What's a Proposal For?

It establishes your credentials for a project and determines whether you will get it.

It usually establishes the scope of work for a project.

It definitely determines how much money you get.

It is a team planning document

Written Proposal

Executive Summary (1 page maximum)

A. **Specific Aims (1 page maximum)**
B. **Background (~2 pages)**
C. **Preliminary Work / Design Possibilities (3-4 pages)**
D. **Design Approach to be used (~1 page)**
E. **Milestones and Schedule (~1/2 page)**
F. **Cost Estimate (~1/2 page)**
G. **Expected Problems and how they will be resolved (~1 page)**

Total length should be no greater than 10 single-spaced pages, including figures but excluding the Executive Summary and a title page

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Questions that should be answered by Background

Significance of project

> **What is new?**
> **What is different?**
> **Why is it important?**

How does it fit in with things that have already been done?

> This section should review the state-of-the-art and/or relevant scientific literature.

Why should our group be doing it?

Background (~2 pages)

Potential Design Approaches

Commercial State-of-the-Art

Research (Literature Review)

IEEE Sources

Spectrum, Potentials and Proceedings of the IEEE

IEEE Specialized Publications

Total of 126 titles in technical areas ranging from computer engineering and biomedical technology to electric power and wireless technology:

Magazines

Technical papers

Conference Proceedings

Books

Go to http://ieee.org/web/publications/home/index.html

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Spectrum, Potentials and Proceedings of the IEEE

IEEE Technical Society Magazines

Aerospace & Electronics Systems
Annals of the History of Computing
Antennas & Propagation Magazine
Circuits & Devices Magazine
Circuits and Systems Magazine
Communications
Communications Surveys and Tutorials
Computer
Computer Graphics & Applications
Control Systems Magazine
Design & Test of Computers
Distributed Systems Online
Electrical Insulation Magazine
Engineering in Medicine & Biology
Engineering Management Review
Industry Applications Magazine

Instrumentation & Measurement Magazine
Intelligent Systems
Internet Computing
IT Professional
Micro
Microwave Magazine
MultiMedia
Network
Pervasive Computing
Power and Energy Magazine
Robotics & Automation Magazine
Security and Privacy Magazine
Signal Processing Magazine
Software
Technology & Society Magazine
Wireless Communications

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Comments on Literature Citations

Take the approach that the reader is your adversary.
    You are trying to convince your reader that you are right, and your reader is likely to be looking for evidence that you are wrong. By citing publications in the scientific and engineering literature, you are providing authoritative outside evidence that what you say is correct . . .

and you are protecting yourself from someone else's error – as well as charges of plagerism.

Web citations are becoming increasingly acceptable. Be sure to include date you accessed a website.

Personal experience is important, but it is generally not acceptable as documentation. If you must use personal experience, give details on how your conclusions from the experience were formed.

Examples of problem statements
"Developing this type of algorithm for use on this processor is something that has not been done before."
A statement like this cannot stand by itself. It must be supported. You can support it by reviewing what has been developed for the processor and noting that none of the applications involve the algorithm of interest.

"This approach has . . . already . . . been published in several papers . . ."
To support a statement like this, you need to list (cite) at least two papers.

"Based on our research, the best approach is to . . ."
Not enough. You need to describe the research with enough detail to allow the reader to draw the same conclusion you did.

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Preliminary Work/Alternatives (3-4 pages)

Describe alternative design approaches

Hardware

DSP chip/microcontroller

Experience with development environment

Computer

Peripherals

Language

Arguments for selected approach

Technical capabilities

Cost and experience

Development time

Milestones (~1 page)

Identify key tasks of project

- Which tasks can be done independently and which depend on previous work
- How much overlap is possible
- How many people will work on each task
- Estimate time for each task

Progress presentation should address milestones

Schedule (1/2 page)

Tasks

Can sequential tasks be completed in time?
Who is doing what?

Parts

Sources
How long will it take to get them?

Time frame

Proposals due Feb. 3.
Six weeks – Mar. 24 progress presentation
Four more weeks –Final presentation Apr. 21,
Design Expo (Apr. 23 Senior Design Expo)
Final report due Apr. 30.
Need time for debugging and testing

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Cost Estimate (1/2 page)

A. Development costs

What will it cost you to design and build a prototype?

Parts needed

Availability and sources

Funding—some is available from ECE Dept. Proposal should present specific, detailed request. Please coordinate this request with Jim Lyle (room 364 lyle@engr.pitt.edu)

B. Production costs

What would it cost to produce the product in market-sized quantities for sale?

Expected Problems (~1 page)

Purpose of this section is to show you have thought through the project and have some expections of how it will turn out

> **Identify bottlenecks in project**
>
> **Identify technical hurdles**
>> **What don't you know how to do**
>>
>> **Devise alternatives in case problems can't be solved in time**
>
> **Parts sourcing problems**

Oral Proposal Presentation

12-15 minutes

About 1 slide per minute (less than 15)

Be selective - you can't explain everything

Title slide should include team members, advisor, and acknowledgement of any outside groups you are working with. You are to give Angela a copy of the title slide after your presentation.

Comments on Proposals (and final reports)

1) A proposal or report is a sales document – you are trying to sell a project to someone (boss, customer, investor). You have to be convincing. Remember that you are trying to convince your reader that you are right, and your reader is likely to be looking for evidence that you are wrong.

2) The Executive Summary is <u>not</u> an introduction. It needs to include technical detail about what is to be done and why it should be done. You will need some introduction for the summary to make sense, but use as little a possible. (This is part of the art of writing summaries.)

3) Background should include a general introduction to the problem. This is where you cite references to the state-of-the-art and current research. Justify that what you are proposing is important and worthy of a senior design effort.

4) Don't just say that you have done such-and-such. Give sufficient detail for the reader to be able to evaluate the reliability of your results and the validity of your conclusions directly. Remember, the reader is your adversary, looking for holes in your arguments.

5) Reports should make the project look like it was planned and executed perfectly. Anything else is hard to understand. You can (should) discuss at the end what problems were encountered and whether they were solved.

6) Learn to be your own editor. Be tough. Unnecessary words are usually confusing.
Remember that behind every great novelist, there is a great editor who reduced the book length by two-thirds! (Okay, I made that up, but it is close.)

7) Use white space – bullets and lists can make a page much easier to read.

8) Be careful of how you use words. Avoid colloquial and picturesque language. It is likely to mean different things to different people.

9) Minimize repetition, even when you are forced to use an organization that is inherently repetitive.

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