How to write a paper

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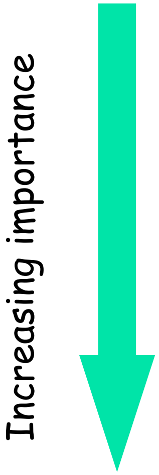
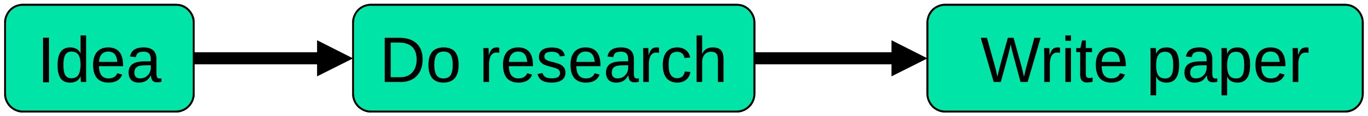
Writing papers is a skill

- Many papers are badly written
- Good writing is a skill you can learn
- It's a skill that is worth learning:
  - You will get more brownie points (more papers accepted etc)
  - Your ideas will have more impact
  - You will have better ideas



Writing papers: model 1

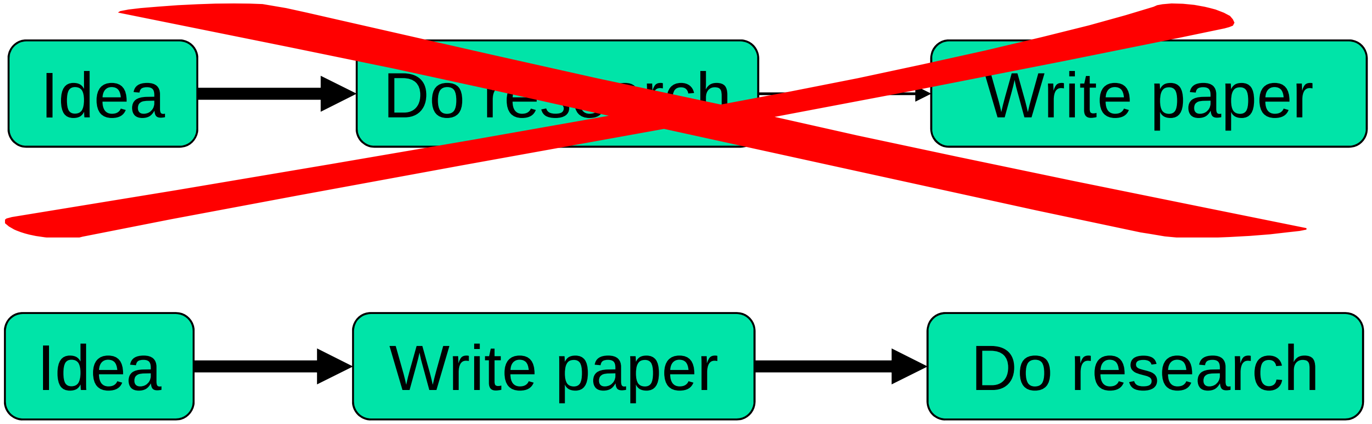


Idea

Do research

Write paper

Writing papers: model 2



~~Idea → Do research → Write paper~~

Idea → Write paper → Do research

- Forces us to be clear, focused
- Crystallises what we don't understand
- Opens the way to dialogue with others: reality check, critique, and collaboration

Do not be intimidated

Fallacy You need to have a fantastic idea before you can write a paper. (Everyone else seems to.)

Write a paper,
and give a talk, about
any idea,
no matter how weedy and insignificant it may seem to you

Do not be intimidated

Write a paper, and give a talk, about any idea, no matter how insignificant it may seem to you

- **Writing the paper is how you develop the idea in the first place**
- It usually turns out to be more interesting and challenging that it seemed at first

The purpose of your paper

Why bother?

