MICHIGAN STATE UNIVERSITY

1. Course Overview

CSE 498, Collaborative Design

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CSE 498

- Collaborative Design
  "The Capstone Course"
- Dr. Wayne Dyksen ("Dr. D.")
  Ken Horne
- Lecture
  MW, 3:00-3:50pm, 175 COM
- Labs, 3352 EB
  TT, 3:00-4:50pm
  WF, 8:00-9:50am
  WF, 12:40-2:30pm

Web Site

- Details
  - URL: www.cse.msu.edu/~cse498
  - User name: cse498
  - Password: TBD
- Check it Often for
  - What's new?
  - Meeting Agendas
  - Career Opportunities
  - Etc…

Course Objectives

- Build a Software System (From Scratch)
- Use (New) Tools and Environments
- Build and Administer Systems
- Integrate Your Computer Science Knowledge
- Work in a Team Environment
- Develop Your Communication Skills
- Develop Interview Talking Points
- Etc…

Team Course Goal

- Complete Large Software Project
  - Architect
  - Implement
  - Test
  - Document
  - Deliver
- For Client
- From "Scratch"
- In 15 (Short) Weeks

Team / Project Generalities

- Clients
  - Vary in Size and Type
  - Client contacts/mentor(s) 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
  - System Administration Manual
  - Users Manual

Team / Project Generalities

- Challenges
  - Very Short, Unforgiving Time Line
  - Client Contact
  - Team Dynamics
  - Architecture / Specifications (in Three Weeks)
  - Entirely New…
    - Languages
    - Environments
    - API's
    - Processes
    - Protocols
  - Project Management
  - Etc…

Project Specifics

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

Project Teams/Clients

- Team 01: Auto-Owners Insurance
- Team 02: Chrysler
- Team 03: Ford
- Team 04: IBM
- Team 05: Microsoft
- Team 06: Motorola
- Team 07: TechSmith
- Team 08: Toro

1-10

Team 1 Auto-Owners Insurance

Project Overview

Recruiting Contact and Events System

- System to Track University and College Engagement
  - Recruiting Events
    - Career Fairs
    - Interviews
    - Etc…
  - Advisory Board Memberships
  - Etc…
- Features
  - Web Interface with SQL Server Backend
  - Synchronization with Microsoft Outlook
  - Summary Reports
- Technologies
  - C# / .NET
  - Microsoft Exchange/Outlook
  - SQL Server
  - Etc…

Team 2 Boeing

Project Overview

KML Scene Builder 2008 (KMLSB 2008)

- System for 3D Geometrical Scene Building
  - To Be Used by Boeing Phantom Works
  - Provide Scenery for Boeing Simulation Software
    - Flight Simulators
    - Weapons Systems
    - Ground Vehicles
    - Etc…
- Features
  - Landscapes
  - Buildings
  - Roads
  - Data points
  - Etc…
- Technologies
  - Google Earth
  - OpenGIS® KML Encoding Standard (OGC KML)
  - LUA 3-D Model Scripting

Team 3 Chrysler
Project Overview

Performance Feedback System (PFS) Dashboard

- Existing Performance Feedback System
  - Captures Quality Metrics for Each Vehicle During Production
  - Mainframe-Based
  - Generates Static Reports
    - Legacy Terminal-Based
    - Web-Based
- PFS Dashboard
  - Real-Time Visualization of PFS
  - Highlights Key Process Indicators
  - Quality Status-At-a-Glance
  - Customizable Based on User needs
- Technologies
  - Java
  - Javascript
  - XML
  - IRAD 7.0
  - SQL
  - COBOL

Team 4 Ford
Project Overview

Ford Test Drive

- Create Driver Profile Base On Test Drive
  - Capture Driver Information During Test Drive
    - Velocity, Acceleration, Deceleration, Cabin Temperature
    - Via Wireless Sensors
  - Create and Upload Driver Profile to Dealership Computers After Test Drive
  - View Profile with Web Interface
- Provide Real Time Location System (RTLS)
  - Location of Vehicles on the Dealership Lot
  - Via Wireless Mesh Network
- Technologies
  - Crossbow iMote2 Wireless Sensors
    - Temperature, Humidity, Light
    - Motion by 3-Axis Accelerometer
  - Wireless Mesh Networks
  - .NET Micro Framework
  - Etc…

