CIS 640  
Writing in Computer Research

Sources:
Duke University Graduate School Scientific Writing Resource at https://cgi.duke.edu/writing/sciwriting
Writing for Computer Science 2nd Edition, Justin Zobel

Concise (“taut”) writing

• Apply this principle at all levels
• Whole paper
• Sections of the paper
• Paragraphs
• Sentences
• Graphs and figures

Ways to Achieve Taut Writing

• Think and/or outline key ideas first (think tautly)
• Use simple short sentences and phrases
• Re-read and revise
• Ask outside readers to edit

Principle 1: Omit needless words

Inefficacious phrases:
- Intent to make sentences appear more substantial than they actually are
- But no sentence made more meaningful by their inclusion

Examples:
§ note that
§ it should be noted that
§ respectively
§ it is important to realize
§ so-called

Omit needless words

Wordy phrases – Multword phrases that mean nothing beyond a single word

<table>
<thead>
<tr>
<th>Instead of</th>
<th>Consider</th>
</tr>
</thead>
<tbody>
<tr>
<td>a large number of</td>
<td>many</td>
</tr>
<tr>
<td>due to the fact that</td>
<td>because</td>
</tr>
<tr>
<td>the question as to whether</td>
<td>whether</td>
</tr>
<tr>
<td>there is no doubt that</td>
<td>doubtless</td>
</tr>
<tr>
<td>used for testing purposes</td>
<td>used for testing</td>
</tr>
<tr>
<td>in a careful manner</td>
<td>carefully</td>
</tr>
<tr>
<td>this is a subject that</td>
<td>this subject</td>
</tr>
<tr>
<td>a large majority of</td>
<td>most</td>
</tr>
<tr>
<td>has a capacity to</td>
<td>can</td>
</tr>
<tr>
<td>whether or not</td>
<td>whether</td>
</tr>
</tbody>
</table>

Omit needless words

<table>
<thead>
<tr>
<th>Instead of</th>
<th>Consider</th>
</tr>
</thead>
<tbody>
<tr>
<td>are in agreement</td>
<td>agree</td>
</tr>
<tr>
<td>prior to</td>
<td>before</td>
</tr>
<tr>
<td>subsequent to</td>
<td>after</td>
</tr>
<tr>
<td>at this point in time</td>
<td>now</td>
</tr>
<tr>
<td>in the event that</td>
<td>if</td>
</tr>
<tr>
<td>a new initiative</td>
<td>an initiative</td>
</tr>
<tr>
<td>nearly unique</td>
<td>unique / rare</td>
</tr>
<tr>
<td>plays a key role in</td>
<td>is essential to</td>
</tr>
<tr>
<td>both the users were equally affected</td>
<td>the users were equally affected</td>
</tr>
</tbody>
</table>
Omit needless words

<table>
<thead>
<tr>
<th>Instead of</th>
<th>Consider</th>
</tr>
</thead>
<tbody>
<tr>
<td>adding together</td>
<td>adding</td>
</tr>
<tr>
<td>after the end of</td>
<td>after</td>
</tr>
<tr>
<td>cancel out</td>
<td>cancel</td>
</tr>
<tr>
<td>let us now consider</td>
<td>consider</td>
</tr>
<tr>
<td>divide up</td>
<td>divide</td>
</tr>
<tr>
<td>totally eliminate</td>
<td>eliminate</td>
</tr>
<tr>
<td>semantic meaning</td>
<td>meaning</td>
</tr>
<tr>
<td>completely optimized</td>
<td>optimized</td>
</tr>
<tr>
<td>separate into partitions</td>
<td>partition</td>
</tr>
</tbody>
</table>

Omit needless words

As discussed, the second reaction is really the result of a very large number of reactions. It is also worth emphasizing that the reactions do not represent a closed system, as r appears to be produced out of thin air. In reality, it is created from other chemical species within the cell, but we have chosen here not to model at such a fine level of detail. One detail not included here that may be worth considering is the reversible nature of the binding of RNAP to the promoter region. It is also worth noting that these two reactions form a simple linear chain, whereby the product of the first reaction is the reactant for the second.

Revision Technique
• Search for the phrases like the ones listed
• Consider removing or replacing them
• Make sure revision has intended meaning

Principle 2: Prefer simple words

• Never use a complex word when a simple one will do
• Not impressive to use long words—just poor writing
• Choose among alternatives for precise meaning needed

Methodology vs. method
• Method — a way of doing something
• Methodology — a system of methods followed in a particular discipline

Prefer simple words

Utilize vs. use, etc.
• Use — preferred simple word unless nuances meant — use a dictionary or thesaurus to distinguish
• Use a passive object to accomplish a purpose
• Utilize something profitably not designed for the purpose
• Employ person or thing currently idle
• Apply something general to accomplish a specific, practical result
• Take advantage of (or exploit) is similar to utilize but maybe more opportunistic or selfish, maybe abusing thing used
**Prefer simple words**

