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

09/12: Project Schedule and Risk

The Capstone Experience

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From Students…
…to Professionals

Project Schedule and Risk

➢ Risk

• Project Schedule

• Teamwork

Identifying Risks

• What You Don't
  ▪ Know
  ▪ Understand
  ▪ Know How to Do
• Normally
  ▪ Major Project Features
  ▪ "Showstoppers"
• Varies From
  ▪ Not Familiar With But (Probably) Can Learn
                          to
  ▪ Absolutely No Idea How to Do It

What are you worried about?

What should you be worried about?

Example Risks

Including but not limited to...
• Key Application Features
• Hardware Systems
• Software Systems
• Development / Programming Environments
• Programming Languages
• Etc...

Prioritizing Risks

• Classify Difficulty
  ▪ High   Very Hard, No Idea How to Do
  ▪ Medium
  ▪ Low   Not Hard, Probably Doable
• Classify Importance
  ▪ High   Showstopper, Must Have
  ▪ Medium
  ▪ Low   Not Vital, Nice to Have

Prioritizing Risks
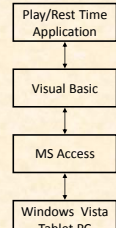

Case Study: Basketball App

- For Each Player, Track
  - Minutes Played
    - Game Clock Time
    - Consecutive & Total
  - Minutes Rested
    - Wall Clock Time
    - Consecutive
- Must Be Usable
  - On the Bench
  - In Real Time

Basketball App Architecture

Basketball Playing/Resting Time
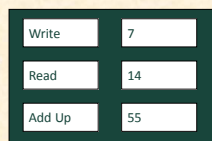
Basketball App Risks?

- How do I program in VB?
- How do I make a GUI in VB?
- What SDK should I use?
- How do I interface VB with Access?
  - Create/Open/Save a Database?
  - Read/Write Records?
  - Traverse Records?
- How do I do clocks in Windows?
  - Game Clock?
  - Wall Clock?

How would you classify these risks?

Mitigating Risks

- Use Existing Resources
  - Including But Not Limited To
    - Product Demos
    - Book Sample Code
    - Downloadable Examples
    - Etc...
  - Test Drive
    - Install
    - Compile
    - Extend
    - Etc...
- Build Prototypes
  - Single Purpose
  - Quick-and-Dirty

Nota Bene:
1. Check license if including in project.
2. Document.
3. Inform client.

Basketball App Risk Mitigation

- Game Clock
  - Start /Stop
  - Counts Down
  - By Minutes/Seconds
- Handling Access Records
  - Write Number
  - Read Number
  - Add Up Numbers

| Start | 19:55 |
| Stop | |

Write	7
Read	14
Add Up	55

Capstone Examples

- 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

What are your risks?

Project Schedule and Risk

✓ Risk

➢ Project Schedule

• Teamwork

Where do you start?

• Project Plan

• Prioritized Risks

• Feature Set(s)

• Fixed Milestones
  ▪ Course
  ▪ Client

Tradeoffs...

Features

vs.

Time

Are there fixed milestones in the "real" world?

Major Milestones

• 08/31: Capstone Overview
• 09/05: (Labor Day, No Meeting)
• 09/07: Project Plan
• 09/12: Project Schedule and Risk
• 09/14: Team Status Reports
• 09/19: Resume Writing and Interviewing
• 09/21: Team Project Plan Presentations
• 09/26: Team Project Plan Presentations
• 09/28: Team Project Plan Presentations
• 10/03: Team Project Plan Presentations
• 10/05: Career Gallery
• 10/10: Prototyping
• 10/12: Creating and Giving Presentations
• 10/17: Team Alpha Presentations
• 10/19: Team Alpha Presentations
• 10/24: Team Alpha Presentations
• 10/26: Team Alpha Presentations

• 10/31: Design Day and the Project Videos
• 11/02: Camtasia
• 11/07: Team Beta Presentations
• 11/09: Team Beta Presentations
• 11/14: Team Beta Presentations
• 11/16: Team Beta Presentations
• 11/21: Team Status Reports
• 11/23: Team Status Reports
• 11/28: Ethics and Professionalism
• 11/30: Intellectual Property and Copyright
• 12/05: Team Project Videos
• 12/07: Team Project Videos and All Deliverables
• 12/08: Design Day Setup
• 12/09: Design Day
• 12/15: Team Project Videos

Project Parts

• Break Down Project
  ▪ Main Parts
  ▪ Sub-Parts
  ▪ Sub-Sub-Parts
  ▪ Etc…
• Categorize
  ▪ Risks
  ▪ Dependencies (Particularly Risk Dependencies)
  ▪ Priorities
• Worry About
  ▪ Interfaces Between Parts
  ▪ Integration of Parts

Building A Project Schedule

• Start With Fixed Course Milestones
• Estimate Times for Tasks for Parts
  ▪ Building
  ▪ Integrating
  ▪ Testing
• Assign Tasks to Team Members
• Must Keep Everyone Busy All the Time
• Use "Short" Deadlines (E.g., 2-3 Days) Why?
• Document and Track
  ▪ Microsoft Project?
  ▪ Collaboration Tool?

