CSE 490RA

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Course goals

- For students
  - Programming experience on Tablet PC
  - UI and Design experience
  - Work in team
  - Develop an application for an external customer

Course goals

- For Richard Anderson
  - Build undergraduate expertise in Tablet PC development
  - Prototype of TPC capstone
  - Ugrad curriculum shift

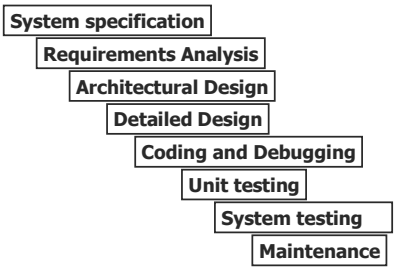
Course goals

- For Chris Mason [I'm making these up]
  - Explore approaches to diagnostic tools
  - Build ties with UW CSE
  - Get to know UW Programs and what students can accomplish
  - Artifacts to show to Schindler
    - Justify time spent with UW
    - Suggest R&D Directions for Schindler

Team organization

- Classic software teams
  - Program manager
  - Developers (Dev lead + devs)
  - Test
  - Documentation/UI
- Other models
  - Fad of the day

Waterfall model (McConnell)



Requirements

- "Gather and document the functions that the application should perform for the users in the users' language and from the users' perspective"
- Requirements should neither constrain nor define methods of implementation

Challenges of requirements gathering (Kulak, Guiney)

- Finding out what users need
- Documenting users' needs
- Avoiding premature design assumptions
- Resolving conflicting requirements
- Eliminating redundant requirements
- Reducing overwhelming volume
- Traceability

Use case

- Overview of interactions
- Text details
- Example
  - Authenticate User
    - Actors: User, Unauthorized user
    - Summary: Users request entry to the system, valid credentials allow access

User requirements

- Requirements from the user's point of view
- Expressed in the user's language
- Based on understanding of user's application
- Does not define implementation
- How do we get them???

Requirements gathering

- Understand application from users perspective
  - An application which doesn't match needs won't be purchased, or won't be used
- Building for a specific customer
- Building a widely used application, getting requirements from representative users

Understanding use case

- Not asking users to define the application
- Observations, Interviews, Examination of artifacts, Focus Groups
- Ethnography
  - Branch of anthropology dealing with the scientific description of individual cultures

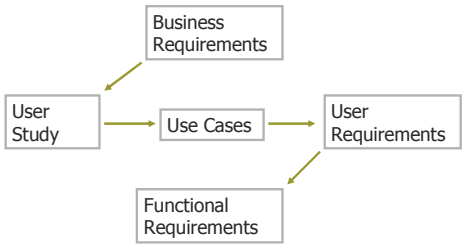
Field observations

- Protocols developed in many academic fields
- Event based
- Narrative

What do you do with the data?

- Define user experience of application
- Application must support the process
- Efficient handling of common cases
- Ability to handle exceptional cases (which aren't all that exceptional!)
- Develop feature lists

User requirements



Software project failures

- Software projects have a reputation for failure
  - Probably well deserved
  - Many examples of massive cost over runs, release delays and cancellations

Project Failure

- Not delivering working program on targeted date
  - Overrun on time/budget
  - Under delivery of functionality or quality

All to common case

- Project starts out fine, with a few minor changes in requirements, delays of supporting activities and changes in personnel
- Coding proceeds at a good rate with most modules almost working at the point when the system is to integrated

Then everything goes wrong

- Integration reveals incompatibility between components
- Integration reveals severe bugs in components
- Unexpected hardware or software change
- And a few random disasters
  - Source code lost, key people directed to other tasks, sudden changes in requirements or schedule

What happens next

- Devs code like hell
  - Fixing and patching bugs
  - Significant changes in architecture or functionality on-the fly
- Test and documentation held up
  - "The build is broken – I can't do anything"
- Long hours
  - Negative team dynamics
  - Damage control activities

Day of reckoning

- Substandard product shipped
  - "It's just version 1.0 – we can issue an upgrade"
- Schedule shifts
- Project cancelled or downgraded

Classic Mistakes

- McConnell, *Rapid Development*
  - People related mistakes
  - Process related mistakes
  - Product related mistakes
  - Technology related mistakes

People issues (high level)

- Personnel management
  - Functioning team
- Relationship with customer
- Management issues
  - Management support and competence

People related mistakes

- Motivation
- Weak personnel
- Problem employees
- Heroics
- Adding people to a late project
- Crowded offices
- Friction between dev and customers
- Unrealistic expectations
- Lack of sponsorship
- Lack of stakeholder buy-in
- Lack of user input
- Politics over substance
- Wishful thinking

Process issues (high level)

- Accurate planning
  - Realistic scheduling
  - Contingency planning
- Paying attention to all stages of product development

Process related mistakes

- Optimistic schedules
- Insufficient risk management
- Contractor failure
- Insufficient planning
- Abandonment of planning under pressure
- Wasted time in “fuzzy front end”
- Shortchanged upstream activities
- Inadequate design
- Shortchanged QA
- Insufficient management controls
- Premature convergence
- Omitting necessary tasks from estimates
- Planning to catch up later
- Code-like-hell programming

Product related mistakes

- Requirements gold-plating
- Feature creep
- Developer gold-plating
- Push-me, pull-me negotiation
  - Adding new tasks when schedule slips
- Research-oriented development

Technology related mistakes

- Silver-bullet syndrome
- Overestimating savings from new tools or methods
- Switching tools in the middle of a project
- Lack of automated source-code control