

# Technical Writing Review

COS 301

Fall 2018

- 1 Technical writing
- 2 General issues
- 3 Elements of writing
- 4 Overall structure
- 5 Paragraph structure
- 6 Sentence structure
- 7 Word usage & spelling

# Acknowledgments

- These slides are based on those from C. Meadow, who based them on ones prepared by J. Murphy in 2008
- Some examples are used by permission of some Fall 2008 COS 301 students

# Technical writing

# What type of writing are you doing?

- Different types, different formats
- Types include: proposals, literature reviews, theses/dissertations, tech manuals, user manuals, journal articles, reports
- We're interested in reports
- See [The Mayfield Handbook](#) Ch. 2, for more information

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  - Research reports
  - Research articles
  - Design & feasibility reports
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- Your paper: a research report

## The Mayfield Manual:

*Research reports present the results of formal investigations into the properties, behavior, structures and principles of material and conceptual entities.*

- “Research” here: in sense of a writing a research paper, not **doing** research



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In a work where new research is done, then literature review is part of 2.

- In COS 301, has to do with languages
  - Properties, behavior, structure of language
  - Design principles embodied in the language
  - Comparison to other languages
- A **survey** report – no new research, but surveying existing knowledge (and adding critical opinions)

# Survey reports

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  - clearly & concisely present material about each topic for your language
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  - not easy to be concise:
    - “I am sorry to have wearied you with so long a letter, but I did not have time to write you a short one.” (attr. Blaise Pascal)

# General issues

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  - a journal or conference (e.g., *OOPSLA*, *SPLASH*, *ACM Transactions on Programming Languages and Systems*)

# Exercise: Audience

- Explain the process of language compilation in a short paragraph, where your audience is:
  1. students in COS 140
  2. your parents/aunts/uncles/etc.
  3. readers of the Maine Campus
  4. fellow COS 301 students
  5. the faculty
  6. middle school students
- Group work @ tables, 5 minutes, then read aloud.



# Who is your audience in COS 301?

- Your audience: your peers (**not** me)
- Question to consider:
  - How much background can be assumed?
  - How much has to be explained?
- Assume: they know about the same things you do
- Though not about **subject** of paper

- Technical paper  $\Rightarrow$  **formal tone**
- Doesn't  $\Rightarrow$  stiff, stilted writing. . .
- . . . i.e., not **overly** formal – common problem w/ student writing!
- Goal is **communication**

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- Not writing to impress me or peers with
  - vocabulary
  - command of buzzwords and technical jargon
  - elegant sentence structure
  - literary flourishes
  - your intelligence

# Not too informal

- Write naturally – but avoid being **too** informal
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“Are Java and JavaScript programming paradigms similar? Sort of. . . maybe.”

“As you can see, there were a lot of scripting languages floating around [. . .]”

“On top of the numeric data types [. . .]”

# Which person?

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[...]”

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- Avoid second person:  
“You can call things such as the square root function [...]”
- Avoid too much use of first person
  - Use only where needed
  - E.g., stating your opinion
    - “In my opinion, X is true.”
    - Less pretentious than “In the author’s opinion, X is true”
  - “Royal we”:
    - Probably not needed in this class
    - Often in technical writing, however



- Often taught passive voice  $\equiv$  formal voice:  
The results shown were produced by the program.  
It was noticed that the program crashed.
- Fallen out of favor – stilted
- Almost **always** better to use active voice:  
The program produced the results shown.  
The program crashed. —or—  
We [or I] noticed that the program crashed.

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Computers have revolutionized the world.

# Your opinions matter

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- Fine (required, actually) to state your opinion
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    - \*Perl is good for text processing tasks, but it is too large.
- Perl is a good language for text processing tasks. For example, it natively supports regular expression matching and substitution as well as implicit looping over lines of input files. It is too large, however, for simple tasks. The Perl language reference is 1092 pages long. The reference manual for C, a very capable language, is only 294 pages long.

# Elements of writing

# Sources for writing style advice

- *The Mayfield Handbook* – an abbreviated version is at [www.mhhe.com/mayfieldpub/tsw/home.htm](http://www.mhhe.com/mayfieldpub/tsw/home.htm)
- Strunk and White's *The Elements of Style* – one version is at [www.bartleby.com/141](http://www.bartleby.com/141)
- *The Little Red Schoolhouse* (now Grounds for Argument) – [www.groundsforargument.org/drupal/welcome](http://www.groundsforargument.org/drupal/welcome)

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  - **Not** in formal writing!
- Mayfield reference, ch. 11–14: basic review
- Note: correct grammar by itself **doesn't** guarantee well-constructed sentences!

- Paper organization
- Paragraph structure
- Sentence structure
- Word usage & spelling

# Announcements



Announcements

COS 301

Announcements

- Photos on Monday

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School of Computing and Information Science  
**Hallway Poster Sign Up Sheet**

In order to help all of us recognize and get to know each other better, I agree to allow my name and photo to be included on a School-wide paper poster to be hung in the first floor of Boardman Hall. (Note: We are emulating the Civil Engineering hallway poster in Boardman).

