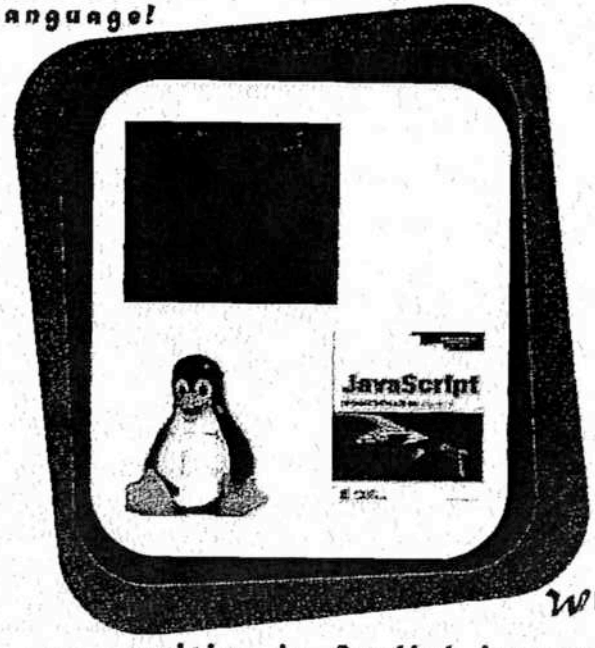
Writing in Computer Science

'But I already write in more than one language!



Why is writing in English important?'

WHY WRITING MATTERS FOR COMPUTER SCIENCE

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The Goal

Why write when I can diagram and show equations?

Writing in CS is about helping computer science students move from being well trained as programmers, to being prepared for a career which involves research, discussion, and thoughtful analysis of what is done in programming and other computer science related work and research.

Writing is important in CS because it allows individuals to communicate their work in ways that others outside of the discipline can understand, appreciate, and apply in real life situations.

The main goal of writing in science is to inform readers. After writing a sentence, you should always ask yourself, "Does this sentence reader inform and teach my readers something new? Does this sentence move them closer to a better understanding of my main point?" By keeping the understanding and needs of your readers at the forefront of your mind at all times you are on your way to writing clear, meaningful work.

"Place an interesting sentence or quote from the text here."

Getting Started

First, determine the audience of the booklet. This could be anyone who might benefit from the products or services it contains. Next, establish how much time and money you can spend on your booklet. These factors will help determine the length of the booklet and how frequently you publish it. If your booklet is acting as a catalog of products or services, it's recommended that you publish at least quarterly so that your booklet is considered a consistent source of information. Your customers or employees will look forward to its arrival.

Also consider how you want to print your booklet. You can print it on a desktop printer, at a copy shop, or at a commercial printing service. In addition to your budget, the complexity of the publication—including whether you print it as a black and white or a color publication—will help determine the best method for printing your publication.

Before you print your booklet, consider how you will bind its pages. The method you choose depends upon your booklet's page count, its intended use, and your budget. For example, if your booklet contains just a few pages, you might choose the most cost-effective option: folding and stapling. If it contains more than a few pages, consider comb or coil binding, which use a continuous, spring-shaped piece of plastic that enables your booklet to lie flat and fold back on itself for easy reading. For thick booklets, you might use a more permanent (and expensive) method called "perfect binding," used for paperback books.

Inserting Your Own Art

You can replace the pictures in this template with your company's art. To do so, click where you want to insert the picture. On the **Insert** menu, point to **Picture**, and then click **From File**. Locate the picture you want to insert, and then click it. Next, click the arrow to the right of the **Insert** button, and then click either **Insert** to place a copy of the picture into the booklet, **Link to File** to display the picture without actually inserting a copy, or **Insert and Link**. Since **Insert** embeds a copy, the picture is always visible, but it may greatly increase the size (in bytes) of your booklet depending on how large the picture is. In contrast, **Link to File** does not increase the size, and if you make changes to the original picture, they automatically show up in the booklet. But the picture won't be displayed if viewed from a computer that can't link to the original. **Insert and Link** inserts a copy so that the

image is always available, and also automatically updates changes to the original.

Using Pull Quotes

You can draw readers into the information in your booklet by using a pull quote, like the one on page two. A pull quote is a phrase or sentence taken from your main column and set apart so that it's easy to see. It can be set apart in several ways. Typically, you place it in a text box and then position the box either in the margin or within the main column (with the column text flowing around it). In addition, you might format the pull quote differently from the main column by centering it or changing the typeface, style, and size of the font. The text of a pull quote should be engaging. When a reader flips through your booklet looking for a reason to read it, a pull quote can provide that reason.