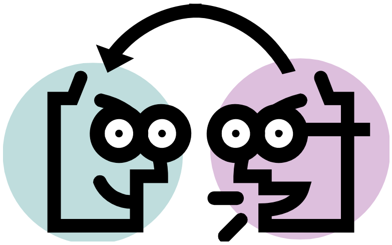
Fallacy

we write papers and give talks mainly to impress others, gain recognition, and get promoted

Good papers and talks are a fundamental part of research excellence

Papers communicate ideas

- Your goal: to infect the mind of your reader with **your idea**, like a virus
- Papers are far more durable than programs (think Mozart)



The greatest ideas are (literally) worthless if you keep them to yourself

The Idea

Idea

A re-usable insight, useful to the reader

- Figure out what your idea is
- Make certain that the reader is in no doubt what the idea is. Be 100% explicit:
  - "The main idea of this paper is...."
  - "In this section we present the main contributions of the paper."
- Many papers contain good ideas, but do not distil what they are.

One ping

- Your paper should have just one “ping”: one clear, sharp idea
- Read your paper again: can you hear the “ping”?
- You may not know exactly what the ping is when you start writing; but you must know when you finish
- If you have lots of ideas, write lots of papers

Your narrative flow

- Here is a problem
- It's an interesting problem
- It's an unsolved problem
- **Here is my idea**
- My idea works (details, data)
- Here's how my idea compares to other people's approaches

I wish I knew how to solve that!

I see how that works. Ingenious!

Structure (conference /Journal)

- Title (1000 readers)
- Abstract (4 sentences, 100 readers)
- Introduction (1 page, 100 readers)
- Related work (1-2 pages, 10 readers)
- The problem (1 page, 10 readers)
- My idea (2 pages, 10 readers)
- The details (5 pages, 3 readers)
- Conclusions and further work (0.5 pages)

The abstract

- I usually write the abstract last
- Used by program committee members to decide which papers to read
- Four sentences [Kent Beck]

1. State the problem
2. Say why it's an interesting problem
3. Say what your solution achieves
4. Say what follows from your solution

Example

1. Many papers are badly written and hard to understand
2. This is a pity, because their good ideas may go unappreciated
3. Following simple guidelines can dramatically improve the quality of your papers
4. Your work will be used more, and the feedback you get from others will in turn improve your research

Structure

- Abstract (4 sentences)
- **Introduction** (1 page)
- The problem (1 page)
- My idea (2 pages)
- The details (5 pages)
- Related work (1-2 pages)
- Conclusions and further work (0.5 pages)

The introduction (1 page)

1. **Describe the problem**
2. **State your contributions**

...and that is all

ONE PAGE!

Describe the problem

Introduction:

In recent years, computer and network security has been formulated as a technical problem. A key area in security research is authentication which is the determination of whether a user should be allowed access to a given system or resource. In this respect, the password is a common and widely authentication method still used up to now.

A password is a form of secret authentication data that is used to control access to a resource. It is kept secret from those not allowed access, and those wishing to gain access are tested on whether or not they know the password and are granted or denied access accordingly.

The use of passwords goes back to ancient times when soldiers guarding a location by exchange a password and then only allow a person who knew the password. In modern times, passwords are used to control access to protect computer operating systems, mobile phones, auto teller machine (ATM) machines, and others. A typical computer user may require passwords for many purposes such log in to computer accounts, retrieving e-mail from servers, accessing to files, databases, networks, web sites, and even reading the morning newspaper online.

Use an example to introduce the problem

State your contributions

- Write the list of contributions first
- The list of contributions drives the entire paper: the paper substantiates the claims you have made
- Reader thinks "gosh, if they can really deliver this, that's be exciting; I'd better read on"

State your contributions

In graphical password, the problem arises because passwords are expected to have two fundamentals requirements:

Password should be easy to remember.

Password should be secured.

Graphical passwords were originally described by Blonder [5]. In his description, an image would appear on the screen, and the user would click on a few chosen regions of it. If the correct regions were clicked in, the user would be authenticated. Memorize ability of password and efficiency of their inputs is two key human factors criteria. Memorize ability have two aspects:

- How the user chooses and encodes the password?
- What task the user does when retrieving the password?

In a graphical password system, a user needs to choose memorable image. The process of choosing memorable images depends on the nature of the process of image and the specific sequence of click locations. In order to support memorize ability, images should have meaningful content because meaning for arbitrary things is poor.

Bulleted list of contributions

Do not leave the reader to guess what your contributions are!

