MICHIGAN STATE
U N I V E R S I T Y

01/12: Course Overview

CSE 498, Collaborative Design

From Students…
…to Professionals

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01/12: Course Overview

➢ Course Logistics

From Students…
…to Professionals

• Client Projects

• Course Logistics Continued

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CSE 498, Collaborative Design

• "The Capstone Course"
• Instructors
  – Dr. Wayne Dyksen ("Dr. D.")
  – Matt Luciw
• Class Meetings
  MW, 3:00-3:50pm, 2400 EB
• Course Web Site
  – www.cse.msu.edu/~cse498
  – Check it often.

Course Goals

• Work in a Team Environment
• Build a Significant Software System
• Use (New) Tools and Environments
• Build and Administer Systems
• Develop Your Communication Skills
• Develop Interview Talking Points
• Etc…

Team Course Goal

• Build Large Software Project
  – Design
  – Architect
  – Develop
  – Test
  – Document
  – Deliver
• For Client
• From (Almost) Nothing
• In 15 (Short) Weeks

Course Environment

• Business-Like

• Team == Startup Company

• Dyksen & Luciw
  – Your
    • Venture Capitalists
    • Board of Directors
    • Managers
  – Expect
    • ROI
    • Results

All-Hands Meetings

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

All-Hands Meeting Agendas

01/12: Course Overview / Course Inventory	03/16: Teams: Status Reports &/or Demos
01/14: Project Plan / Team Assignments	03/18: Teams: Status Reports &/or Demos
01/19: (Martin Luther King Day, No Meeting)	03/23: The Project Video
01/21: Project Schedule & Risk	03/25: Camtasia Demo
01/26: Teams: Status Reports	03/30: Teams: Beta Demonstrations
01/28: Prototyping	04/01: Teams: Beta Demonstrations
02/02: Teams: Project Plan	04/06: Teams: Beta Demonstrations
02/04: Teams: Project Plan	04/08: Teams: Beta Demonstrations
02/09: Teams: Project Plan	04/13: Ethics and Professionalism
02/11: Teams: Project Plan	04/15: Intellectual Property and Copyright
02/16: Resume Writing & Interviewing	04/20: Teams: Status Reports &/or Demos
02/18: Creating & Giving Presentations	04/22: Teams: Status Reports &/or Demos
02/23: Teams: Alpha Demonstrations	04/27: Teams: Project Videos
02/25: Teams: Alpha Demonstrations	04/29: Teams: Project Videos
03/02: Teams: Alpha Demonstrations	04/30: Design Day Setup
03/04: Teams: Alpha Demonstrations	05/01: Design Day
03/09: (Spring Break, No Meeting)	05/07: Teams: Project Videos
03/11: (Spring Break, No Meeting)	

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   Do NOT Schedule Interviews
  - Design Day

CSE498 Lab

- 3352 EB
- Door Lock
  - Electronic Keypad
  - Code = ####
- 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)

Scheduled 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.
- Scheduled Lab Times
  - TT, 3:00-4:50pm
  - WF, 8:00-9:50am
  - WF, 12:40-2:30pm

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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
    - 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
  - Course Feature, Not Bug

Project Teams/Clients

- Team 01. Altair Engineering
- Team 02. Auto-Owners Insurance
- Team 03. Boeing
- Team 04. Ford
- Team 05. GE Aviation
- Team 06. Motorola
- Team 07. TechSmith
- Team 08. Terex
- Team 09. Toro
- Team 10. Urban Science

Team 1. Altair Engineering
Project Overview

U3D Object Rendering Java Applet
- View 3D Computer Aided Design (CAD) Objects
  - View Large CAD Assemblies
  - Render with Lighting and Shading
  - Select Parts of Interest
  - View Both Original Assembly and Selected Parts
  - Export Parts List to XML
- Software Components
  - Import CAD File (UG, CATIA, V4/V5, SolidWorks, SolidEdge, Inventor)
  - Convert to Universal 3D (U3D)
  - Render U3D
  - Export Subassemblies to XML
- Technologies
  - CAD
  - U3D (Universal 3D)
  - Java
  - OpenGL
  - Web Services
  - Etc…

Team 2. Auto-Owners Insurance
Project Overview

Telephone Log Self-Service Dashboard
- Dashboard for Telephone Call Log
  - Used by Managers
  - Daily, Weekly, Monthly Thresholds
    - Phone Numbers
    - Duration
    - Cost
  - User Customizable
    - Views
    - Thresholds
    - Notifications
- Automatic Determination of…
  - Management Hierarchy from SAP Organizational Management System
  - Caller/Callee ID from
    - Internal Phone System
    - Agency/Branch System
    - White/Yellow Pages via Web Services
- Technologies
  - Javascript
  - Sequel Server Database
  - Web Services
  - Etc…

Team 3. Boeing
Project Overview

KML Urban Scene Builder 2009 (KMLUSB 2009)
- System for 3D Geometrical Scene Building
  - To Be Used by Boeing Phantom Works
  - Provide Scenery for Boeing Simulation Software
- Built On KMLUSB 2008
- Features
  - Advanced Urban Scenery Fidelity
  - Advanced COLLADA Model Viewer (CMV)
  - DIS Building Simulation (DBS)
  - Unmanned Vehicle Capability
  - On-Demand Load Capability
  - KMLUSB 2008 Improvements
- Technologies
  - KMLUSB 2008
  - Google Earth
  - OpenGIS® KML Encoding Standard (OGC KML)
  - LUA 3-D Model Scripting
  - COLLADA
  - Distributed Interactive Simulation (DIS)
  - Etc…

