The Capstone Experience

08/31: Capstone Overview

CSE 498, Collaborative Design

• “The Capstone Experience”
• Instructors
  • Dr. Wayne Dyksen (“Dr. D.”)
  • Meredith Schmidt
• Class Meetings
  MW, 3:00-3:50pm, 2245 EB
• Syllabus
• Web Site
  • capstone.cse.msu.edu
  • Check it often.

Course Goals

• Teams of Students
• Build Significant Software System
  • Design
  • Develop
  • Debug
  • Document
  • Deliver
• For Corporate Clients
• In 15 (Short) Weeks

Project Deliverables

• Project Plan Document & Presentation
• Alpha Presentation
• Beta Presentation
• Project Software & Documentation
• Project Video
• Design Day
See Major Milestones.

Capstone Overview

Course Logistics

• Client Projects
• Course Logistics (Continued)
All-Hands Meetings

- Presentations By
  - Professor
- Teams
  - Status Reports
  - Formal Presentations
    - Project Plan
    - Alpha
    - Beta
  - Project Videos
  - Guest Speakers

CSE498 Lab

- **3352 EB**
- Door Lock
- Electronic Keypad
  - Code = 1234
- Systems
  - Two PC’s per Team
    - Server
    - Development Machine
  - Team 100% Responsible
    - Building
    - Maintaining
    - Securing
    - Backing Up
- Books
- Conference Area
- Client Conference Calls
- Google Conference Calendar
- Appliances
  - Water Cooler/Heater
  - Refrigerator
  - Microwave
  - Keurig Coffee Maker
  - Lockable Storage
    - One Drawer Per Team
    - Assigned and Labels
    - Obtain Keys from CSE Office

Scheduled Lab Times

- No Formal Lab Sessions
  - “Credit” for Scheduled Weekly Meetings
    - Team Meeting
    - Client Conference Call
    - Triage Meeting with Meredith
  - Meeting Times TBA With
    - Team
    - Client
    - Meredith
  - Students must be available to meet.

Team / Project Generalities

- Clients
  - Vary in Size and Type
  - Client contacts/mentors are “volunteers”.
- Team Contact Person
  - Picked By Team
  - Main Point of Contact for Client
Team / Project Generalities

- Project Level of Difficulty
  - Hard Enough
  - But Not too Hard
- Deliverable
  - To the Client
  - By the Due Date
- Documentation
  - Administrator Manual
  - User Manual

Team / Project Generalities

- Challenges
  - Very Short, Unforgiving Time Line
  - Client Contact
  - Team Dynamics
  - Project Plan (in Three Weeks)
  - Entirely New...
    - Languages
    - Environments
    - APIs
    - SDK’s
    - Processes
    - Protocols
    - Etc.
    - Project Management
    - Etc...

Project Specifics

- Vary
  - Type
  - Current State of Specificity
- Challenge
  - Connect with Client
  - “Nail Down” the Project
    - Hard Enough
    - Not too Hard
    - Avoid Feature Creep
  - Course Feature, Not Bug

Project Teams/Clients

- Team Auto-Owners
- Team Boeing
- Team Ford
- Team GE Aviation
- Team Meijer
- Team Motorola Mobility
- Team Sparrow
- Team Spectrum Health
- Team TechSmith
- Team Urban Science

Team Auto-Owners

Project Overview

24-Hour Road Service Mobile Apps

- Functionalities
  - Request Road Service via Mobile Apps
  - GPS-Based Local Searches
    - Service Centers
    - Restaurants
- Features
  - iPhone, iPad, and Android User Apps
  - Web Administrator App
  - Interface with Vendor, Quest
  - Process Insured Policy Information
    - Pulled from Auto Owners Database
    - Pushed to Quest
- Technologies
  - Apple iOS iPhone and iPad SDK, C, Objective-C
  - Google Android SDK, Java
  - CSS, HTML5, JavaScript

Team Boeing

Project Overview

BAPS 2: Battle Aircraft Position Share 2

- Functionalities
  - Two-Player Game
    - Destroy Targets of Opposing Team
    - Use Aircraft with Various Capabilities
  - Integrated with Battle Aircraft Position Share
  - Based on Cyber Attacks
    - Gain Information
    - Disrupt Operations
- Features
  - Playable on iPhone and Android
  - Supports Both 1-Player and 2-Player Modes
  - Integration of Remote Cyber Attacks
- Technologies
  - iPhone and Android App Development
  - HTML5, Javascript, WebGL
  - Blender (3D Modeling)
  - Internetworking
  - Data Encryption and Cyber Security
    - BAPS: Battle Aircraft Position Share, Spring 2011

Team Meijer

Project Overview

Team Urban Science
Team Ford
Project Overview

Ford Quickboard

- **Functionalities**
  - "Virtual" Study Note Boards
  - Share Ideas, Plans, Announcements, Etc.
- **Use Cases**
  - Group Geo-Centrically Deployed Teams
  - Display an "What's Happening" Dashboard
- **Features**
  - Organized by Teams, Projects and Purposes
  - Disable into Panels
  - Support Rich Content, #Hashtags and @UserID
  - Accessible via Web, Tablets and Mobile Devices
- **Technologies**
  - HTML5, JavaScript, CSS
  - Microsoft Office and SharePoint

