PROPOSAL ANATOMY

CS/ECE 3992

BASED ON SLIDES FROM AL DAVIS AND KEN STEVENS

Proposal Anatomy

- Purpose
- Format
- Details

Purpose

- Demonstrate benefit and motivation for idea
- Show that you understand project:
  - Business issues: market, window of opportunity, etc.
  - Design requirements
  - Personnel requirements
  - Cost: NRE, materials, etc.
  - Risks and rewards

Problem Finding

- Computers make it easier to do a lot of things, but most of the things they make it easier to do don't need to be done.
  - —Andy Rooney

Features

- Normal people believe that if it ain't broke, don't fix it. Engineers believe that if it ain't broke, it doesn't have enough features yet.
  - — Scott Adams

Format

- "Format" vs. "Formatting"
  - Format is pretty standard even if the specific formatting can be flexible
  - That being said, there are a few standard formatting styles that you should be aware of
    - IEEE, ACM, Chicago Manual of Style, MLA, APA
    - More on this later…

Overall Format

- Title Page
- Introduction and Motivation
- Project Tasks
  - Specific Task Interfaces
- Testing and Integration Strategy
- Group management and communication plan
- Schedule and milestones
- Risk Assessment
- Bill of Materials
  - Vendor List
- Conclusion
- References
  - Cite everything - publications, web, personal advice

Basic Format - Title Page

- Title
- Group List
  - Names and email contact information
- Project Web URL: Repository for design documentation
  - Meeting synopses
  - Decision log
  - Parts documentation
  - Project proposal and reports
- Continue next semester until project completed
  - Start web tracking soon (as noted on class web page)

Motivation

- Why are you interested in this project?
  - common: skill development, problem need, future product zeal
  - key: if you're psyched you'll do a better job
- Functional project synopsis
  - Describe the scope of what it is and what it will do
    - No need for details on how it will be done
- How completed project will be demonstrated
  - Define success
  - Aimed at general audience
  - See if your mother can read and understand it

Project Tasks

- Break work into specific tasks
  - Each task should be easily understood
  - Include documentation as a task!
- Individual task descriptions
  - Interfaces!
    - Inputs and outputs - both logical and physical
    - Function
  - Personnel requirements per task
  - Estimated time for completions

Interfaces

- Each task interfaces to one or more others
  - Interfaces must be defined, or they won't be comparable
- HW-SW interfaces
  - Specify HW capabilities
  - Specify logical interfaces to SW
- The better, and more complete, your interfaces descriptions, the more fun you'll have next fall!
  - Surprises == problems…

Documenting Interfaces

- The name of a Type instance is a Name instance representing the name of the Type; its value may not be a null name....The name of an Instance instance is optional, but where it exists it must not be a null name....An Instance instance with no name is always considered to have a unique name, distinct from any other Instance instance with no name.
  - —Rational UML Document Set, Semantics, Chapter 5.2

Testing Strategy

- Describe testing plan for each task
- Describe integration plan
  - How will the smaller components come together?
- Don't even attempt to not take this seriously!
  - “plug everything in and hope” will not work…
  - …and demonstrates that you’re a poor engineer

Testing

- “ It's hard enough to find an error in your code when you're looking for it; it's even harder when you've assumed your code is error-free. ”
  - - Steve McConnell

Group Logistics

- Good communication is key
- Weekly team meetings are required
  - Create a log on your project web site
    - Time, Duration, Attendance
    - Completion status of previous tasks
    - Substantive points discussed
    - Decisions made
    - New tasks assigned (“action items”)
    - Assessment of team progress
    - Anything else you’ll need to refer back to

Schedule and Milestones

- Complete flow diagram
  - Show tasks, team members, completion projections, etc.
- Milestones
  - Fall is 15 weeks long…
  - … at least every three weeks
    - each person needs to specify a milestone
    - and specify how that milestone will be demonstrated
- This is your schedule, and part of your fall grade!

Risk Assessment

- Some tasks are simple, some aren't
- Each task should have a risk assessment and mitigation plan
  - Nature of the risk
    - Lack of knowledge? Lack of experience? Complexity? Hard to find parts?
  - You should minimize risk with mitigation plan
    - What happens if the risk manifests in error?

Risk

- "It does not do to leave a live dragon out of your calculations, if you live near him."
  - — J.R.R. Tolkien, The Hobbit

Bill of Materials (BoM)

- Complete component list
  - Primary vendor and secondary vendor
    - part number, lead time, unit cost, quantity, form factor, packaging, etc.
  - Other resources that you need
    - Things you need from the U
    - Other infrastructure

Vendor List

- Provide a detailed list
  - Vendor name, address, web site, etc.
    - I might follow up… just to help avoid problems
  - Include sales person's name if appropriate
    - Be wary - their job is to sell
  - Notes on anything special

Demo Description

- Describe you you'll show off your working system
  - Describe any additional logistics needed for a good demo
  - Describe what parts of the system will be highlighted in the demo

Demos

- "No matter how slick the demo is in rehearsal, when you do it in front of a live audience, the probability of a flawless presentation is inversely proportional to the number of people watching, raised to the power of the amount of money involved."
  - —Mark Gibbs

Conclusions

- Assessment of dependencies between milestones
- Synopsis of the key risk components and when they will turn low
- Final advertisement of why this project is so cool and how amazing the demo will be
  - Technically optional in proposals, but I think it's good to tie things up

References

- NOT optional
- Cite everything that you use from other sources
- Technical documents use endnotes, not footnotes
- Use a standard citation format
  - IEEE, ACM, Chicago, MLS, etc.

Plagiarism

- "What a good thing Adam had. When he said a good thing, he knew nobody had said it before."
  - - Mark Twain

Background Research

- “Google' is not a synonym for 'research'.”
  - — Dan Brown

Getting Started

- There's no such thing as writer's block. That was invented by people in California who couldn't write.
  - - Terry Pratchett