Structure

- Abstract (4 sentences)
- Introduction (1 page)
- **Related works (1-2 page)**
- The problem (1 page)
- My idea (1-2 pages)
- The details (5 pages)
- Related work (1-2 pages)
- Conclusions and further work (0.5 pages)

Related work

Fallacy To make my work look good, I have to make other people's work look bad

The truth: credit is not like money

Giving credit to others does not diminish the credit you get from your paper

- Warmly acknowledge people who have helped you
- Be generous to the competition. “In his inspiring paper [Foo98] Foogle shows.... We develop his foundation in the following ways...”
- Acknowledge weaknesses in your approach

Credit is not like money

Failing to give credit to others can kill your paper

If you imply that an idea is yours, and the referee knows it is not, then either

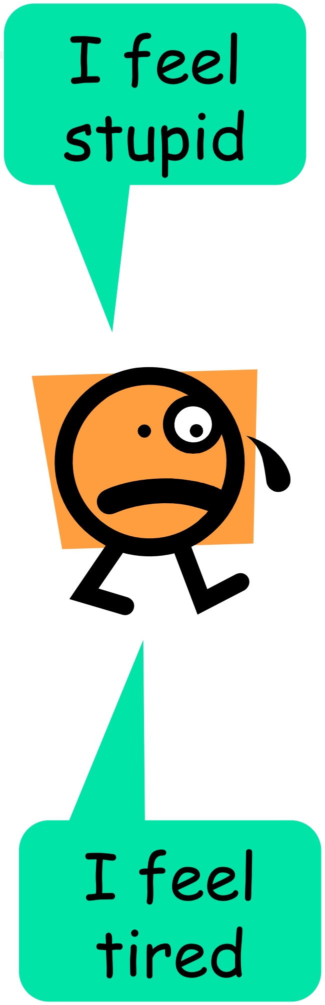
- You don't know that it's an old idea (bad)
- You do know, but are pretending it's yours (very bad)

Structure

- Abstract (4 sentences)
- Introduction (1 page)
- Related work (1-2 page)
- The problem (1 page)
- My idea (2 pages)
- The details (5 pages)
- Related work (1-2 pages)
- Conclusions and further work (0.5 pages)

No related work yet

- Problem 1: the reader knows nothing about the problem yet; so your (carefully trimmed) description of various technical tradeoffs is absolutely incomprehensible
- Problem 2: describing alternative approaches gets between the reader and your idea



Structure

- Abstract (4 sentences)
- Introduction (1 page)
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- The problem (1 page)
- My idea (2 pages)
- The details (1 page for conference and 5 pages for journal)
- Conclusions and further work (0.5 pages)

Presenting the idea

3. The idea

Consider a bifircuated semi-lattice D, over a hyper-modulated signature S. Suppose p_i is an element of D. Then we know for every such p_i there is an epi-modulus j, such that $p_j < p_i$.

- Sounds impressive...but
- Sends readers to sleep
- In a paper you MUST provide the details, but FIRST convey the idea

Presenting the idea

- Explain it as if you were speaking to someone using a whiteboard
- **Conveying the intuition is primary**, not secondary
- Once your reader has the intuition, she can follow the details (but not vice versa)
- Even if she skips the details, she still takes away something valuable

Putting the reader first

- **Do not** recapitulate your personal journey of discovery. This route may be soaked with your blood, but that is not interesting to the reader.
- Instead, choose the most direct route to the idea.