Estimating Time for Tasks

• Rough Estimate
  ▪ Intuition
  ▪ Experience
• Refined Estimate
  ▪ Prototype or Partial Build
  ▪ Extrapolation
  ▪ E.g., 2 Days to Build 1 → 6 Days to Build 3
• Keys
  ▪ Be Realistic
  ▪ Include Buffer Time if Unsure
• Adjust Schedule Accordingly

Typical Build Cycle

Until Project Done Do

1. Divide Next Big Task Into Little Tasks
2. Assign Little Tasks to Team Members
3. Complete Little Tasks
   a. Implement
   b. Test
4. Integrate Little Tasks Into Big Task   } Very
5. Test Big Task   } Important

   High Priority Risks Get High Priority Scheduling

Revision Control

- Versioning
  - Discrete "Internal" Versions (States)
  - May Correspond to Builds
- Revision Control Systems
  - Check Code In and Out   } Can Be
  - Mark Specific States as Versions   } Serious
- Motivation   } Problem
  - Build Breaks System
  - Revert to Earlier Build
  - Avoid Bridge Burning
- Examples
  - Visual SourceSafe
  - GNU RCS (Revision Control System)

Living Schedule

- Schedule Is Dynamic
  - Unforeseen Problems
  - Added Features (Avoid Feature Creep)
  - Etc..
- Track Your Progress
  - Microsoft Project?
  - Collaboration Tool?
- Revisit Schedule Often
  - Weekly Team Meetings
  - Weekly Triage Meetings with TA
  - Identify Slippage
  - Hold Each Other Accountable (or Contact TA or Me)
  - Set Corrective Action
  - Adjust Schedule

Project Schedule and Risk

✓ Risk

✓ Project Schedule

➢ Teamwork

Team Organization

- Up to Each Team
- Organize into Roles
  - Client Contact
  - Program Manager
  - Developer
  - Tester
  - Systems Administrator
  - Web Master
  - 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 TA
- 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   5
  - Total   70
- Individual (30%)
  - Technical Contribution   10
  - Team Contribution   10
  - Team Evaluation   5
  - Meeting Attendance   5
  - 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.

Team of Peers

Effective Team Members
- Relate as Equals
- Have Specific Roles and Responsibilities
- Respect Specific Roles and Responsibilities
- Empowers Individuals in Their Roles
- Have Specific Skills
- Hold Each Other Accountable
- Drive Consensus-Based Decision-Making
- Give All Members a Stake in the Project

Potential Problems

Over and/or Under
- Bearing
- Qualified
- Achiever
- Etc…

Mutual Responsibility

- You are your "brother's/sister's keeper".
- Responsible For
  - Your Contribution
      and
  - Your Teammates' Contributions
- What Won't Work
  - "They never asked me to do anything."
  - "They never let me do anything."
  - "He/she never asked to do anything."
  - "He/she never wanted to do anything."
  - Etc…

Team Evaluation Form

- 5% of Final Grade
- Rate Each Team Member
  - Technical Contributions
  - Overall
    - Effort
    - Performance
- Other Questions
  - 8. Describe the contributions of each team member, starting with you. Be specific. Include comments about your/their individual technical contributions as well as your/their contributions to the team as a whole.
  - 9. Whom do you feel did the best (either in effort or overall contribution to the team)? Why? Be specific.
  - 10. Whom do you feel did the worst (either in effort or overall contribution to the team)? Why? Be specific.

Team Problems

- Can Be
  - Really Hard
  - Awkward
  - Frustrating
  - Etc...
- Addressing Problems
  - ASAP
  - Directly
  - Respectfully
  - Maturely
- Resolving Problems
  - Internally First
  - See Dr. D. and/or TA Next but ASAP (Don't Wait)
- "Bad" Team Not an Acceptable Excuse

Potential For Bad Effect on 70% of Your Grade

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✓ Project Schedule

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What's ahead?

- M, 09/12: Project Schedule and Risk
- W, 09/14: Team Status Reports
- M, 09/19: Resume Writing and Interviewing
- W, 09/21: Team Project Plan Presentations
- M, 09/26: Team Project Plan Presentations
- W, 09/28: Team Project Plan Presentations
- M, 10/03: Team Project Plan Presentations
- W, 10/05: Career Gallery

What's next?

- Team Status Report
  - PowerPoint Template
  - Due Midnight, Tuesday, September 13
  - Email to Dr. D.
    - Subject: Team <Company Name>: Status Report
    - Attach: team-<company-name>-status-report.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)

The key word is "status".

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UNIVERSITY

09/19:
Resume Writing and Interviewing

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