



National University  
of Computer and Emerging Sciences



# Technical Business writing

For the Students of

- Computer Science
- Cyber Security

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## TECHNICAL WRITING

### Types of Writings

1. Literary
2. Technical (Business, Science, Technical)
3. Journalistic
4. Academic
5. Yellow Journalism
6. Creative Writing

### What is Technical Writing?

*"It is a long-established and important professional activity that can be defined as a specialized field of communication whose purpose is to convey technical and scientific information and ideas accurately and efficiently."*

*"It can also be defined as the written communication of engineering and scientific ideas, concepts, and data presented objectively, logically, and accurately."*

*"The accurate and factual recording of the knowledge that one gains through one's senses for the purpose of disseminating it is technical writing."*

*"It is a method of communication which deals with subjects in*

1. Engineering
2. Business
3. Trade
4. Government
5. Technology and Science"

### History of Technical Writing

- Prehistoric cave paintings in France and Spain that illustrate primitive man's techniques for hunting buffalo.
- Technical writing from Babylonians which has survived in the form of clay tablets contains information about their accomplishments in astronomy, mathematics, agriculture, instructions manuals for making beer, etc.
- Ancient Egyptian technical writing on papyrus in the fields of medicine and mathematics.

- More prolific technical writers were the ancient Greeks. Their writings on mathematics, physical sciences, biology, psychology, literature, etc provided the foundations for the current modern Western European and American civilization.
- Instruction books or manuals is an important area in technical writing and it started in the 16<sup>th</sup> century when the first manual on military weapons was written.
- World War II brought a tremendous speed-up in research and technology. As a result of this, the field of technical writing grew up almost overnight. The country needed a quick and efficient way to explain new scientific devices and weapons to the non-scientists and soldiers who were going to use them.
- Today's modern world more than ever needs technical writers to explain how to use the new systems, and consumer products and services, spawned by recent advances in agriculture, biology, chemistry, computer science, engineering, and physics.

### **Examples of Technical Writing**

1. Instruction manuals
2. Procedure Guidelines
3. Reports
4. Specifications
5. Proposals
6. CV/Resumes
7. Business correspondence (letters and memos)
8. Research papers and articles
9. Other technical documents

### **The Importance of Technical Writing**

Technologists, engineers, scientists, etc perform functions like: design, analyze, research, manufacture or construct, test, and manage. The result of their work is discussed in reports and other documents. In most of the cases, these reports and documents are one's only form of communication with clients, government agencies, managers, and professionals at other facilities and companies.

### **Common Purposes of Technical Writing**

- To give information (It is the primary purpose of TW)
- To analyze and interpret events and their implications
- To persuade and influence decisions

### **Functions of Technical Writing**

1. To serve as basis for management decisions
2. To furnish needed information

3. To give instructions
4. To explain techniques
5. To report achievements
6. To analyze problem areas
7. To determine design and system requirement
8. To serve as basis for public relation
9. To provide report to stockholders of companies
10. To develop a product
11. To provide service
12. To record business proposals
13. To procure business through proposals

### Writing in the career of Computer Scientists

Any graduate's career starts from CV/resume and cover letter writing. For a successful career, computer science graduates require well-developed technical skills, good communication skills, and sound background knowledge of their field. Technical writing is perhaps the most important skill and ability. Graduates will have to engage in writing different types of technical documents. The most important technical documents written in a computer scientist's career are:

**Technical writing** is a broad and varied category used by many different fields and teams, including computer science teams. There are two major similarities technical writers (aspiring or present) should keep in mind: demand for technical writers is expected to grow quickly, and technical writers are writing for a wide audience with varying degrees of technical knowledge, so the content and writing needs to be clear and direct.

This can be hard for computer science teams because they have such deep and nuanced content knowledge that is not widely known by the general public.

**Technical writing** in computer science has some specific distinctions that make it unique. Let's look at those now.

#### What is computer science technical writing?

Technical writing is simply any writing that conveys technical content. This is often in the form of specifications, instructions, procedures, or policies. Technical communication in computer science can come in any of those forms, and the content will (obviously) be about computer science topics.