The payload of your paper

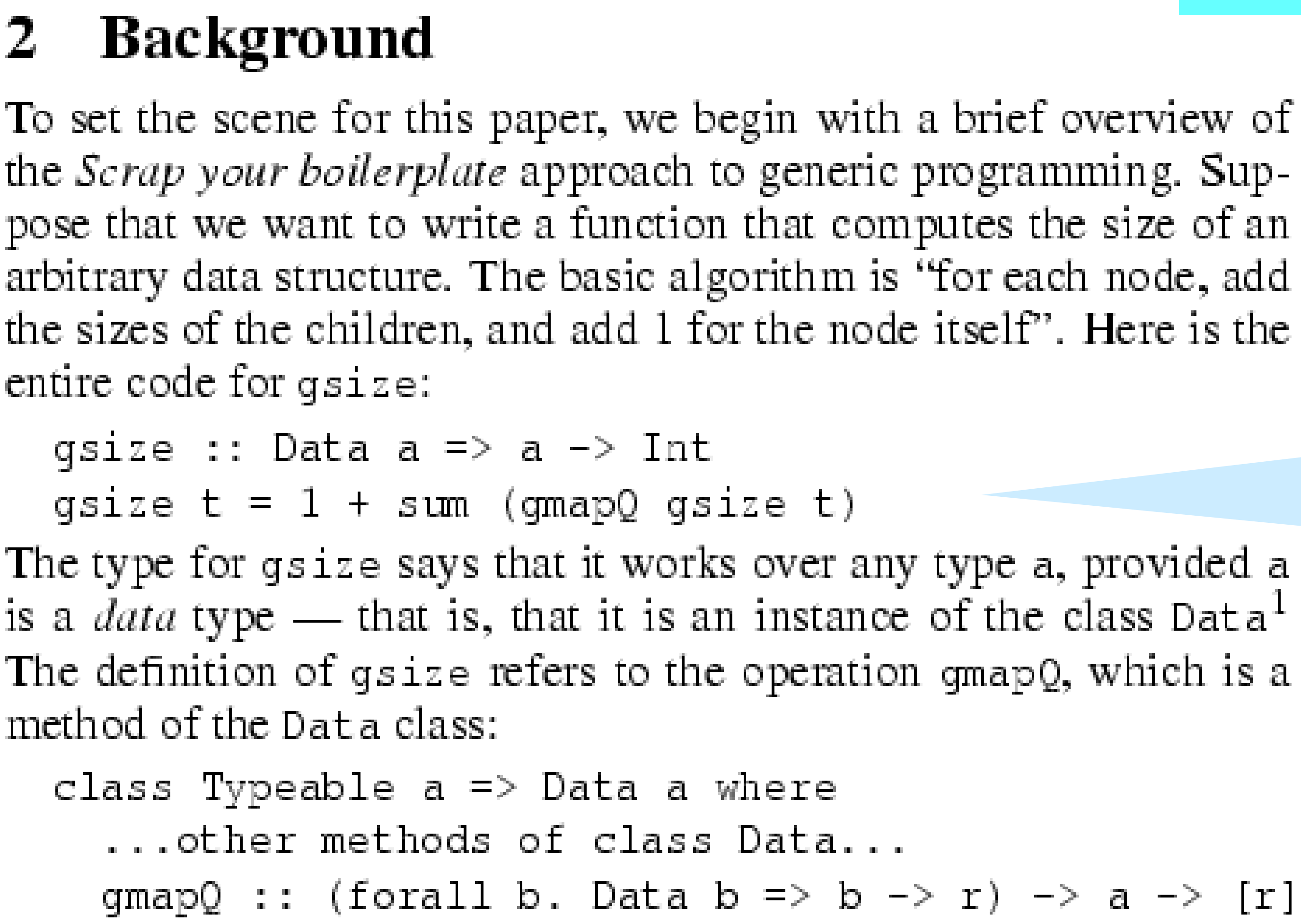
Introduce the problem, and your idea, using

EXAMPLES

and only then present the general case

Using examples

The Simon PJ question: is there any typewriter font?



2 Background

To set the scene for this paper, we begin with a brief overview of the *Scrap your boilerplate* approach to generic programming. Suppose that we want to write a function that computes the size of an arbitrary data structure. The basic algorithm is “for each node, add the sizes of the children, and add 1 for the node itself”. Here is the entire code for gsize:

```
gsize :: Data a => a -> Int
gsize t = 1 + sum (gmapQ gsize t)
```

The type for gsize says that it works over any type a, provided a is a *data* type — that is, that it is an instance of the class Data[1] The definition of gsize refers to the operation gmapQ, which is a method of the Data class:

```
class Typeable a => Data a where
  ...other methods of class Data...
  gmapQ :: (forall b. Data b => b -> r) -> a -> [r]
```

Exampl e right away

The details: evidence

- Your introduction makes claims
- The body of the paper provides **evidence to support each claim**
- Check each claim in the introduction, identify the evidence, and forward-reference it from the claim
- Evidence can be: analysis and comparison, theorems, measurements, case studies

Structure

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Conclusions and further work

- Be brief.