Using Text Boxes

The pull quotes and clip art in this template are contained in text boxes. A text box offers a flexible way of displaying text and graphics; it's basically a container. You can move a text box around, positioning it just where you want it; you can resize it into a tall narrow column or into a short wide column, or even rotate it so that the text reads sideways.

Resizing a Text Box

To move a text box, select it so that it has either a hatched or dotted border. Then, move the cursor over the border of the text box until the pointer becomes a four-headed arrow, and then drag the text box to its new location.

Nudging a Text Box into Position

Sometimes you may want to move a text box slightly in one direction or another, but you find that using the mouse doesn't give you the degree of control you want. You can achieve finer control of movement by using the arrow keys on your keyboard.

To do so, click anywhere in the text box so that its borders become visible, and then click a border to select the text box. Next, press the arrow keys to move the text box. A single keystroke moves the text box a single increment, while holding an arrow key down keeps the text box moving.

If granularity of movement is really important to you and you want as much control as possible, you can cover less distance with each keystroke by first zooming in on the document. To cover a greater distance with each keystroke, zoom out. You can zoom out or in by clicking **Zoom** on the **View** menu.

Products or Services

PRODUCT OR SERVICE

Describe the product or service here. Include a brief description and any features.

Price: $00.00
Item #: 000000
Type: Type

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Order Form

Last Name _____

First Name _____ M.I. _____

Address _____ Apt./Unit _____

City _____ State _____ ZIP Code _____

Phone ( ) _____ E-Mail _____

Method of payment ☐ Check ☐ VISA ☐ MasterCard

Credit Card # _____ Exp. Date _____

Name as it appears on card _____

_____

Signature

Item No.	Price	Qty.	Amount
		Subtotal	
		Tax	
		Shipping	
		Total	

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We give you three easy ways to order:

- Visit us on the Web
- Fill out the order form and mail it to us
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Company Name

Street Address
Address 2
City, ST ZIP Code

Phone (325) 555-0125
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Web site address

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The **main goal** of writing in CS is to inform readers. After writing a sentence, you should always ask yourself, "Does this sentence inform and teach my readers something new? Does this sentence move them closer to a better understanding of my main point?" By keeping the understanding and needs of your readers at the forefront of your mind at all times during the writing process, you are on your way to writing clear, meaningful work.

The Process

Where do I begin?

Writing begins before you sit at your computer in preparation of typing up your article/report/ findings. Writing in CS **happens before** you are done with your experiment/research. Thinking about your writing before actually sitting down at the computer to type it up allows you to see where your research might be lacking, and what areas you need to focus on and refine.

Steps in the CS **Writing Process**:

→ Select titles (of writing, subsections)
→ Introduction
→ Body
→ Closing
→ Revise introduction to account for points made in body and closing
→ Abstract: done last to be sure all important points made in paper are covered
→ Revise

The Forms of Writing

So, what will I be asked to write in Computer Science?

- Technical (lab) report
- Critical analysis of other people's lab work/studies
- Research paper
- Article for an academic journal
- Posters detailing experiments
- Planning a presentation of research or experiment results

Critical Analysis

A Critical Whaaat???

Critical analyses are opportunities for CS students to **read, evaluate,** and **draw conclusions** about the work and research of other scientists.

In these types of assignments, students are expected to evaluate the research & conclusions of other scientists asking such questions as: was the research accurate or inaccurate? Are the conclusions founded or unfounded?

A few tips on writing a successful analysis:

- Be **objective**
- Discuss the **contribution** of the author's work to their field
- Strive to answer questions such as the following: how original is the research, how valid are the ideas and logic behind those ideas, are the conclusions drawn by the author based on the premises given, how do the works of the authors compare?

Organization

What should my paper look like, anyway?

Computer Science writing requires a specific format for writing. The purpose for this **strict organizational structure** is to make sure the vast amount of detailed information discussed is presented in a logical and informative way that is easy for readers to follow and understand.

This organizational structure most often governs the writing up of research or experiments.