Team 4. Ford
Project Overview

Ford Conference Room Monitor
- Web-Based Conference Room Utilization Monitoring System
  - Real-Time Utilization Information
    - Captured by Wireless Sensors
      - Level of Light
      - Timestamp of Light Change
      - Room Temperature
    - Transported via Mesh Network
    - Stored in Database
  - Monitored via Web Applications
    - Building Maintenance People
    - Conference Room Users
- Deliverables
  - Sensor Data Capture and Mesh Network
  - Data Storage and Analysis
  - Web Applications
- Technologies
  - Crossbow iMote2 Wireless Sensors
  - Wireless Mesh Networks
  - .NET Micro Framework
  - Etc…

Team 5. GE Aviation
Project Overview

Flight Management System Voice Interface
- Current System
  - Flight Management System (FMS) Controls Aircraft
    - Heading
    - Altitude
  - Aircraft Communication Addressing and Reporting System (ACARS)
    - Text Messages from Air Traffic Control (ATC)
    - Between Aircraft and Ground Station
  - ACARS Interface to FMS
    - Specially Formatted Message
    - Sent to FMS
- New Voice Interface System
  - Capture Pilot's Voice Command
  - Create ACARS Message
  - Send to FMS
- Technologies
  - GE Desktop Trainer
  - Flight Management Workstation
  - Aircraft ARINC 429 Interfaces
  - Air Traffic Control (ATC)
  - Etc…

Team 6. Motorola
Project Overview

User Generated Video Service for Cable Systems
- User Scenarios
  - User Uploads Videos from a Computer to Web
    - Associates Metadata with Video
    - Specifies Users Allowed to View Video
  - End Users View Videos on Their Set Top Boxes (STBs)
- Software Components
  - AJAX-Based UI for Uploading
  - JEE/RESTful Web Services Store/Transcode/Deliver Video
  - Menu and User Interface for Set Top Boxes
  - Simulated Cable Headend via VideoLan
- Technologies
  - Advanced Java and JEE
  - Object Oriented Design
  - RESTful Web Services
  - AJAX
  - Database
  - Etc…

Team 7. TechSmith
Project Overview

Collaborative Video Captioning
- Automatic Video Captioning
  - Upload Video With Audio to Server
  - Perform Software Speech-to-Text Transcription
    - Efficient
    - Error Prone
  - Produce Video with Caption Text Synchronized to Video
- Collaborative Video Captioning
  - Web-Based, Wiki-Style
  - Edit/Correct Captioning Speech-to-Text Mistakes
  - Provide Methods for Consistency and Accepting Corrections
  - Support User Database with Login and Password
- Technologies
  - Windows Vista, Windows Server
  - Speech-to-Text Software
    - Windows Speech Recognition Engine
    - Dragon Naturally Speaking
    - Autonomy/Virage
  - Javascript/AJAX
  - Microsoft Silverlight
  - Etc…

Team 8. Terex
Project Overview

Terex Project Portfolio Management

- Project Portfolio Management (PPM)
  - Methods For Analyzing and Managing a Group of Projects
  - Based on a Variety of Key Characteristics
    - Estimated Costs
    - Expected Timeline
    - Benefits to Be Realized
    - Interdependencies
    - Consumption of Scarce Resources
    - Etc...
  - Goal to Determine Optimal Mix and Sequencing
- Terex PPM Features
  - Based on Terex Project Management Framework (PMF)
  - Custom Dashboard
  - Custom Reports
  - Uniform Data Entry
  - Role-Based Editing and Approver Permissions
  - List Availability
- Technologies
  - Windows Server 2008
  - SharePoint Services
  - Etc...

Team 9. Toro
Project Overview

Water Smart Irrigation Software

- GUI for Irrigation and Landscape Lighting Systems
  - Support a Variety of Controllers
  - Provide Wizards
  - Support Advanced Controller Options
  - Upload Program Into Controller
  - Calculate Suggested Watering Times
  - Gather Weather Information
  - Etc
- Technologies
  - Toro Controllers
    - Ecxtra Timer
    - Total Control
    - Rain Dial
  - Windows Vista
  - Visual Studio
  - XML
  - Etc...

Team 10. Urban Science
Project Overview

Web-Based Geography Management

- Primary Market Areas (PMAs)
  - Geographic Areas for Performance Measuring or Marketing
  - Aggregation of Smaller Units of Geography
    - Census Tracts
    - Zip Codes
    - Etc...
  - Modified Regularly
- Geography Management Tool
  - Web-Based, GUI
  - Detailed Maps (Roads, Water, Cities, PMAs, Etc.)
  - Add, Remove, Edit, Combine, Split, Etc. Geographic Structures
    - Regions
    - PMAs
- Technologies
  - Mapping
  - Microsoft Silverlight
  - Web Browser Compatibility
  - Etc...

Project Deliverables

- Project Plan Document & Presentation
- Alpha Demonstration
- Beta Demonstration
- Project Video
- Project Software & Documentation
- Design Day
- Team Web Site

See Other Information, Major Milestones

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➢ Course Logistics Continued

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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

Grading (1 of 2)

- Team (70%)
  - Project Plan Document & 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.

VISA

- Verified Individualized Services and Accommodations

- Let us know **immediately**.

- We will work with you.

Design Day

- College of Engineering Event
  - MSU Union
  - Friday Morning, May 1
- 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

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

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

Team Dynamics

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

Office Hours

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

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 Clients

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✓ Course Logistics Continued

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What's Next?

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

MICHIGAN STATE
U N I V E R S I T Y

01/14: Project Plan

CSE 498, Collaborative Design

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