09/06: 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 your client’s problem?
  ▪ What’s your solution?

• Includes
  ▪ List of Objectives
  ▪ Use Cases

• Not Necessarily Complete
• Understandable by End User
• Initial Problem Statement
• Usually Refined
Functional Specifications

• Amazon
  ▪ Create Innovative Fashion Shopping Experience
  ▪ With Virtual Personal Stylists

• MSUFCU
  ▪ Provide Virtual Banking Assistance
  ▪ Using a Chatbot

• Spectrum Health
  ▪ Recommend Spectrum Health Services to Patients
  ▪ Based on Symptoms They Provide
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

• What’s the user experience (UX)?
  ▪ How does a user use it?
  ▪ How does it look and feel?
• Includes
  ▪ Business Process Flow
  ▪ Specific Features
  ▪ 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
  ▪ Design and Build Time-Based Virtual Reality Game
  ▪ Build Virtual Model of Single-Family Home
  ▪ Display Various Scenarios Inside and Outside
    o Hazardous
    o Safe
    o Innocuous
  ▪ Support Various Levels of Difficulty
  ▪ Provide Limited Hints
  ▪ Use Randomization for Varied Experiences
  ▪ Show Review Panel At Game End

• Meijer
  ▪ Track Customer Shopping History
  ▪ Determine Likely Existing Household Ingredients
  ▪ Recommend Range of Recipes
    o Ingredient Availability
    o Food Preferences
  ▪ Create Shopping List for Missing Ingredients
  ▪ Integrate with mPerks

• Phoenix Group
  ▪ Create Windows Tablet-Based Pick Ticket
  ▪ Display Geolocation-Based Warehouse Map
  ▪ Provide Bin Locations and Route Planning
  ▪ Support Real-Time Shelf Counts
  ▪ Handle Bar Codes

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...
• NOT Screen Captures of Other Software
Screen Mockups

• “Use” with Clients
  ▪ Show to Clients
  ▪ Go Through Use Cases with Clients

• “Cruder” may be better.
  ▪ What?
  ▪ Why?
Screen Mockup Example

- Apple
  - Logo
  - Sentiment
  - Likelihood to buy

- MacBook Pro
  - Sentiment
  - Likelihood to buy
  - Add a product

- Add new brand
  - Sentiment
  - Likelihood to buy
Screen Mockups Example
Screen Mockups 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

• Michigan State University
  ▪ Apple iPads and iPhones (iOS) / Swift
  ▪ Google Android Tablets and Phones / Java
  ▪ RSS News Feeds
• Microsoft
  ▪ Microsoft Intune
  ▪ Microsoft Graph
  ▪ Microsoft Windows / C#
  ▪ Google Android Tablets and Phones / Java
  ▪ Apple iPads and iPhones (iOS) / Swift
  ▪ RESTful Web Services
• Mozilla / Firefox
  ▪ CSS
  ▪ JavaScript
  ▪ Python
  ▪ XUL / XBL
  ▪ Mercurial
  ▪ IRCCloud
  ▪ Bugzilla
  ▪ Review Board
  ▪ Windows
  ▪ OS X
  ▪ Linux

Probably Not Understandable by End User
System Architecture Example

The diagram illustrates a system architecture example involving iOS, API Gateway, Lambda, AML, S3, NLTK, and DynamoDB. The iOS app communicates with the API Gateway, which in turn triggers a Lambda function that interacts with AML, S3, NLTK, and DynamoDB.
System Architecture Example

Product catalog

- Converts to element tree

Server Architecture
- SQL Based
- Catalog Table
- Secured by SSH

Mobile Devices
- Pulled from server
- Cache in device memory

Parse into SQL server

Update each week

Mobile Devices

Converts to element tree

Parse into SQL server

Update each week

Server Architecture
- SQL Based
- Catalog Table
- Secured by SSH
System Architecture Example

![Diagram of system architecture example]

- CATA
- CATA Reader
- MySQL
- API Layer
- Android Application
- iOS Application

Inputs data/delete old data

Request

Response

Query

Request

Response

Request

Response
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.
    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
  ▪ Schedules > Major Milestones
  ▪ 09/13: Status Report Presentations
  ▪ 09/18: Project Plan Presentations
  ▪ 10/16: Alpha Presentations
  ▪ 11/13: Beta Presentations
  ▪ 12/04: Project Videos
  ▪ 12/06: All Deliverables
  ▪ 12/07: Design Day Setup
  ▪ 12/08: 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
  - Included with Windows 10 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., Monday, September 18
  - < 2.0 Weeks
- In Class Formal Presentations
  - September 13 – September 27
  - PowerPoint Template Provided

Get on it, now!
Resources on the Web

• **Other Links > Downloads**
  Project Plan Examples
  
  ▪ Fall 2016
    o Team Amazon
    o Team Rook
    o Team Whirlpool
  
  ▪ Spring 2017
    o Team Microsoft
    o Team MSUFCU
    o Team TechSmith

• **High Resolution Sponsor Logo**

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Project Plan

✓ Functional Specifications
✓ Design Specifications
✓ Technical Specifications

• Risks and Prototypes
• Schedule and Teamwork

Future Meetings