

Key Skills for Computer Science

Lecture 5: Effective Writing

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Writing in a Technical Work Environment

- Informal:
 - email
 - post-it notes
- Formal:

Good (Technical) Writing Is...

- Unambiguous
- Economical
- Precise
- Correct
- Coherent
- Logical
- Self Contained
- Clear
- Scholarly
- Stylish

An Extreme Example of Style in a Technical Report

Tuesday, September 11, 2001, dawned temperate and nearly cloudless in the eastern United States. Millions of men and women readied themselves for work. Some made their way to the Twin Towers, the signature structures of the World Trade Center complex in New York City. Others went to Arlington, Virginia, to the Pentagon. Across the Potomac River, the United States Congress was back in session. At the other end of Pennsylvania Avenue, people began to line up for a White House tour. In Sarasota, Florida, President George W. Bush went for an early morning run. For those heading to the airport, weather conditions could not have been better for a safe and pleasant journey. [Across the eastern seaboard], 19 men boarded four transcontinental flights. They were planning to hijack these planes and turn them into large guided missiles, loaded with up to 11,400 gallons of jet fuel. By 8:00am on the morning of Tuesday, September 11, 2001, they had defeated all the security layers that America's civil defence then had in place to prevent a hijacking.

The 9/11 Commission Report

- The report attracted a good deal of interest at the time not just because of how important the subject matter was, but because of the style
- After reading that introduction:
 - who do you think the report was aimed at?
 - do you think this made the report more or less successful?
 - what are the dangers in using such a style?

(Some) Golden Rules of Technical Writing

Golden Rule #1: **The Aim is to Communicate;** **Everything Else is Secondary**

- A piece of technical writing will be judged on how effectively it communicates its message
- Anything which helps communicate the message is good; anything that gets in the way is bad
- Things that might help:
 - examples, diagrams, explanatory notes
- Things that might get in the way:
 - bad punctuation, illogical structure, bad spelling, cliches, obscure terminology, ...

Golden Rule #2: Know Your Audience

- A cliché, but like many clichés, it's a cliché because it's true
- In order to communicate effectively, you need to understand who is going to read your writing and *tailor your document to their needs*
- Key questions to ask yourself?
 - what terms will my audience already know, and what will they need to be told?
 - what do they hope to get from reading my document?
 - what are their expectations about documents of this type, and does my document meet them?

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Golden Rule #2: Know Your Audience

- Suppose you are writing safety regulations for a university, to be read by 1st year undergraduates -- which of the following newspaper styles would you suggest to adopt?
 - *The Times*
 - *The Guardian*
 - *The Financial Times*
 - *The Daily Mirror*
 - *The Daily Mail*
 - *The Telegraph*
- Now suppose the regulations are to be read by academics -- which style might be most appropriate for them?

Golden Rule #3: **Know What you Want to Say**

- A key problem in many scientific papers is that it is not at all clear what message the authors are trying to get across
- It may help to simply write down in bullet point form the main things you want to get across in your document
- These can then help you in structuring the document

Golden Rule #4:

Draft; Proof Read; Edit; Proof Read; Edit; Proof Read; Edit; Proof Read; ...

- “Easy reading is damn hard writing” (Nathaniel Hawthorne)
- The *only* way you will succeed to write effective documents is to go through a series of edits
 - generate a first draft, and print (you can’t proof read on screen)
 - “red ink” it -- proof read and mark up with corrections, in red ink -- correct typos, rewrite, restructure, ...
 - edit it according to your proof read copy
 - goto (1)
- Reading it out loud is the single most effective way to tell whether its good or not

Golden Rule #5:
Everything included is Essential;
Nothing is included that isn't Essential

- The goal is to *tighten* a document until it reaches a stage where nothing can usefully be added, and nothing need be deleted without reducing comprehension
- Avoid repetition!
- Repeated edits are really the only way to do thi

Golden Rule #6: Definitions before Use

- *Never* use a term before you have defined it, unless you are absolutely certain that it is a commonly accepted term for your audience

Golden Rule #7: **No Jokes**

- (Attempts at) humour are simply best avoided in technical documents
- Somebody will always misinterpret
- Jokes that are funny for white English males won't be for anybody else

Golden Rule #7: **Avoid Local References**

- Technical documents are typically read by an international audience
- Local references (eg to local politicians, football clubs, pop stars, TV shows, ...) should be avoided -- they don't travel well

Golden Rule #8: **You Can Never Have Too Many Examples**

- By far the best way to explain definitions, concepts, etc is with examples
- In general, the more of these the better
- Start with very simple ones, and work your way up

Golden Rule #9: **Be Consistent with Terminology & Notation**

- In the literature on logic, “propositional variables” are sometimes called “Boolean variables”, “atoms”, “propositional letters”, etc
- It doesn’t really matter which you use *as long as you always use the same term for the same thing*
- Adopt *naming schemes* for variables, methods, etc, and stick to them

Golden Rule #10: Don't Overload Notation

- In arithmetic, we use the symbol “+” to mean addition of numbers
- In programming languages, we often use the same symbol to mean string concatenation, the logical “or” operator...
- Assigning multiple meanings to the same symbol is called *overloading*, and is best avoided - can be very confusing

Golden Rule #11: **Be Explicit**

- Subtlety and nuance may be an advantage in novels, but in technical documents they often have no place
- Be explicit and straightforward about your results and your claims
- (The only exception is where you are talking about people...)

Golden Rule #999: The Rules Don't Matter

- You can follow all the rules (of grammar, punctuation, style, ...) and still write nonsense; you can ignore them, and still write a perfect document
- The rules are not the point of the exercise
- The point of the exercise is to *communicate*

Common Technical Documents

- *Scientific papers:*
 - aim to communicate scientific (research) results to the scientific community
- *Proposals:*
 - request funds, make a case for supporting something
- Evaluations:
 - analyse options and make recommendations
- Strategy/planning
 - propose plans and courses of actions
- *SWOT analyses:*
 - analyse strengths, weaknesses, opportunities, threats
- *Documentation:*
 - document the workings of code etc
- *Manuals:*
 - aim to describe how to use a piece of software/hardware