**Please sign in the order your photo is taken.**

NAME	NAME
1.	16.
2.	17.

Feel free to send a substitute photo if you prefer to [harlan.onsrud@maine.edu](mailto:harlan.onsrud@maine.edu)  
While we highly encourage you to appear on the annual poster, it is not required.

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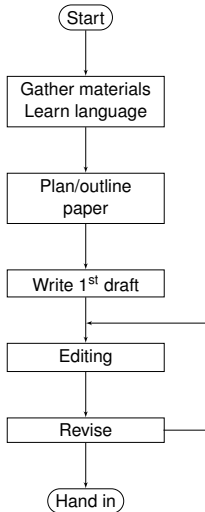
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- Due today: Project Part 1
- Assigned today: Project Part 2 (due 9/24)

- Introduction for your paper
  - Overview + history of your language
  - Likely will revise later in semester
  - Length: ~5 pp – up to you
  - Must use  $\LaTeX$ !
- **Annotated** bibliography
  - Use
    - APA, IEEE, natural sciences style
- Programming – very simple
- Turn in via Blackboard – **carefully** read the instructions!

# Overall structure



# Organizing the paper

- What do you want to say?
  - Bullet points
  - Mind map
- Group into related points
- Outline

- Resource: *Scientific Writing and Communication*, Angelika H. Hofmann
- IMRAD model [Hofmann]
  - Introduction
  - Materials & methods
  - Results
  - Discussion
  - References (bibliography)
- Modified for 301:
  - Introduction
  - Language description
  - Analysis
  - Discussion/Conclusion
  - Annotated bibliography
- Each assignment  $\rightsquigarrow$  section or subsection



# Organizing sections

- Each section/subsection: General → specific
- “Funnel model” [Hofmann] – e.g.:
  - Background/known information
  - What isn’t known
  - Question/issue addressed by section
  - Method to address question
- Example:

# Organizing sections

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- Example:
  1. (Background/known) Introduction: Looping
  2. (New, general) Recursion
  3. (New, specific) Recursion and iteration in Lisp
- Funnel structure useful for paper, paragraphs, too

# Exercise: Organization

- What is wrong with this section organization, and how would you fix it?
  1. Python as a rapid prototyping language
  2. Comparison of development using Python to using Java
  3. Problem with compiled languages for quick program development
  4. What is Python?
  5. Why rapid prototyping is useful
- Each group, 5 minutes.

- Make sure flow through paper is smooth
- Logical organization
- Transitions between sections, paragraphs

# Paragraph structure

- Don't just group sentences into paragraphs. . .
- . . . make sure the grouping is **logical**
- Special sentence locations [Hofmann]
  - First sentence: topic sentence (usually)
  - Last sentence: summary, conclude, emphasize, transition
- Typical structure:
  - Topic sentence: gives overview/intent of paragraph
  - Middle sentences: expand/support topic
  - Last sentence:
    - Conclusion about paragraph
    - Reiteration/emphasis of topic
    - Transition to next (e.g., unknown) topic – next paragraph

# Paragraph structure: Example

Recursion is fundamental in Lisp. [topic]

This is in keeping with the roots of the language in math and its overall functional character. [elaboration]

All functions (“statements”) return values, and so a function call can be used anywhere a value is needed, including in invocations of itself. [support]

The primary data structure, i.e., a list, is a recursive structure. [support]

Language implementations are optimized for recursion, including support for automatically replacing tail recursion with a simple unconditional branch for efficiency. [support]

Consequently, it is unsurprising that most Lisp programs rely heavily on recursion. [emphasis]

- Depends on topic sentence
- Some possibilities:
  - supporting points from general → specific
  - chronological order
  - cause → effect → effect → ...
  - “on one hand ... ; on the other hand ... ”
  - devil’s advocate then response
  - ...



# Sentence structure

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- Probably most common source of errors in papers
- Some common errors (Mayfield, ch. 6):
 

Stacked modifiers & nouns	Wordiness
Overloaded sentences	Sentence fragments
Comma splices	Fused sentences
Stringy sentences	Agreement
Lack of parallelism	Choppy sentences
Misplaced modifiers	Dangling modifiers
Double negatives	Faulty comparisons
Inappropriate shifts	Sequence of tenses
Pronoun reference	Pronoun case
- Editing: sometimes will note the error, sometimes just say “rewrite” or “awk” (awkward)

# Stacked modifiers/nouns

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- \*The object-oriented, semi-functional, imperatively-structured program ran fine.
- Better: The program ran fine. It was object-oriented, as well as semi-functional and structured imperatively.

- \*It was a fine day due to the warm temperature and lack of any rain.

- \*It was a fine day due to the warm temperature and lack of any rain.
- Better: It was a fine, sunny, warm day.

