09/05: Project Plan

The Capstone Experience

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Fall 2012
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**
  - Make Electronic Deposits Into Annuity Accounts
  - By Annuity Policyholder, Family, and Friends
  - Via Web Apps, Both Classic and Mobile

- **Meijer**
  - Page IT Team Members
  - Via Web App
  - To Address Computer System Issues

- **Spectrum Health**
  - Manage Shortages of Key Medications
  - Chose Best Course of Action
    - Weather the Shortage
    - Seek Additional Stock from the Grey Market
    - Swap the Medication for an Alternative

*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

- **GE Aviation**
  - Intuitive, Easy-to-Use Interface
  - Interactions
    - Translation, Scaling and Rotation
    - Geo-Located Touch Sensitivity
  - Fast and Efficient Image Processing
    - Manipulation Algorithms
    - Data Caching

- **Mozilla**
  - Decluttered View
  - Dimmed or Removed Irrelevant Content
  - Styled Reading Content

- **Quicken Loans**
  - Multimedia Notes
  - Four Primary Inputs
    - On-Screen Keyboard
    - Free Form Drawing
    - Photo and/or Camera
    - Audio
  - Incorporate Metadata

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

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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

- Boeing
  - HTML5
  - JavaScript and JSON (JavaScript Object Notation)
  - Blender (3D Modeling)
  - OpenGL and WebGL
  - DIS (Distributed Interactive Simulation) and WebSockets

- Google
  - Java
  - Android SDK
  - Google App Engine
  - Google Chart Tools
  - Google Protocol Buffers

- Whirlpool
  - CSS, HTML
  - PHP or .NET
  - JavaScript, JSON (JavaScript Object Notation)
  - Java
  - Microsoft SQL Server
  - RESTful Web Services

Probably Not Understandable by End User
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

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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.
    ▪ 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

• 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?

The Capstone Experience

Project Plan

24
How To’s

• Schedule
  ▪ Dictated by Course
  ▪ See **Major Milestones**
    o 09/12: Status Report Presentations
    o 09/17: Project Plan Presentations
    o 10/15: Alpha Presentations
    o 11/05: Beta Presentations
    o 12/03: Project Videos
    o 12/05: All Deliverables
    o 12/06: Design Day Setup
    o 12/07: 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, September 17
  ▪ Less Than 2 Weeks Panic!

• In Class Formal Presentations
  ▪ September 17 – September 26
  ▪ 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/2012-08/projects/<sponsor>/images/originals/sponsor-logo.png
  www.capstone.cse.msu.edu/2012-08/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
    o Dell Server (Ask Meredith)
    o Apple iMac, MacBook Pro
  ▪ Team Software
    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, September 11
  ▪ Email to Dr. D.
    o Subject: Team <Company Name>: Status Report
      Subject: Team Auto-Owners: Status Report
    o 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)
09/10: **Risks and Prototypes**

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