Developer and software teams also use technical writing throughout the life of a product, whether to describe the development, use, or upgrade of a product. API (Application

Programming Interface) documentation is also a big part of technical writing for computer science teams because it informs teams how to connect and route different interfaces.

Any type of computer science documentation is highly technical and requires critical thinking skills as well as knowledge of programming languages and scientific and technical products. On top of this, you'll need to hone clear, direct, and effective professional writing skills.

### **What technical documents do computer science teams write?**

There are many types of technical writing documents, and then there are some specific to the computer science technical field. Software developers, software engineers, and computer science professionals at all levels will work on different forms of these documents, and doing them well can make you a major asset to your company.

Examples of writing in the computer science realm include:

1. **Product documentation**, such as user documentation in the form of user guides, tutorials, manuals, quick start guides, troubleshooting guides, and even frequently asked questions. These items all provide technical content showing how to use a product, software, or hardware. API documentation would also fall under this category.
2. **System documentation**, such as documents that describe the parts and processes of a system. These can include product requirement documentation, design documentation, source code documentation, and maintenance guides.
3. **Process documentation**, which (again obviously) describes a process for developing and maintaining a product. These can include standards, test metrics and schedules, and project plans. Software development requires this documentation.

### **Why technical writing helps developers**

Good technical writing saves time, energy, and money because processes and information are clear. Technical documentation also records information and requirements throughout a process, thereby serving as a guide and rulebook for all project stakeholders.

What's more, technical communication in computer science transfers knowledge to future developers and new users. This can help build product and brand loyalty, as well as long-term employee efficiency and effectiveness.

When done well (i.e. with clear, direct, and accessible language), technical writing can help computer science professionals advance in their careers. Everything in computer science work becomes easier and more efficient with strong technical writing skills.

## Why Every Developer Should Know a Bit of Technical Writing

Most software developers love their craft, and spend hours not just writing code and solving problems, but actively engaging with the community and trying to learn new things. Software developers want to constantly get better, improving their abilities, staying up-to-date with the latest trends, and hopefully making more money.

But improving your knowledge of programming isn't the only way to improve your abilities as a software developer. Most developers see an enormous benefit in learning related skills—especially technical writing.

### What Is Technical Writing?

Technical writing is a form of communication that attempts to take a technical field (like programming or software development) and convey ideas from that field as efficiently as possible, sometimes to other experts, and sometimes to non-experts. Technical writing draws upon traditional writing skills, but has slightly different demands; you'll often be dealing with more challenging descriptions, or technical terminology that may or may not make sense to your audience.

### Why Technical Writing Helps Developers

So why should software developers try and learn technical writing?

- **In-team communication.** First, technical writing can help you communicate more easily with your teammates. If you're collaborating with other software developers on a regular basis, you know the importance of exchanging ideas, ensuring you're working for the same high-level goals, and solving problems together. Technical writing abilities help you formally structure these bits of communication so your coworkers can better understand them; with an efficiently written message, you can avoid most misconceptions and ultimately work faster.
- **Out-group communication.** You can also use your technical writing abilities to communicate with out-groups more efficiently, especially if those groups have limited technical knowledge. Rather than using terms unique to the development field, or describing code directly, you'll have to find high-level ways to describe the challenges you're facing, or use metaphors so that other people can grasp what you're saying. Either way, you'll be more valuable in client meetings, and you'll be able to talk to account

managers and team leaders in other departments in a way that makes sense to them, while still conveying what you need to convey.

