PROPOSAL WRITING

Proposal Writing

* Motivation

* Purpose

* Tactics

Benefits of Writing Well

* We hold written documents to a higher standard than speech

    * Good writing won't make up for bad ideas though

    * Writing down an idea can help make it better

        * Bad organization is easier to see

        * Holes in an argument can be more apparent

    * Often writing down a bad idea can make it go away!

Writing

* Writing often occurs over a longer period of time and is state preserving

    * Unlike thoughts which morph

    * Or speech which is even more ephemeral

* Good writing often evolves

    * One of the points of this lecture is to think about it as a process

Inspiration

* "You can't wait for inspiration. You have to go after it with a club."

  * — Jack London

Writing as Communication

* Nuances vary with document type, of course

  * Notion of permanence

    * Research papers, specifications, standards

    * Historical documents

  * Making things "official" and binding

    * Laws, contracts, etc.

  * Augments the human memory

    * Record of decisions and reasons

    * Clarifies what was planned

Your Proposal

* Has aspects of all the previous ideas

    * Records intent

    * Clarifies goals and methods

    * Has permanence

    * Essentially a contract relate to your grade…

Writing Skills

* No silver bullet

    * Writing well requires practice

    * Writing well requires discipline

    * Writing well requires time

Writing

* "Write. Rewrite. When not writing or rewriting, read. I know of no shortcuts."

  * —Larry L. King

Learning to Write

* "It's none of their business that you have to learn to write. Let them think you were born that way."

  * —Ernest Hemingway

Writing Skills

* Necessary and largely sufficient conditions:

  * **A good idea**

  * **A good story**

    * It must be clear and organized

  * **A technically correct presentation**

    * If you can't write clearly and correctly no one will read or care

    * This is true at each grain size

      * Clauses, sentences, paragraphs, subsections, sections… they ALL have to make sense and be organized

Academic Proposals

* Solicit advice and interest from advisor

* Establish a contract with a sponsor/advisor/company

  * True for dissertation and external research proposals

* Review credibility before committing resources

  * Both time and money

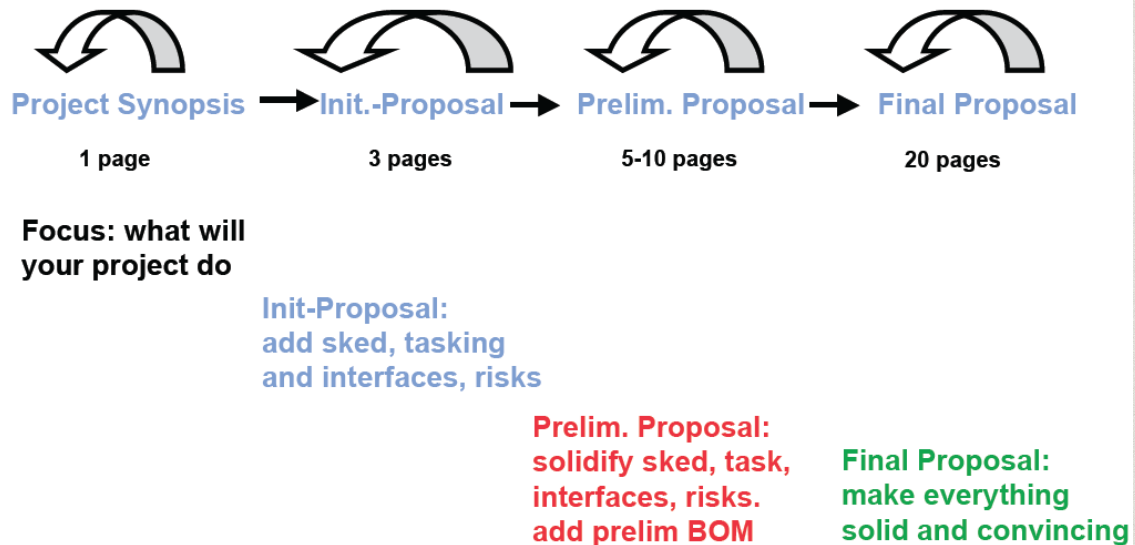 * The biggest role for this particular course

Proofreading

* "Dew knot trussed yore spell chequer two fined all your mistakes."

    * —Brendan Hills

Academic Proposals

* Personal Benefits…

    * Help you thoroughly think through a problem before committing resources

        * Saves both time and money

        * Often the least recognized benefit

        * Often the most important benefit

Proposal Tactics

Tactics: From Ideas to Final Proposal

Project Synopsis → **Init.-Proposal** → **Prelim. Proposal** → **Final Proposal**

1 page   3 pages   5-10 pages   20 pages

Focus: what will your project do

Init-Proposal: add sked, tasking and interfaces, risks

Prelim. Proposal: solidify sked, task, interfaces, risks. add prelim BOM

Final Proposal: make everything solid and convincing

Revising

* "Rewrite and revise. Do not be afraid to seize what you have and cut it to ribbons ... Good writing means good revising."

