - PowerPoint Template Provided

Panic!
Resources on the Web

• Other Links > Downloads
  Project Plan Examples
  ▪ Team Meijer
  ▪ Team Quicken Loans
  ▪ Team Spectrum Health

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

• High Resolution Sponsor Logo
  www.capstone.cse.msu.edu/2015-01/projects/<sponsor>/images/originals/sponsor-logo.png
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Project Plan

✓ Functional Specifications
✓ Design Specifications
✓ Technical Specifications

• Risks
• Prototypes
• Schedule

Future Meetings