- **Problem solving and internalization.** Developers are problem solvers, so it's important to have as many problem solving tools in your toolkit as possible. You'll be forced to come up with creative ways to accomplish what was previously impossible, find creative ways to utilize past breakthroughs, and eliminate those pesky bugs that don't make logical sense. Technical writing forces you to get into the habit of putting abstract concepts into understandable words; it broadens your vocabulary, and in some ways changes how you think about the world. You may not realize it right away, but this change in mindset will be invaluable in how you conceptualize and deal with technical problems (not to mention communicating those problems to others).
- **Help guides and documentation.** On a more straightforward level, technical writing is a useful skill in creating help guides and other forms of documentation for the software you develop. As you develop new features and integrate them into your core product, you can describe them in a way that makes sense to users, and guide them through some of the pain points they might experience along the way.
- **Software design and user empathy.** If you have a hand in coming up with high-level concepts for the software, or tailoring ideal features into something that's usable, technical writing can also give you a better sense of user empathy. After writing in a way that makes technical terms easier for end users to understand, you'll have a better idea of what makes sense to an end user—and you can design your software around it.
- **Career value (and future options).** Technical writing makes you a more valuable employee or vendor, possibly earning you a raise if you can implement the skill appropriately. It also gives you a future career option in technical writing, should you ever lose interest in software development.

With those benefits in mind, it's time to try your hand at improving your technical writing abilities. There isn't a single convenient place to start, so begin the process by outlining your goals and paying more attention to how you communicate (both with teammates and non-experts in your field). Read the work of other technical writers and programmers in your field, and adopt some of the phrasing, formatting, and patterns they use that seem to be the most effective.

Over time, you'll become more comfortable with technical writing, and you'll start to write (and speak) more effectively. Be patient; this is a process that could take years to flourish.

#### Some more examples of technical writing in Computer Science

1. Project proposal
2. Project overview specification (POS)

3. Software project management plan
  4. Software requirements specification
  5. Software design specification
  6. System test specification/report
  7. User manuals
  8. Code comments
  9. Memoranda
  10. Technical report
  11. Simple Technical Information Report
  12. Technical Evaluation Reports
  13. Technical Recommendation Reports
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## Difference Between Technical and Literary Writing:

Compare and contrast the texts given below. How are they different from each other despite describing the same object?

### TEXT A

One enters the palatial room through an elegantly carved maple door to reveal the French provincial furniture of another century. The plush beige carpet makes one want to run and dance barefoot.

### TEXT B

The entrance to the 24-ft room is a 36-in. by 80-in. maple door decorated with a carved family crest. The floor has a beige nylon carpet with a 1-in. pad. The furniture is French provincial.

Point of Difference	Technical Writing	Literary Writing
Rule-governed	It has its own set of rules and practices. It presents a formal order or structure for conveying ideas.	It is experimental.
Organization	It is highly well-organized and logically structured. It follows the patterns and conventions for different text types strictly.	It can be loosely organized.
Clarity	It possesses high degree of clarity. All messages are delivered directly and explicitly. Writers' purpose and theme is clearly indicated in the very first paragraph.	It can be implicit and covert. It may challenge the reader's intellect to discover the writer's objectives and key ideas.
Grammatical Accuracy	It adheres to traditional conventions of punctuation, grammar, and spelling completely.	It tries to do the same.
Tone and Style	It has a formal tone. The writer appears objective, tolerant, and serious. Sentences may be	It can have variety of tones and styles, like, formal, informal, humorous,

	complex.	sarcastic, pensive, meditative, poetic, emotional, nostalgic, friendly, casual, conversational, sophisticated, complicated, etc.
<b>Stylistic Devices</b>	It is more straight forward and down to earth.	It uses plenty of stylistic devices, like, metaphors, similes, irony, puns, oxymoron, etc.
<b>Vocabulary</b>	It uses standard language in order to develop the formal tone and attitude which is the hallmark of technical writing. It may use technical words.	It can use vocabulary belonging to different language varieties depending on the audience and tone.
<b>Content</b>	It is usually based on factual, straightforward, specialized topics.	It can choose from a wide variety of topics, ranging from very important to less significant things in life.
<b>Authenticity</b>	It always informs readers about the sources from where it collects information.	Sources might be clear, or unclear, or sometimes not mentioned at all.
<b>Use of Visual Aids</b>	It uses tables, graphs, figures to facilitate comprehension of facts, statistics, and data	Pictures might be used, but rarely.
<b>Summary</b>	<b>Informative, unemotional, limited interpretation possible.</b>	Entertains, amuses, appeals to imagination and emotions. Suggestive, creative, dramatic, imaginative, metaphoric. Various interpretations possible.

