Writing for

Computer Science & Engineering

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Punctuation

Introduction

- Punctuation
  - Functions of spaces, commas, stops, and capital letters.
  - Concerns stylistic issues of punctuation and errors that are common in science writing.
- Fonts and Formatting
- Stops, Commas, Colons and Semicolons, Apostrophes
- Exclamations
- Hyphenation
- Capitalization
- Quotations
- Parentheses
- Citations

Font and Formatting

- Most computing or mathematical writing
  - Three fonts (plain, italic, and bold)
  - Four (if, say, a fixed-width font is used for the text of programs)
  - Overuse of fonts results in messy-looking text.
  - Some authors prefer **bold** to *italic* for emphasis, but bold print is distracting
  - Use of underlining for emphasis
- Use standard fonts for the text of papers: Times-Roman and Cambria
- Visual clutter of any kind is distracting and should be eliminated unless there is a clear need for it
  - Another kind of clutter is punctuation: excessive use of parentheses, quotes, italics, hyphens, semicolons, and uppercase letters.
- Indentation is an important tool of layout, used primarily to indicate the start of a new paragraph
- Consider using a running header, of say the authors' surnames or the paper's title. Pages should be numbered.

Stops

- Stops (or full-stops or periods) end sentences.
- Sentences should usually be short but commas and other marks give variety.
  - The process required less than a second (except when the machine was heavily loaded, the network was saturated, etc.).
  - The process required less than a second (unless, for example, the machine was heavily loaded or the network was saturated).
- It is not usual to put a stop at the end of a heading.
  - 3. Neural Nets for Image Classification.
  - 3. Neural Nets for Image Classification

Commas

- Mark pauses, indicate the correct parsing, form lists, and indicate that a phrase is a parenthetical remark (that is, a comment) rather than a qualifier.
  - “the four processes that use the network are almost never idle” –> of the processes, the four that use the network are almost never idle
  - “the four processes, which use the network, are almost never idle” –> the four processes use the network and are almost never idle
  - The process may be waiting for a signal, or even if processing input, may be delayed by network interrupts.
  - The process may be waiting for a signal, or, even if processing input, may be delayed by network interrupts.

Commas

- If the commas seem necessary, consider breaking the sentence into shorter ones or rewriting it altogether.
  - When using disk tree algorithms were found to be particularly poor.
  - When using disk, tree algorithms were found to be particularly poor.

  - One node was allocated for each of the states, but of the nine seven were not used.
  - One node was allocated for each of the states, but, of the nine, seven were not used.
  - Nine nodes were allocated, one for each of the states, but seven were not used.
- Commas can be used to give the reader time to breathe.
  - As illustrated by the techniques listed at the end of the section there are recent advances in parallel algorithms and multiprocessor hardware that indicate the possibility of optimal use of shared disk arrays by indexing algorithms such as those of interest here.
  - As illustrated by the techniques listed at the end of the section, recent advances in parallel algorithms and multiprocessor hardware may allow optimal use of shared disk arrays by some algorithms, including indexing algorithms such as those of interest here.

Colons and Semicolons

- Colons are used to join related statements and introduce lists.
  - These small additional structures allow a large saving: the worst case is reduced from *O(n)* to *O(log n)*.
  - There are three phases: accumulation of distinct symbols, construction of the tree, and the compression itself.
- The elements in a list can be separated by semicolons, allowing commas or other marks within each element.
  - There are three phases: accumulation of distinct symbols in a hash table; construction of the tree, using a temporary array to hold the symbols for sorting; and the compression itself.
- A semicolon can also be used to divide a long sentence, or to set off part of a sentence for emphasis.
  - In theory the algorithm would be more efficient with an array; but in practice a tree is preferable.

Apostrophes

- Rules
  - Singular possessives such as "the student's algorithm"
  - Plural possessives such as "students' passwords"
  - Pronoun possessives such as "its" (as in "its speed") and "hers" do not require an apostrophe.
  - Contractions such as "it's" (as in "it is blue") and "can't" require an apostrophe; but note that contractions should be avoided in technical writing
- Other than in the cases above, apostrophes are not required.
  - The uses "in the 1980's", "each of the CPU's", "the computers' s power supplies", and "Goss' approach" are all incorrect.

Exclamations

- Avoid exclamation marks! Never use more than one!!
  - Performance deteriorated after addition of resources!
  - Remarkably, performance deteriorated after addition of resources.