- Too much information in the same sentence

# Overloaded sentences

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- E.g.:
  - \*They decided to use a functional language for the project because the project lent itself to symbolic representation, and because the garbage collection would not impact the solution too much, as well as the problem being structured so that it knowledge engineers could easily capture most of the domain knowledge needed, along with certainty factors.



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  - Better: They chose a functional language for several reasons. First, the project lent itself to symbolic representation. Second, the language's garbage collection would not much impact the solution. And third, the problem was structured in such away that knowledge engineers could easily capture most of the required domain knowledge and certainty factors.

# Sentence fragments

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- \*The boy had many friends. Including, Joe, Henry, and Sally.
- Better: The boy had many friends, including Joe, Henry, and Sally.

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  - \*The programmers are smart and so they are well-paid, but they are also ambitious and they are a little greedy and so they change jobs often.
  - Better: The programmers are smart and are well-paid. However, they are also ambitious and a little greedy, so they change jobs often.

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# Agreement

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- Better: The program is written in FORTRAN. It reads a file and prints the squares of the numbers read. The file may be long and can include spaces.

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# Exercise: Modifiers

- Each table – fix these (5 min.):
  - “I only eat vegetables.” – where you mean you are vegetarian/vegan
  - \*Being too sweet, Joe worried that the ice cream would displease her.
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# Double (or worse) negatives

- From examples.yourdictionary.com:
  - \***“Nobody with any sense isn’t going.”**

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  - \***“You shouldn’t do nothing to the house.”**

# Faulty comparisons

- \*I think ice cream is better than Muse.
- \*She was more unique than Henry.
- \*It was the most perfect day.
- \*Artificial intelligence is not as easy to pass.
- \*Slavery in the United States was much worse than Europe. [from [www.uhv.edu/StudentSuccessCenter](http://www.uhv.edu/StudentSuccessCenter)]

# Inappropriate shifts/sequences of tenses

- \*Computing was revolutionized by structured programming, and Pascal is one of the languages involved.

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- \*Computing was revolutionized by structured programming, and Pascal is one of the languages involved.
- \*When Henry got home, he threw his backpack down. He goes into the kitchen, where he will find a fresh apple pie.

# Pronoun reference errors

- \*Joe and Harry went to town, and he got an ice cream.



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- \*Joe and Harry went to town, and he got an ice cream.
- \*I let the dog out and put food down for the cat, then I couldn't find him.

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- \*Joe and Harry went to town, and he got an ice cream.
- \*I let the dog out and put food down for the cat, then I couldn't find him.
- \*"If the fans don't buy the peanuts, pack them away until the next game." [From towson.edu/ows]

# Pronoun case errors

- \*Harry and her like ice cream.

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- \*Us CS students work hard.

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# Pronoun case errors

- \*Harry and her like ice cream.
- \*Us CS students work hard.
- \*The professor is him.– “the professor” and the person referenced by the pronoun are the same – subjective complement, not object – so use subjective case: “The professor is he.”

# Deep nesting

- Sometimes, nesting clauses is fine:
  - The dog the boy owned howled.

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- Sometimes, nesting clauses is fine:
  - The dog the boy owned howled.
- But can overdo:
  - \*The fish the bear the dog the boy owned treed caught got away.

# Word usage & spelling

- Have dictionary and thesaurus handy
  - To help determine how word is used
  - To find the right word
- Many homonyms, near-homonyms in English – often wrong one used:
  - complement/compliment
  - there/their/they're
  - its/it's
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- Editing mark: circled word, maybe with “usage”, “sp”, “spelling”, etc.

# Mangled phrases & malapropisms

- \*We just need to flush out the details.
- \*The language was built off an older language.
- \*... no one “is the suppository of all wisdom” (Australian PM Tony Abbott)

# When to hyphenate?

- Two word phrases sometimes hyphenated, sometimes not
- If the phrase is a noun, don't hyphenate:
  - The most interesting section of the book was about problem solving.
  - Cigarette smoking is disgusting.
- If the phrase is used as an adjective, hyphenate:
  - The problem-solving program was interesting.
  - The cigarette-smoking receptionist left a trail of ashes on the carpet.
- Some things must be hyphenated: non-negotiable
- Some things should never be: web-site
- Hyphenation often shifts to single words over time: to-day, good-bye.

# Word usage: Formal

- Papers in this class: a more formal style
- Guidelines:
  - Avoid second-person, careful with first-person
  - Avoid contractions
  - Avoid colloquial language
- Guidelines aren't absolute, though
- Editing mark: “informal”, “colloquial”, “tone”



- Fundamental element of writing
- There should be no spelling errors in your writing!
- Tools:
  - Spell checkers (but can give you the wrong homonym)
  - Dictionary
  - Thesaurus
  - Google
- Knowing how to pronounce words can help with spelling, dictionary look-up, and speaking – see [www.howjsay.com](http://www.howjsay.com)

- Now: back to programming languages – finally!