    * —W Strunk Jr

* "The best writing is rewriting."

    * — E. B. White

Proposal Tactics

* Focus:
    * What is the key idea?
* Pre-Proposal:
    * What is the key idea?
    * Why is it interesting?
* Proposal:
    * What is the key idea?
    * Why is it interesting?
    * How will it be done?

* Paper
    * What is the key idea?
    * Why is it interesting?
    * How will it be done?
    * How well did it work?

Documentation

* "Every technology really needs to be shipped with a special manual-- not how to use it but why, when and for what."
    * — Alan Kay

Statement of Focus

* Writing a good one is very hard

  * Need a single sentence that captures the essence of the idea

  * Need a clear hook to capture the reader's attention & imagination

    * Lead with the idea?

    * Lead with the background?

    * Lead with the relevance?

Statement of Focus

* No pat answer – try it multiple ways and see what works

  * Ideas influence the organization

  * Personal style also contributes

    * Bottom up or top down.
      …in the beginning there was a hydrogen atom . . .

* You may need to

  * Consider several ideas

  * Write focus statements for each until a winner emerges

On Complexity

* "It's more important to be nearly right and understandable than to be academically accurate and unintelligible."

    * —Unknown

Proposal as Information

* Make sure the following questions are answered

    * What is the problem?

    * What existing work relates to this problem?

    * Why is the problem significant?

    * What strategy is being proposed for attacking this problem?

        * What is the thesis that forms the core of this proposal?

        * What will be done to support the validity of this thesis?

    * Why is this a good strategy

        * Do preliminary results support this strategy?

    * What will be the original contribution of this work?

A Good Proposal Must Be…

* Written concisely

* Clear

* interesting and attract the audience attention

* Informative and demonstrate your understanding of the proposed project and its issues

Grammar

* "Remember to never split an infinitive. The passive voice should never be used. Do not put statements in the negative form. Proofread carefully to see if you words out. And don't start a sentence with a conjugation."

    * —William Safire

Communication Efficiency

* Quantitative metric but subjectively applied

    * You get a + score if your reader learns something

    * You get a - score if your reader gets more confused than before the reading

    * You get a bigger positive number if you use fewer words to teach

    * You get a bigger negative score if you use more words to confuse

On Complexity

* "Making the simple complicated is commonplace; making the complicated simple, awesomely simple, that's creativity."

    * —Charles Mingus

Elements of a Proposal

* Abstract

* Introduction

* Background

* Proposed Work

* Schedule

* Required Resources

* Summary

* Bibliography

Document Length

* "This report, by its very length, defends itself against the risk of being read."

    * —Winston Churchill

Outlines are Your Friend

* Common problem is document flow

    * Evidence is a confused reader, redundancy, etc.

* Two types of outlines

    * Normal

        * Plot your flow

        * Refine to individual paragraphs

        * Even refine to sentences if a paragraph seems confusing

    * Reverse

        * Create an outline from an existing document

        * At the paragraph level - what is it saying - does it make sense?

Abstract

* A brief summary of the proposal

    * The nature of the problem

    * Importance of the problem

    * Objectives of the research of effort

    * Outline methodologies to be used

    * The hoped for accomplishments

* • A note on brevity

    * *If you can't write an abstract in a few sentences, you probably don't really understand your idea very well!*

On Brevity

* "The most valuable of all talents is that of never using two words when one will do."

    * — Thomas Jefferson

Introduction

* Content

    * A few paragraphs describing the problem and the proposed research

* Not a summary

    * Don't duplicate the abstract!

* You must convince the reader that

    * The problem is interesting

    * And that you have defined the problem sufficiently will that results are likely

Introduction

* **Opening paragraph**

  * Is the most important

  * It must capture the readers interest

    * Without resorting to hyperbole

      * Remember we're engineers not sales people

    * Without exaggerating or making unsupportable claims

      * They just start the bogon alarms in the reviewer's mind

Introduction

* **Focus on the idea and the problem**

* **Common errors**

  * Describe the problem and just say you'll solve it

    * Method and prior results missing

  * Describe the technique without the problem

    * I'll build a system to do x

    * Note: for a project this may be okay

      * It is preferable to have a problem to solve. That is what engineers do!

Goals and Objectives

* **Often organized to correspond with milestones**

  * Emphasize what is to be accomplished

    * Not how it will be done

  * Often appears with other sections

    * Part of the introduction for high level goals

    * Part of the schedule for more detailed goal

Goals and Objectives

* **BEWARE**

  * Poorly defined objectives are a common trait for efforts that are doomed from the start

  * Don't spend time on the project/research until you are clear about the goals!