Team GE Aviation
Project Overview

NextGen Aircraft Taxi Assistance

- **Functionalities**
  - Airport Ground Taxi Assistance
  - Safety Guide Pilots During Low Visibility
  - To Point of Arrival or Departure
- **Features**
  - Three Dimensional Visualization
  - Designed for Next Generation Flight Deck
  - Pushed X-Plane FSDA RUC Plug-in
- **Technologies**
  - X-Ray
  - Open GL, GUI Tools

Team Meijer
Project Overview

Tablet-Based Point-of-Sale System

- **Functionalities**
  - Tablet-Based Self-Checkout System
  - For Use by Customers and Employees
  - Supports Various UPC Barcode Scanners
  - Interfaces with Meijer’s Virtual Point-of-Sale Subsystem
- **Features**
  - HP Slate 100 Web Apps
  - SOAP (Simple Object Access Protocol)
  - Common Extensible .NET Service for UPC Scanners
  - Employee Monitoring of Customer
  - Transaction Totals and Item Exceptions
- **Technologies**
  - Microsoft Windows Server 2008 R2
  - Microsoft Visual Studio 2010
  - CSS, HTML, SQL
  - BlackBerry

Team Motorola Mobility
Project Overview

Synchronized Program Content Delivery

- **Functionalities**
  - Provide Enhanced Television Program Information
  - Auto Pregates
  - Auto-Pregates on TV, Task Shown
  - Alternative Service on Show
- **Features**
  - Triggered at Specific Times in Program
  - Synchronized between TV and Mobile Device
  - Displayed in Customizable Selectable Layers
- **Technologies**
  - iPhone, iPad Development (Objective-C)
  - Android Development (.Java)
  - Java Services (J2EE, J2S)
  - Web Services (RESTful)
  - Database (MySQL, MySQL, MySQL)

Team Sparrow
Project Overview

iSupport Device Management System

- **Functionalities**
  - Manage Devices Throughout Hospital
  - Desktop Computers
  - Portable, Fax, Guardian Devices
  - Over 2,000 Devices
  - Improve Reliability and Response Time
  - Location Aware via Facility Maps
  - Suggest Alternate Devices
- **Features**
  - Configurable Dashboard Interface
  - Web, iPhone and iPad Apps
  - Generate Helpdesk Tickets
  - Produce Reports
- **Technologies**
  - CSS, HTML, JavaScript
  - Apple iOS Phone and iPad SDK, C, Objective-C
  - Microsoft SharePoint and SQL Server
  - Microsoft .NET

Team Spectrum Health
Project Overview

Log Monitoring Compliance

- **Functionalities**
  - Automate Log Monitoring
  - Improve Compliance
  - Provide Automated Alerts to Management
  - Forensic Evidence
- **Features**
  - Configurable Dashboard User Interface
  - Aggregation of Defer Event Logs
  - Drill Down to Root Causes
  - Correlation Between Events and Problems
  - Reports for Action and Compliance
- **Technologies**
  - Microsoft SharePoint 2010
  - Epic, Caremer (Electronic Medical Record Systems)
  - Health Quest, Lawson (Financial Systems)
  - CA Service Desk (Ticketing System)
  - syslog, P2Send (Logging Systems)
Team **TechSmith**

**Mobile Web Reporter**
- **Functionalities**
  - Enable "Citizen Journalists"
  - Create Video Content in the Field
  - Publish to YouTube, Facebook and Screencast.com
- **Features**
  - Mobile App
    - iPhone and iPad
    - Android Phone and Tablet
  - Capture Content from Camera and Web Browser
  - Add Voice Narrations and Annotations
- **Technologies**
  - Apple iOS, iPhone and iPad SDK, C, Objective-C
  - YouTube, Facebook and Screencast.com APIs

Team **Urban Science**

**Visual Hierarchy Selection**
- **Functionalities**
  - Visual Control for n-Level Hierarchy
    - Navigation
    - Selection
    - Search
- **Examples**
  - Geography (United States > Eastern > Area 2 > Michigan)
  - Lead Source (Brand > Audi USA > Audi A8)
  - Vehicle Model (Audi A6 > Audi A6 3.0T)
- **Features**
  - Visually Appealing and User Friendly
  - Hierarchy Nodes
    - Include Image and Text
    - May Have Multiple Parents
- **Technologies**
  - HTML5
  - ASP.NET
  - JavaScript
  - SQL Server

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**First Assignments**
- **Read the** [Syllabus](#)
- **Check out the Lab**
  - See if you can find it.
  - See if you can get in.
- **Check out the** [Web Site](#)
- **Research Your** [Project](#)
- **Client**
- **Technologies**

**What’s Next?**
- **Teams**
  - Assignments by Email Tonight
  - Meet Initially by Thursday Afternoon
  - Lab Machine Assignments in Lab
  - Start Configuring Lab Machines
  - Team Photos Wednesday After All-Hands Meeting
- **Client**
  - Contact by Email by Thursday COB
  - Conference Call by Phone Thursday or Friday
  - Review Project Proposal