Team 5 IBM
Project Overview

FixPack Publishing Tool Enhancements

- Existing FixPack Publishing Tool
  - Enables Bulk Publishing of Fix Packs
    - To IBM's Electronic Fix Delivery (EFD) Infrastructure
    - Typically 30 to 50 Fix Packs Per User Session
  - Semi-Automated
- FixPack Enhancements
  - Eclipse-Based Rich Client
  - Web Service For Product System Requirements
  - HTTP-Based Methodology for Dynamic Update to Support New Products
- Technologies
  - Java
  - XML
  - Eclipse Standard Widget Toolkit (SWT)
  - Rational Software Architecture (RSA)

Team 6 Microsoft
Project Overview

Application Health Monitoring Portal

- Portal
  - Windows SharePoint Services-Based
  - Plugs Into .NET Workflow Foundation & Windows Communication Tracking Store
  - Provides Health Monitoring and Management of .NET Applications
- Components
  - Metrics Databases (New and Existing)
  - System to Calculate Metrics
  - Web-Based Portal
- Technologies
  - Silverlight
  - Windows SharePoint Services Framework
  - C# /.NET Framework
  - .NET Workflow Foundation
  - .NET Windows Communication Tracking Store

Team 7 TechSmith
Project Overview

Text Recognition Using Cloud Computing

- Existing Computer Screen Capture/Recording Software
  - Text on Screen Stored as Image (Pixels)
  - Resulting Capture/Recording Not Searchable For Text
- Create Searchable Screen Capture/Recording System
  - Use Optical Character Recognition (OCR)
    - Recognize Text
    - Search For Text in Captures/Recordings
  - Use Cloud Computing (Internet Computers)
    - Perform Optical Character Recognition
    - Scale Number of CPU's Based on Amount of Text in Capture/Recording
- Three Components
  - Screen Capture/Recorder Client
  - Text Recognition Service
  - Search/View Website
- Technologies
  - C++, Open Source
  - Amazon EC2 Compute Cloud Services
  - Amazon S3 Storage
  - Tesseract, FFmpeg, ImageMagick
  - Etc…

Team 8 Toro
Project Overview

GolfVision Interface for Turf Guard

- Existing Turf Guard System
  - Wireless Soil Monitoring (for Golf Courses)
  - Buried Sensors, Repeaters, Base Station, and User Interface
  - Data Includes Moisture, Temperature, and Salinity Every 5 Minutes
- Create New GolfVision Interface
  - Used by Course Superintendent
  - Communicates with Sensors, Repeaters, and Database
  - Provides Graphical Visualization of Soil Conditions
  - Allows User to Modify Database Settings and Data
- Technologies
  - C# / .NET
  - Networking
  - Databases
  - TG2 Dual Level Sensors
  - Turf Guard Pedestal Repeater
  - Etc…

Course Environment

- Business-Like
- Team = Startup Company
- Dyksen & Horne
  - Your
    - Venture Capitalists
    - Board of Directors
  - Expect
    - ROI
    - Results

Team Dynamics

- Organize as See Fit
  - Really Hard Stuff
  - Really Important Stuff
- Board of Directors…
  - Hires
    &
  - Fires
- (Be Ready to Discuss During Interviews)

Project Deliverables

- Technical Specification & Presentation
- Alpha Demonstration
- Beta Demonstration
- Project Video
- Project Software & Documentation
- Design Day
- Team Web Site

Design Day

- College of Engineering Event
  - MSU Union
  - Friday Morning, December 5
- Displays (Booths) of Design Projects
  - CSE Capstone
  - ECE Capstone
  - ME Capstone
  - Etc…
- Presentations and Awards
  - ECE and ME Capstone Team Talks
  - CSE Team Project Videos

All Hands Meetings

Presentations By

- Professor
- Teams
  - Status Reports
  - Demonstrations
  - Formal Presentations
  - Project Videos
- Guest Speakers