<table>
<thead>
<tr>
<th>Instead of</th>
<th>Consider</th>
</tr>
</thead>
<tbody>
<tr>
<td>methodology</td>
<td>method</td>
</tr>
<tr>
<td>utilize</td>
<td>use</td>
</tr>
<tr>
<td>elucidate</td>
<td>show</td>
</tr>
<tr>
<td>proactive</td>
<td>proactive</td>
</tr>
<tr>
<td>etiology</td>
<td>cause</td>
</tr>
<tr>
<td>systematic</td>
<td>(nothing?)</td>
</tr>
<tr>
<td>advantageous</td>
<td>helpful</td>
</tr>
<tr>
<td>deleterious</td>
<td>harmful</td>
</tr>
<tr>
<td>prescribed</td>
<td>required</td>
</tr>
<tr>
<td>erroneous</td>
<td>wrong</td>
</tr>
</tbody>
</table>

**Use simple words**

Revision Technique

• Search for complex words
• Replace if simpler word can convey intended meaning

**Principle 3: Use simple subjects**

- Scientific writing abounds with complex sentence subjects.
- These increase distance between subject (actor) and verb (action) – earlier lecture.
- Scientific writers try to cram too much in one sentence.
  - define complex abstract entity
  - describe something it does
- Writers should split such “multitasking” sentences into multiple sentences.

**Use simple subjects**

Revision Technique

• Find the subject (actor) and verb in each sentence.
• If too far apart, they may have complex subject.
• Try simplifying subject, e.g., by dividing sentence in two or eliminating unnecessary modifying clauses.
• Consider using summarizing nominalizations (concept nouns) to simplify subject and link back.

**Principle 4: Use adjectives/adverbs frugally**

Often adjectives and adverb modifiers add no meaning.

- This method illustrates the frequency of very high-energy collisions. Does very add anything to sentence?
- Can likely distinguish high-energy from low-energy. But is there a distinction between high energy and very-high-energy in this context?
- If not, then leave out very.

Many other such uses of adverbs and adjectives.
Use adjectives/adverbs frugally

Repetition problem: using two words where one suffices
• Using multiple synonyms together
  "completely and utterly alone"
  ⇒ "completely alone" ⇒ "alone"
All have same meaning—generally avoid in scientific writing
  (but might be stylistically useful in popular nonfiction, fiction, poetry)
• Using word implied by another
  "new invention" ⇒ "invention"
  Invention implies new, so new unneeded

Excessive hedging
• Scientific writers careful about claims, but too many hedges erode confidence
  ❌ These results suggest that our method may possibly identify putative enhancer elements. [4 hedges]
  ✔ Our method identifies enhancers. [no hedges]
  ✔ Our method identifies possible enhancers. [1 hedge]

Demeaning adverbs: using adverbs "obviously", "clearly", "undoubtedly"
• Sometimes point confusing to readers, not clear
• Author should work to bridge conceptual gap with readers
• Author should not demean or insult readers

Self-aggrandizement: describing merits of your own work more than deserved
• Be positive, avoid hedging, but do not inflate importance or novelty of your own work in scientific writing
  ❌ Here we describe an exciting new groundbreaking method to …
  ✔ What about advertising copy?

Revision Technique
• Highlight all adjectives and adverbs
• Ask whether each contributes meaningful idea or is clutter
• Search specifically for overused modifiers like "very", "extremely", or "clearly"
• Cut the clutter

Example 1: Sentence Level
(from Zobel, p. 54)
A well-known method such as the venerable quicksort is a potential practical alternative in instances of this kind.
Example 1
(from Zobel, p. 54)
✖ A well-known method such as the venerable quicksort is a potential practical alternative in instances of this kind.
Are we interested in impractical alternatives?
Much simpler revision!
✔ A method such as quicksort is a potential alternative.

Example 2
(from Zobel, p. 46)
✖ We are planning to consider possible options for extending our work.
Much simpler revision!
✔ We are considering how to extend our results.

Example 3: paragraph level
The volume of information has been rapidly increasing in the past few decades. While computer technology has played a significant role in encouraging the information growth, the latter has also had a great impact on the evolution of computer technology in processing data throughout the years. Historically, many different kinds of databases have been developed to handle information, including the early hierarchical and network models, the relational model, as well as the latest object-oriented and deductive databases. However, no matter how much these databases have improved, they still have their deficiencies. Much information is in textual format. This unstructured style of data, in contrast to the old structured record format data, cannot be managed properly by the traditional database models. Furthermore, since so much information is available, storage and indexing are not the only problems. We need to ensure that relevant information can be obtained upon querying the database. (Zobel p. 12)

Example 3 Simplified
Much information is textual. This unstructured data cannot be managed properly by traditional database models. Furthermore, storage and indexing are not the only problems. We need to ensure that relevant information can be obtained upon querying. (Zobel p. 12)

Can you do better?
Example 3: even shorter

Much information is **Unstructured Textual**. This unstructured data cannot be managed properly by traditional database models. Furthermore, Storage and indexing are not the only problems: we also need to ensure that relevant information can be obtained upon querying.

Example 4 (shorter)

- As part of their work, they showed that the problem of finding the best total order in a set of given items belongs to the class of NP-hard problems. To be able to find an approximation for the global order, in the paper, they provide a simple greedy algorithm and a second slightly modified algorithm that takes advantage of strongly connected graphs to return an approximation to the best ordering.

  (from a student’s paper summary of Cohen et al.)

Example 4: even shorter

- The contribution of this paper was to describe a method in which a collection of objects can be ordered, using preference judgments. There are two stages in which this ordering is done. First, one creates a “binary preference function” in order to determine how to rank the objects. Then, one uses this function to order the objects.

  (from a student’s paper summary of Cohen et al.)