**Lab Miscellany**
- **Security**
  - Keep Lab Doors Closed
  - Do Not Open Doors For Strangers
  - Email Dr. D. if Door Becomes Unlocked
- **Wireless**
  - SSID: Capstone
  - Password:
- **Coffee**
  - Bed, Bath & Beyond
  - Get 20% Off Coupon
- **Game Playing**
  - Not On Monitors Facing Hallway
  - Maybe on Unassigned Machines (But Later)
Expectations & Workload

- Extremely High For Both
- Your MSU Career Capstone
- Addition to Your Personal Portfolio
- Experience Viewed Like an Internship
- Interview Talking Points
- Leverage Into a Job Offer

Major Milestones

- 09/14: Status Reports
- 09/21: Project Plan Presentations
- 10/17: Alpha Presentations
- 11/07: Beta Presentations
- 12/05: Project Videos
- 12/07: All Deliverables
- 12/08: Design Day Setup
- 12/09: Design Day

Meeting Attendance

- Required
  - All-Hands (Class) Meetings
  - Team Triage Meetings
  - 5% of Final Grade
  - Late == Absent
- Almost No Excuses Accepted
  - One or Two Excused Possible for Interviews
  - Must Provide Information In Advance (Date, Company, Recruiter Name & Contact Info)
- Must Attend (No Excuses Accepted)
  - Your Team Presentations
  - All Final Project Video Viewing
  - Design Day

Team Organization

- Up to Each Team
- Organize into Roles
  - Client Contact
  - Program Manager
  - Developer
  - Tester
  - Systems Administrator
  - Etc...
- Everyone Must Make Technical Contributions

Team Dynamics

- Key to Success
- Significant Component of Course Grade
- Address Problems Immediately
  - Within Team
  - With Dr. D. and/or Meredith
- Be Ready to Discuss During Interviews

Grading (1 of 3)

- Team (70%)
  - Project Plan Document & Presentation 10
  - Alpha Presentation 10
  - Beta Presentation 10
  - Project Video 10
  - Project Software & Documentation 25
  - Design Day 05
  - Total 70
- Individual (30%)
  - Technical Contribution 10
  - Team Contribution 10
  - Team Evaluation 05
  - Meeting Attendance 05
  - Total 30
Grading (2 of 3)

- Final Grade Sum Of...
  - Individual Total
  - % of Team Total Based on Team Contribution
  - Grand Total = 
    (Individual Total) 
    + 
    (Team Total) * (Team Contribution) / 10.0
- *Nota Bene:* Your Team Contribution will have a very significant effect on your final grade.

Grading (3 of 3)

- We reserve the right to make changes with sufficient notice.
- No special consideration will be given for final grades including but not limited to
  - status in any academic program including CSE,
  - financial aid,
  - rank in the armed forces,
  - job,
  - graduation,
  - mortgage,
  - wedding,
  - visa status,
  - or anything else.

Integrity of Scholarship

- MSU's policies will be enforced.
- Individual and team work must be original.
- Violators...
  - ...will be referred to the appropriate deans.
  - ...may receive a grade of F in the course.

IP & NDA’s

- IP: Intellectual Property
  - By Default, Owned by MSU
  - Client May Request
    - Right to Use
    - Assignment of Ownership
    - Etc.
- NDA: Non-Disclosure Agreement
  - May Be Required by Client
  - You will...
    - ...respect/protect intellectual property.
    - ...respect/protect source code.
    - ...etc.
- Normally Not an Issue
- Always Contact Dr. D. Before Signing Anything

Using Resources

- Ok For “Help”
  - People
    - Past Capstone Teams
    - Other Capstone Teams
    - Faculty Members
  - Articles
  - Sample Code
  - Etc...
- Not Ok For “Entire” Project
- If Unsure, Ask Dr. D. and/or Meredith

Using Existing Code

- Ok
  - Examples
  - Prototypes
  - Open Source Code
    - Fragments
    - Libraries
    - Utilities
- Not Ok
  - Vast Amounts of Your Project
  - Not Open Source
  - Document and Report All Existing Code Used
  - Be Careful!
  - If Unsure, Ask Dr. D. and/or Meredith
**Design Day**

- College of Engineering Event
  - MSU Union
  - Friday Morning, December 9, 2011
- Displays (Booths) of Design Projects
  - CSE Capstone
  - ECE Capstone
  - ME Capstone
  - Etc...
- Presentations and Awards
  - Panel of Judges
  - CSE Team Project Videos

**VISA**

- Verified Individualized Services and Accommodations
  - Let us know immediately.
  - We will work with you.

**Office Hours**

- Any Time...
  - Visit
    - 3149 EB
    - 411 Nat Sci
  - Call
    - EB: 353-5573
    - Nat Sci: 884-2469
  - Send Email (dyksen@cse.msu.edu)
  - Make Appointment

**Capstone Overview**

- ✔ Course Logistics
- ✔ Client Projects
- ✔ Course Logistics (Continued)

**Questions?**

09/07: Project Plan