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

Do NOT Schedule Interviews

All-Hands Meeting Agendas

1. 08/25: Course Overview / Skills Inventory
2. 08/27: Technical Specifications / Team Assignments
   09/01: Labor Day, No Meeting
3. 09/03: Project Schedule & Risk
4. 09/08: Teams: Status Reports
5. 09/10: Prototyping
6. 09/15: Teams: Technical Specifications / Schedule
7. 09/17: Teams: Technical Specifications / Schedule
8. 09/22: Teams: Technical Specifications / Schedule
9. 09/24: Resume Writing & Interviewing
10. 09/29: Creating & Giving Presentations
11. 10/01: Career Gallery
12. 10/06: Teams: Alpha Demonstrations
13. 10/08: Teams: Alpha Demonstrations
14. 10/13: Teams: Alpha Demonstrations
15. 10/15: Teams: Alpha Demonstrations
16. 10/20: Teams: Status Reports &/or Demos
17. 10/22: Teams: Status Reports &/or Demos
18. 10/27: The Project Video
19. 10/29: Camtasia Demo
20. 11/03: Teams: Beta Demonstrations
21. 11/05: Teams: Beta Demonstrations
22. 11/10: Teams: Beta Demonstrations
23. 11/12: Teams: Beta Demonstrations
24. 11/17: Ethics
25. 11/19: Intellectual Property and Copyright
26. 11/24: Teams: Status Reports &/or Demos
27. 11/26: Teams: Status Reports &/or Demos
28. 12/01: Teams: Project Videos
29. 12/03: Teams: Project Videos
30. 12/04: Design Day Setup
31. 12/05: Design Day
32. 12/11: Teams: Project Videos

CSE498 Lab

- 3352 EB
- Door Lock
  - Electronic Keypad
  - Code = #### Bell
- Systems
  - Two PC's per Team
    - Server
    - Development Machine
  - Team 100% Responsible
    - Building
    - Maintaining
    - Securing
    - Backing Up
- Books
- Conference Area
  - Team Meetings
  - Client Conference Calls
  - Google Calendar
- Appliances
  - Refrigerator
  - Microwave
  - Coffee Maker
- Lockable Storage (If Needed)

Schedule Lab Times

- No Formal Lab Sessions
- Placeholders for Team Meetings
- Teams may meet at any time.
- Students must be available during their scheduled lab time.

Expectations & Workload

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

IP & NDA's

- IP: Intellectual Property
  - By Default, Owned by You
  - 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

NDA: Motorola Example

- To not use, retain or disclose Motorola Software or other Motorola confidential information, except in the course of participating in this class and for other University educational purposes approved in writing by Motorola. You may identify and describe your participation in your curriculum vitae or to prospective employers.
- To consult with Motorola, through the undersigned Motorola representative, before using any confidential information of Motorola outside of your coursework, so we can take steps to protect any Motorola confidential and other proprietary rights.
- That the Motorola Software is being provided on a temporary basis for Motorola's benefit and your educational use for this class only, and may not be used in any other context. This software must not be installed on a shared drive accessible by individuals not involved in the class. You must delete this software when your participation in the class has ended unless you obtain further written permission from Motorola. All derivative works to Motorola Software are created on a work-for-hire basis, and will be retained by Motorola.
- That by this Agreement you grant Motorola a perpetual and irrevocable right, on a nonexclusive basis, to use and otherwise commercially exploit independent code and related documentation that you develop in the course of this program.

Grading (1 of 2)

- Team (70%)
  - Technical Specification & Presentation 10
  - Alpha Demonstration 10
  - Beta Demonstration 10
  - Project Video 15
  - Project Software & Documentation 15
  - Design Day 5
  - Team Web Site 5
  - 70
- Individual (30%)
  - Technical Contribution 10
  - Team Contribution 10
  - Team Evaluation 5
  - Class Meeting Attendance 5
  - 30

Grading (2 of 2)

- 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, or
  - visa status.

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.

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 TA

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 TA

VISA

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

Office Hours

- Any Time…
  - Visit
  - Call
  - Send Email
- Make Appointment If Necessary

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
  - See if you can log in.
  - Check out the links.
- Research Clients

What's Next? Today

- Teams
  - Assignments
  - Meeting
  - Organization
  - Pictures
- Client
  - Contact
  - Project Review
- Technical Specification
  - Examples on Course Site