The process of writing

The process

- Start early. Very early.
  - Hastily-written papers get rejected.
  - Papers are like wine: they need time to mature
- Collaborate

Getting help

Get your paper read by as many friends as possible

- Experts are good
- Non-experts are also very good
- Each reader can only read your paper for the first time once! So use them carefully
- Explain carefully what you want ("I got lost here" is much more important than "Jarva is mis-spelt".)

Getting expert help

- A good plan: when you think you are done, send the draft to the competition saying "could you help me ensure that I describe your work fairly?".
- Often they will respond with helpful critique (they are interested in the area)
- They are likely to be your referees anyway, so getting their comments or criticism up front is Jolly Good.

Listening to your reviewers

Treat every review like gold dust

This is really, really, really hard

But it's
really, really, really, really, really, really,
really, really, really, really
important

Listening to your reviewers

- Read every criticism as a positive suggestion for something you could explain more clearly
- DO NOT respond "you stupid person, I meant X". Fix the paper so that X is apparent even to the stupidest reader.
- Thank them warmly. They have given up their time for you.

Language and style

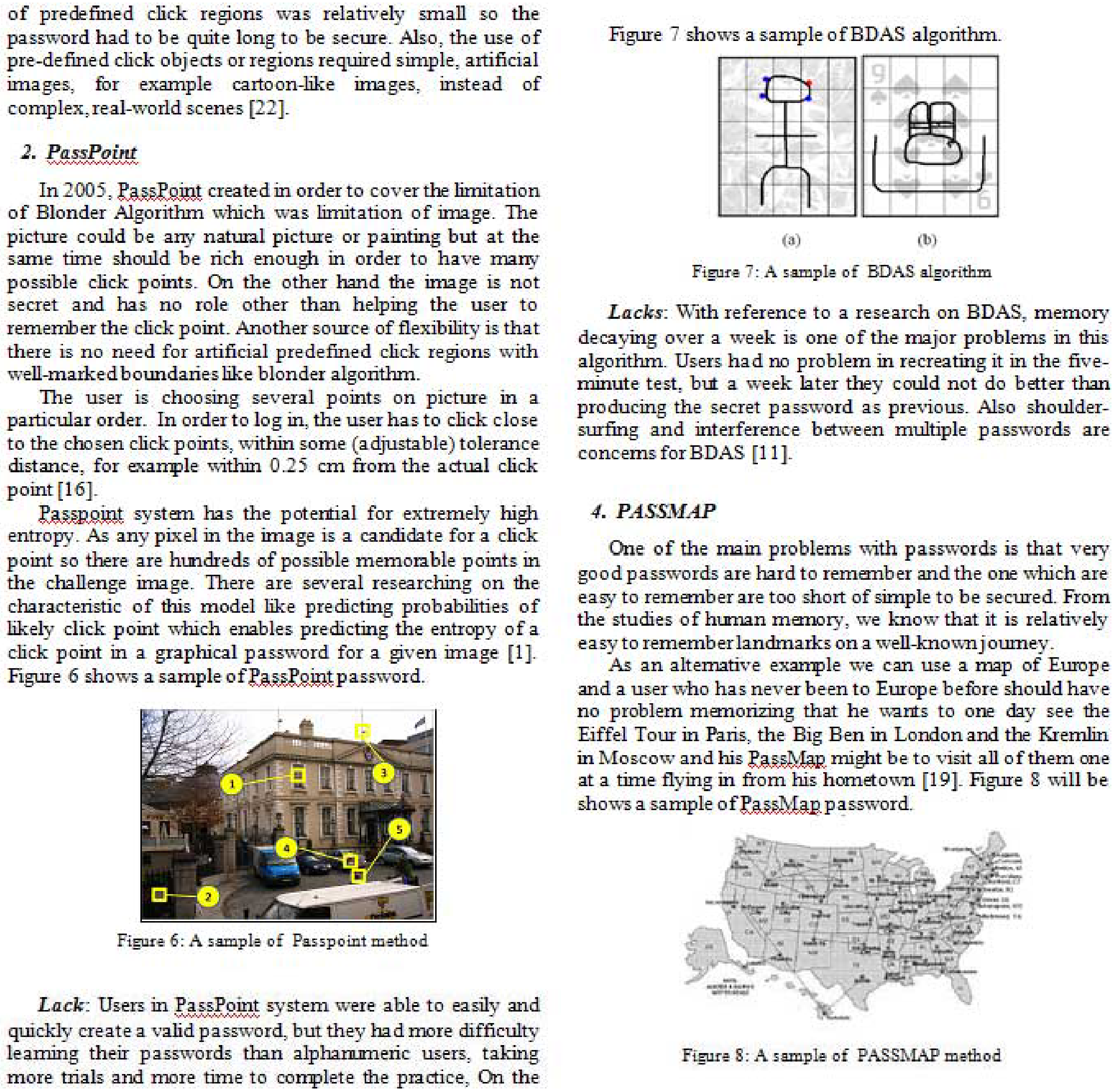
Basic stuff

- Submit by the deadline
- Keep to the length restrictions
  - Do not narrow the margins
  - Do not use 6pt font
  - On occasion, supply supporting evidence (e.g. experimental data, or a written-out proof) in an appendix
- Always use a spell checker

Visual structure

- Give strong visual structure to your paper using
  - sections and sub-sections
  - bullets
  - italics
  - laid-out code
- Find out how to draw pictures, and use them

Visual structure



of predefined click regions was relatively small so the password had to be quite long to be secure. Also, the use of pre-defined click objects or regions required simple, artificial images, for example cartoon-like images, instead of complex, real-world scenes [22].

2. PassPoint

In 2005, PassPoint created in order to cover the limitation of Blonder Algorithm which was limitation of image. The picture could be any natural picture or painting but at the same time should be rich enough in order to have many possible click points. On the other hand the image is not secret and has no role other than helping the user to remember the click point. Another source of flexibility is that there is no need for artificial predefined click regions with well-marked boundaries like blonder algorithm.

The user is choosing several points on picture in a particular order. In order to log in, the user has to click close to the chosen click points, within some (adjustable) tolerance distance, for example within 0.25 cm from the actual click point [16].