- **Title & Author**, including author's e-mail address and date of publication.
- **Abstract:** Brief overview of what is discussed in the paper. Should be written so that someone who has little or no background in the subject matter can grasp what the paper is about. Purpose: to entice readers by showing what is exciting about your research/findings. You should reveal new conclusions from your research here, but not in detail. Limit: generally, 50-250 words.
- **Introduction:** An expanded abstract. Briefly address paper topic, background, problem paper is centered around, your approach to the problem, solution, limits to the solution, and the conclusion. Do not to give too much away here, lest you strip your readers of any reason to keep reading. Refrain from including evidence and proofs.
- **Survey:** Compare the work in your experiment/research to the work of those who have studied it before you. May be included as part of the introduction, if your audience is unfamiliar with the field, or before the discussion, if your audience is familiar with the field.
- **Methods:** Present your proofs, algorithm(s), and

terms pertinent to your work or experiment.

- **Results:** Describe research methods. Graphs, data from the experiment, and tables can be incorporated here.
- **Summary/Conclusion:** Discuss the significance, implications, and relationships of and between the conclusions of your paper. Restate the main results of your research/experiment, and address any unanswered questions. Speculate about consequences of the conclusions you've reached in your research, and address what might be done in the future to answer these questions.
- **Acknowledgements:** Thank those who helped with your research, provided funding, etc.
- **Works Cited** (see related section below)
- **Appendices:** Present any detailed proofs, results, or computer programs that are too lengthy to be included in the body of your writing.

Making Your Case

But, my proof is beautiful. Can't I use it somewhere in this paper??

Proofs, algorithms, diagrams, and **graphs** can be used to aid in understanding your writing, and supporting the arguments of your paper. Tips for using these kinds of aids effectively:

- Choose specific parts of proofs and/or algorithms that purposefully support the point you are making in writing
- Cite proofs, algorithms, and other research when the c i t i c o n h e lps to clarify the point you're making

TIP
Always check with your professor about his or her specific requirements for paper structure, style guidelines, and what form of citation should be used.

Style

What in the world is it?

Style is about **how** your choice of **words** and **sentence structure communicate** with your reader. It is important to use a writing style that both clearly informs and engages readers.

Every writer has a **unique style**, which is why writing is so interesting, but there are some general style guidelines you can follow to help your writing be the clearest and best it can be.

- Choose an **audience**: Are you writing for a professor? Classmates? Academics who will be reading a journal? Keep this audience in mind as you craft each sentence of your writing.
- Write in the **active voice,** unless you are drawing on established knowledge in the field or have some similar reason to write in the passive.
- Be **specific**
- Bigger words are not always better
- Avoid clichés
- Be **confident:** avoid using words like "might", "could be", "it's possible" excessively.
- **Present** your results – don't decide their quality for the reader.

Citations

How do I give credit where credit is due?

Citations should be made when you directly use or quote someone else's work or thoughts, or when you paraphrase their ideas or words. You must also include a reference list, noting the sources of your citations.

You do not need to cite information that is common knowledge. It's best to check with a professor to confirm what is considered common knowledge in your field, since what is common knowledge often depends on your audience.

Common ways to reference and cite in science writing:

REFERENCES

1. **Alphabetical:** list your references by the alphabetical order of the author's last name.
2. **Reference order:** list your references by the order they appear in the text.

CITATIONS

1) **Ordinal- Number Style:** Use Reference Order to list sources. In text citation: put source's corresponding number in brackets after the reference.
2) **Harvard style:** Use Alphabetic Citation to list sources. In text citation: the author's last name and year of publication are listed in parentheses after the reference.
3) **CS Alpha numeric:** Use Alphabetic Citation to list sources. In text citation: the first 3 letters of the author's last name are followed by the last 2 digits of the year of publication in brackets.

Meghan Gilligan

Updated 22 April 2006

Works Cited

Mukherji, Proshanto. Personal Interview. 29 March 2006.
Pawlicki, Ted. Personal Interview. 23 February 2006.
Scott, Michael. Personal Interview. 3 March 2006.

Writing in CS is about helping computer science students move from being well trained as programmers, to being **prepared for a career** which involves research, discussion, and thoughtful analysis of what is done in programming and other computer science related work and research. Writing is important in CS because it allows individuals to communicate their work in ways that others outside of the discipline can understand, appreciate, and apply in real life situations. The **main goal** of writing in science is to inform readers. After writing a sentence, you should always ask yourself, "Does this sentence reader inform and teach my readers something new? Does this sentence move them closer to a better understanding of my main point?" By keeping the understanding and needs of your readers at the forefront of your mind at all times you are on your way to writing clear, meaningful work.	• Technical (lab) report • Critical analysis of other people's lab work/studies • Research paper • Article for an academic journal