Getting it Right

* "Then you should say what you mean," the March Hare went on. "I do," Alice hastily replied; "at least —at least I mean what I say — that's the same thing, you know." "Not the same thing a bit!" said the Hatter. "Why, you might just as well say that `I see what I eat' is the same thing as `I eat what I see'!"

  * — Lewis Carroll

Background

* Review of previous work related to your topic, work that you use, or alternate approaches

  * Contrast and compare them with your work

  * Organize into logical groups

  * Need not be exhaustive but MUST be representative

* Work cited should be:

  * Pertinent

  * Correct

  * Able to demonstrate your knowledge of the field

Background

* Proper length

  * Too short

    * Writer is either lazy or uninformed

  * Too long

    * Writer may not understand the problem clearly

Proposed Work

* Specific aims

  * Outline the activities

  * Describe specific steps

  * Emphasize how the goals will be achieved

* Demonstrate

  * You have defined your problem well

  * You have a clear understanding of how to attack it

Proposed Work

* Rationale

    * Why should this work be done at all

    * Why should it be done the way it's being proposed

        * Important when several approaches are possible

* Originality

    * What's different about the proposed effort

        * Required for Ph.D. dissertations

Writing Style

* "Put it before them briefly so they will read it, clearly so they will appreciate it, picturesquely so they will remember it, and above all, accurately so they will be guided by its light."

    * —Joseph Pulitzer

Proposed Work - Plan

* Steps of your intended solution

    * Integrated with aims but more specific and more procedural

    * What will be done and how

* Appropriate level of detail

    * This is a tough one. Provide enough so your reader knows:

        * You have thought through your problem

        * You have already developed an approach which has reasonable chance of success

    * Excessive detail won't be read

        * When the page budget is fixed you lose on this one

Proposed Work

* Preliminary results

    * Best way to demonstrate credibility

    * May not apply as much for this class…

* Downside

    * Weakens creativity claims

        * Is the proposal just an evolutionary work since the original part has already been done?

* Options

    * Present preliminary work as seed work to provide proof of concept for the approach

    * Preliminary work responsible for the development of of the current thesis

Proposed Work

* Illustrations are very useful

  * Provides succinct overview

    * Problems, approach, sample results

  * Shows how various tasks fit together

    * Shows temporal dependencies

    * Shows task parallelism

      * Critical for multi-person projects

Three Levels of Detail

* Goals and Objectives

  * Declarative and high level

* Specific Aims

  * Declarative but specific

  * What needs to be done

* Plan of Work

  * Procedural and with operational details

Schedule

* Shows work flow in a temporal sense

    * Often done graphically (GANT chart)

* Demonstrates organization and understanding of project tasks

* Estimated start and completion dates

    * Good ones also include specific resource usage

* Realize

    * Scheduling things accurately requires LOTS of practice

    * In academia we usually don't do this well

        * So be conservative

        * Include testing and documentation in your schedule!

Demonstration

* How will the work be evaluated?

    * What constitutes success

    * What criteria or tests must be met

        * How do you test that they have been achieved

        * Stay away from subjective measures

    * Best is a scientific metric

* *Note:* very few proposals do a good job on this

    * Distinguish yourself from the mutts and nail this one

Presentations

* "Present to inform, not to impress; if you inform, you will impress."

  * —Frederick P Brooks

Required Resources

* Proposals have a budget

  * The necessary resources need to be described and justified to make the budget acceptable

    * People, parts, space, test equipment, etc.

  * Inherently more complicated in Computer Engineering due to electronics requirements

  * Need to distinguish between standard resources that are available at your institution vs. project specific need that need to be acquired in order to make the project succeed.

Proposal Summary

* What will be the significant contribution of this work?

    * Significance of the research is the focus

    * Emphasize original contribution

    * For Senior Projects…

        * Also can emphasize the educational value

        * e.g. you want to develop skills in doing X

    * Make sure you don't duplicate the abstract and introduction

Bibliography

* You should include an Acknowledgment section before the Bibliography if individuals provided direct support in terms of funding or technical help to complete the project.

* The bibliography contains related work and indirect information you received through publications.

    * Complete list of references cited

        * Web references are OK

        * Published references are preferred

Proper Citation

* A primary issue in professional ethics

  * Academics take this particularly seriously

    * Don't be a plagiarist!

  * Companies take this particularly seriously

    * They need to distinguish their IP from external IP

    * Failure here leads to costly legal battles

Writing Process

* "I hate writing, I love having written."

  * — Dorothy Parker