01/11: **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 Continuing Education and Certification
  - For Auto-Owners Associates Throughout the Enterprise
  - Customize and Extend Moodle LMS

- **GE Aviation**
  - Display Weather Maps
  - For Aviation Industry
  - On Mobile Devices
    - Apple iPad
    - Google Android Tablets

- **Plex Systems**
  - Design Labels
  - For Manufacturing Companies
  - To Label Products For End-Customers

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

- **Dow**
  - Web-Based Dashboard
  - Display Water Data, Basin Names and Stressed Areas
  - View by Sites or Geographical Regions
  - Filter by Water Stressed Basins
  - Drill Down by Water Intake Type
- **Meijer**
  - HTML5-Based Web App
  - Support Touchscreen Tablets
  - Various User Levels
- **TechSmith**
  - Table of Contents and Hotspots
  - User Settable Bookmarks
  - Timed Text Captions Displayed During Playback
  - Support For Panning and Zooming
  - Varied Playback Speeds with Audio Pitch Adjustment

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)
  ▪ 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

- **Boeing**
  - C++, Python
  - Jenkins, QT Creator
  - Open Scene Graph (OSG)
  - Blender (3D Modeling)
  - Secure Internetworking, Encryption

- **Motorola Mobility**
  - Android Development (Java)
  - Java (Servlets, JEE, JSE)
  - Web Development (RESTful, XML, JSON, JavaScript, jQuery)
  - Database (iBatis, Hibernate, MySQL)
  - Hbase, Hadoop

- **Urban Science**
  - Microsoft C#/.NET, ASP.NET
  - JavaScript
  - CSS, HTML5
  - SQL Server

*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

• 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 01/23: Status Reports
    o 01/30: Project Plan Presentations
    o 02/20: Alpha Presentations
    o 04/02: Beta Presentations
    o 04/23: Project Videos
    o 04/25: All Deliverables
    o 04/26: Design Day Setup
    o 04/27: 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, January 30
  ▪ A Little Over 2 Weeks

• In Class Formal Presentations
  ▪ January 30 – February 8
  ▪ 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/2012-01/projects/<sponsor>/images/originals/sponsor-logo.png
  www.capstone.cse.msu.edu/2012-01/projects/auto-owners/images/originals/sponsor-logo.png
Project Plan

✓ Functional Specifications
✓ Design Specifications
✓ Technical Specifications

• Risks
• Prototypes
• Schedule

Future Meetings
What’s next?

• Team Photos
  ▪ Informal: After Meeting Today
  ▪ Formal: After Each Project Plan Presentation

• Setup
  ▪ Team Machines
    ○ Dell Server (Ask Meredith)
    ○ Apple iMac, MacBook Pro
  ▪ Team Software
    ○ Web Server
    ○ Code Repository
    ○ SDK’s
    ○ Etc.

• Think About Team Status Report
What’s next?

• Team Status Report
  ▪ [PowerPoint Template](#)
  ▪ Due Midnight, Sunday, January 22
  ▪ Email to Dr. D.
    o Subject: Team <Company Name>: Status Report
    o Subject: Team Auto-Owners: Status Report
    o Attachment: team-<company-name>-status-report-presentation.ppt
    o 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)
01/18: **Risks and Prototypes**

**The Capstone Experience**

Dr. Wayne Dyksen

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