Passpoint system has the potential for extremely high entropy. As any pixel in the image is a candidate for a click point so there are hundreds of possible memorable points in the challenge image. There are several researching on the characteristic of this model like predicting probabilities of likely click point which enables predicting the entropy of a click point in a graphical password for a given image [1]. Figure 6 shows a sample of PassPoint password.

Figure 6: A sample of Passpoint method

Lack: Users in PassPoint system were able to easily and quickly create a valid password, but they had more difficulty learning their passwords than alphanumeric users, taking more trials and more time to complete the practice, On the

Figure 7 shows a sample of BDAS algorithm.

Figure 7: A sample of BDAS algorithm

Lacks: With reference to a research on BDAS, memory decaying over a week is one of the major problems in this algorithm. Users had no problem in recreating it in the five-minute test, but a week later they could not do better than producing the secret password as previous. Also shoulder-surfing and interference between multiple passwords are concerns for BDAS [11].

4. PASSMAP

One of the main problems with passwords is that very good passwords are hard to remember and the one which are easy to remember are too short of simple to be secured. From the studies of human memory, we know that it is relatively easy to remember landmarks on a well-known journey.

As an alternative example we can use a map of Europe and a user who has never been to Europe before should have no problem memorizing that he wants to one day see the Eiffel Tour in Paris, the Big Ben in London and the Kremlin in Moscow and his PassMap might be to visit all of them one at a time flying in from his hometown [19]. Figure 8 will be shows a sample of PassMap password.

Figure 8: A sample of PASSMAP method

Don't Use "We", "You" ,...

YES	No
It can be seen that...	We can see that...
34 tests were run	We ran 34 tests
These properties were thought desirable	We wanted to retain these properties
It might be thought that this would be a type error	You might think this would be a type error

Use simple, direct language

NO	YES
The object under study was displaced horizontally	The ball moved sideways
On an annual basis	Yearly
Endeavour to ascertain	Find out
It could be considered that the speed of storage reclamation left something to be desired	The garbage collector was really slow

Summary

If you remember nothing else:

- **Identify your key idea**
- **Make your contributions explicit**
- **Use examples**

No Question.

THANK YOU

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THE END

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