Scientific Writing: Problem Set 4

November 7, 2026

When rewriting a text fragment in LaTeX, please include in the preamble:

```
\usepackage[addedmarkup=uwave,deletedmarkup=sout]{changes}
```

Then

```
Context \added{new text} \deleted{old text} \replaced{replacing text}{replaced text}
```

prints

Context new text ~~old text~~ replacing text~~replaced text~~

Different colours for new and old can be done, but this is not well implemented in the package...
Consider also

```
\usepackage[paperwidth=320mm,paperheight=180mm,margin=15mm]{geometry}
```

which should compile into TV-compatible aspect ratio.

Tasks 1–6 are worth 0,5 points. Choose tasks worth 3 points.

Task 1. Shorten the following passages:

At this point in time, the algorithm has the ability to process individual records separately and is therefore capable of achieving a reduction in overall memory consumption.

It should be noted that a number of experiments were performed in order to evaluate the effectiveness of the proposed method. The results clearly demonstrate the fact that the new approach is capable of achieving improved performance.

Through a remarkable process of careful consultation and profound analysis, the essential requirements were transformed into specifications capturing the true essence of the system.

Task 2. Improve the following passages.

We test three datasets. The algorithm achieved the best performance. We have shown that the method scales linearly and next we proved a stronger result.

In Section 2 we define the model. We showed several properties of the model. We prove that the algorithm terminates.

The algorithm processes the input stream. The stream can contain errors. Error detection is important for reliability. Reliability is crucial in distributed systems. Distributed systems often operate under resource constraints. Therefore we employ efficient error correction codes.

The method compresses data. Compression reduces storage costs. The implementation is written in Rust. Several competing methods exist.

Task 3. Improve the following sentences.

After preprocessing, which requires quadratic time but is executed only once when the database is created, queries can be answered efficiently because the resulting index supports several operations.

The system utilizes a sophisticated procedure to commence the analysis process.

It is important to note that the results clearly demonstrate that the proposed method is, in fact, faster.

It should be noted that, in our opinion, the results seem to indicate that the proposed approach is actually quite effective.

Task 4. Repair tense and time flow.

We define the relation R in Section 2. We proved that it is transitive. In Section 3, we will introduce the algorithm that computes R. We have implemented it and test it on five data sets last month. Figure 2 showed the results. In the next section we proved that the running time is linear. We conclude that the algorithm was useful for the considered instances.

Is there a difference between rewrites organized around the logical structure of a paper, and one organized according to chronological account?

Task 5. Shorten.

In recent years, the amount of information that is available in electronic form has been increasing at a very rapid rate. This growth has been caused, at least in part, by developments in computer technology, which have made it possible to store and process increasingly large amounts of data. At the same time, the increasing amount of information has itself created new demands on computer technology. A variety of database systems have been developed over the years, including hierarchical, network, relational, object-oriented, and deductive databases. Although these systems have been useful in many applications, they do not solve all of the problems that arise when the information to be stored is textual rather than structured in the form of records. In such situations, it is not enough to store and index the available information. It is also necessary to retrieve the information that is relevant to a user's query. The purpose of this paper is to investigate one approach to this problem.

Task 6. Identify problems in the following texts, improve it.

In terms of fractals, a straight line has a dimension of one, an irregular line has a dimension of between one and two, and a line that is so convoluted as to completely fill a plane has a dimension approaching the dimension of the plane, namely a dimension of two. Fractal dimensions assign numbers to the degree of convolution of planar curves.

Due to the advances in computer graphics and robotics, a new interest in geometric investigations has now arisen within computer science focusing mainly on the computational aspects of geometry, forming the research field known as computational geometry.

Task 7. Choose a definition, theorem, data structure, or algorithm that you know. Construct a running example that can be used throughout a short exposition.

Possible topics (other are welcome): rotations for AVL trees, removal of outliers in linear regression. Choosing a pivot for quicksort.

Task 8. Prepare a short research-style passage about a hypothetical algorithm that appears to outperform a known method. Include at least six claims, mixing formal results, empirical observations, plausible explanations, and conjectures.

Rewrite those statements so that the meaning and factual status is clear for each statement.