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**Technical Writing**

In order to write effectively, one must know the audience. In technical writing, the audience is made of mostly scientists and engineers. Given that, one must write using a scientific method. Some of the rules for writing technically are given below. Another aspect of good technical writing, and writing in general, is format. The general guidelines for formatting are also described.

***Organization***

A general method for technical writing is:

1. introduce what you’re going to write about
2. write about it
3. conclude with a summary of what you wrote

Another way of phrasing the same concept is to:

1. State your objective
2. State what you did to reach the objective
3. State how you did it
4. State why you did it

Organize the paper in terms of ideas, or functionality. on VLSI into sections of:

1. schematic
2. layout
3. DRC, LVS
4. simulation, back annotation

For example, break apart a paper

Within each section, describe an idea per paragraph. First paragraph on schematic might be to describe the functionality of the circuit. Second paragraph may be the options considered, and why the one used was chosen.

A similar way to organize the paper is by the various charts, plots, tables, and other data. If you have data in the form of various simulations, then one can organize the paper by taking a paragraph to describe each of the simulations, and then conclude with what all the simulations have proven.

When starting a new section of the paper, use headers and sub-headers. One can automatically create a table of contents by organizing the headers appropriately.

***Style/Syntax***

Within each paragraph, sentences should be kept short. Compound sentences are discouraged for the following reason. While writing, keep in mind that the audience is technical, but is not intimately familiar with your work. It is a common mistake to assume that everyone else knows what you know. Therefore, long sentences, which mix

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various technical aspects, are difficult to follow. Keep ideas, and sentences, short and to the point.

Avoid using the first person (I, me, my) while writing. Technical writing is about inanimate objects, so placing ownership on it is discouraged. The idea is yours, but that is obvious by the fact that you are writing the paper. For collaborative papers, the same applies, but it is not followed as strictly. The usage of second person (you, we, ours), while discouraged, is seen in some papers. The way to avoid this common pitfall is to use “The” instead of “I”, for example, “I placed the schematic element” would be written as “The schematic element was placed”.

When describing the audience of the paper, the noun “one” is used. For example, when describing why the paper is relevant, instead of stating, “You can see the functionality of the schematic”, it would be written, “One can see the functionality of the schematic”.

Avoid using ambiguous terminology, such as “good”, “bad”, etc. Quantify as much as possible. For example, when comparing two different simulations, avoid writing “sim1 is better than sim2”; rather, “sim1 is 1.2ns faster than sim2”. Avoid non-technical jargon, such as “the bias can be, say, between 2 to 3 volts”.

Never say never - as in “NMOS is never used in today’s semiconductor designs”. Nothing is “easily seen”, “obvious”, or “simply done”. It may be true to you, but as soon as one says these phrases, you’ll be proven wrong.

While creating the document, and especially before a final version is turned in, do a spell checker. This will not catch all issues, such as real words used incorrectly (ex., ensure vs. insure). However, if words are misspelled, they stick out dramatically.

The tense of the document should be consistent. This is difficult to do, and in some cases, one would purposefully change the tense. In general, it is better to stick to the past tense. For example, “The schematic was placed and LVS is run” would be written “The schematic was placed and LVS was run”.

***Format***

The following are common rules of format to use when writing:

1. Either align the text to the far left, or indent every paragraph by 2-5 spaces (one tab character)
2. End every sentence with a period
3. Put two spaces in between every sentence
4. Avoid using bold font, except for Titles, Headings, Captions
5. Use captions for all tables, figures, graphs
6. Use a table of contents

***Citing References***

When writing something that is not yours, it needs to be referenced. If you do not reference a source that is used, it is called plagiarism. When citing, use footnotes and

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indicate the source at the end of the section (if it is a long document), or at the end of the document. The same applies to figures or other material that is not your creation.

Further reading:

The web sites below also describe some aspects of technical writing: <http://www.writing-technical.com/> <http://www.rbs0.com/tw.htm#anchor111>