Hyphenation

- Many compound words, such as “website”,would originally have been written as two separate words, “web site”.
  - When the combination becomes common, it is hyphenated, “web-site”, then eventually the hyphen is dropped to give the final form.
  - All three of “data base”, “data-base”, and “database” are used
  - randomized data structure vs. randomized data-structure

Capitalization

- Capitalization
  - Proper names are capitalized
  - Capitalize names such as “Theorem 3.1”, “Figure 4”, and “Section 11”.
  - Headings can be either minimally or maximally capitalized.
- Be consistent in your style of capitalization.
- Use maximum capitalization for sections and minimum capitalization for subsections, but not the other way around.

Quotations

- One convention for quotations is that some punctuation marks are placed inside the quotation even when they are not part of the original material
- An alternative is to place a punctuation mark within the quotation only if it was used in the original text
  - Crosley (2000) argues that "open sets are of insufficient power", but Davies (2002) disagrees: "If a concept is interesting, open sets can express it."

Parentheses

- A sentence containing a statement in parentheses should be punctuated exactly as if the parenthetical statement was not there
  - Most quantities are small (but there are exceptions.)
  - Most quantities are small (but there are exceptions).
  - (Note that outlying points have been omitted).
  - (Note that outlying points have been omitted.)
- Important text should not be in parentheses
- Overuse of parentheses looks crowded

Citations

- Citations should be punctuated as if they were parenthetical remarks
  - In [2] such cases are shown to be rare.
  - In (Wilson 1984) such cases are shown to be rare.
- The cite should be close to the material it relates to—poor placement of cites can be ambiguous.
  - The original algorithm has asymptotic cost $O(n^2)$ but low memory usage, so it is not entirely superseded by Ahlberg's approach, which although of cost $O(n \log n)$ requires a large in-memory array (Ahlberg 1996; Keele 1989).
  - The original algorithm has asymptotic cost $O(n^2)$ but low memory usage (Keele 1989). Thus it is not entirely superseded by Ahlberg's approach (Ahlberg 1996), which, although of cost $O(n \log n)$, requires a large in memory array.

Mathematics

Introduction

- Mathematics gives solidity to abstract concepts
- Reading mathematics is difficult work at the best of times, unpleasant work if the mathematics is badly presented, and pointless if the mathematics does not make sense
- A statement can be made clearer by using mathematics to express the ideas.
  - Describe algorithms, data structures, automata, or just about any of the objects that computer scientists study.
  - Should not be used unnecessarily—to dress up uninteresting ideas,

Clarity

- An ambiguous statement of a theorem can make its proof incomprehensible
  - An inverted list for a given term is a sequence of pairs, where the first element in each pair is a document identifier and the second is the frequency of the term in the document to which the identified correspond
  - An inverted list for a term *t* is a sequence of pairs of the form <*d*, *f*>, where each *d* is a document identifier and *f* is the frequency of t in *d*.

Clarity

- Many terms have well-defined mathematical meanings and are confucing if used in another way
  - Normal, usual, typical
  - Definite, strict, proper, all, some
  - Any
  - Intractable, infeasible
  - Formula, expression, equation
  - Equivalent, similar
  - Element, partition
  - Average, mean
  - Subset, proper subset, strict subset
  - Metric, measure

Theorems

- When you submit a paper containing a proof of a theorem, you should be satisfied that the proof is correct
  - Details of the proof may not be important to the reader
  - Steps in the logic of a proof should be simple enough that the gaps can be completed by a reader mechanically
  - A common mistake is to unnecessarily include mechanical algebraic transformations
- Theorems, definitions, lemmas, and propositions should be number even if there are only two or three of each in the paper
  - "Definition 4.2" than "the definition towards the bottom of page 6"
  - Statement of theorems should be complete as possible
- Authors choose to end a paper with a proof of some theorem or lemma
  - It is worth reminding the reader of the main lessons of the paper in its final paragraphs

Theorems

- When stating your proof in a paper
  - Make it comprehensive to a reader
  - Use any available means to convey your argument with the greatest possible clarity; a diagram

Readability

- Mathematics
  - Usually presented in italics to distinguish it from other text
  - “of length *n*”
  - Exception is function name such as log or sin
  - Always use the same font for the same variable
  - There are several standards for representing a vector value, such as


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&
A