## **Characteristic Features and the Style of Technical Writing:**

The technical style has its own peculiarities and features. Let's consider the definition of the word "technical". It can be defined as "something having to do with practical, industrial, or mechanical arts or applied sciences." Now, let's consider the definition of the word "style". It can be defined as

1. "Proper words in the proper places." Jonathan Swift
2. "Dress of thoughts." Seneca and Lord Chesterfield
3. The way a writer puts words together into sentences, arranges sentences into paragraphs, and groups paragraphs to make a piece of writing express thoughts clearly.

**Technical style is the way you write when you deal with a scientific or technical subject.**

Following are the important qualities of the technical style.

### **FEATURE 1: CLARITY**

Getting the meaning from your head to the head of your reader accurately is the purpose of clarity. Follow these strategies to ensure Clarity!

1. Completeness (Answer all Wh-Question also anticipating those that can arise post reading.)
2. Correct Grammar: This includes
  - The structures (tenses, voice, conditionals), articles,
  - prepositions, modal verbs
  - Sentence structure (the conjunctions, clauses, punctuation, avoidance of sentential errors)
  - Other mechanics and punctuations
3. Clear organization of Content: This includes
  - Organizing your thoughts in an organic way that creates a progression of ideas that is clear and natural to the reader
  - Using the writing process effectively
  - Clear paragraphing
4. Clear Pronoun References: Pronouns substitute for nouns. The word a pronoun refers to is called its antecedent. A pronoun should refer clearly to its antecedent. A pronoun's reference will be unclear if it is ambiguous, implied, vague or indefinite.

**Exercise: The following sentences contain pronoun reference errors. Re-write them correcting this mistake.**

1. The boat bumped the edge of the dock, but it didn't need many repairs.
2. Marco and his father worked together to turn the old storage room into his office.
3. When the senators realized that the bill would be defected, they tried to postpone the vote but failed. It was a disaster.
4. Although design flaws in the Titanic were realized soon after its sinking in 1912, the reasons for the severe damage inflicted by the iceberg remained a mystery until its discovery in 1985.
5. Bella saw the answer in the textbook, but now she cannot find it.
6. The counselor was speaking to Dave, and *he* looked unhappy.
7. The paper was too long, too general, and too filled with pretentious language. *This* meant Joe had to rewrite it.
8. Mary told her sister that her car had a flat tire.
9. John Roberts once defended a serial murderer before he became chief justice of the Supreme Court.
10. Since the legal profession is highly valued by the public, they are very well paid.

## **FEATURE 2: PRECISION**

Precision refers to exact, definite, and distinct terms/words/details for expressing an idea. It will leave no room for misinterpretation or multiple interpretations.

Analyze the following examples:

Vague and Ambiguous	Clear and Precise
The flow of lava was affected.	The flow of lava was decreased.
The lacquer created nice appearance.	The lacquer created a glossy appearance.
Since the component was rejected, a new manufacturing process was developed.	Because/After the component was rejected; a new manufacturing process was developed.
This is the last carburetor to be installed.	This is the most recent carburetor to be installed.
Some of our competitors have very good businesses.	Both Sunbelt Instruments, Inc. and Ohio Testing laboratories grossed over \$6.2 million during the fourth quarter of last year.
As we discussed recently, I have the figures on the projects.	I have discussed the comparative costs of three word processing computers which you requested in our telephone conversation last Friday.
The policy change will affect us adversely.	New Policy 1204.05 (Leaves) will decrease our allowable sick days from 10 to 8 per year.

**Exercise: Revise the following sentences for clarity and precision.**

1. Once we increased the strength, we had no additional failures.

2. At this stage, several forces exert themselves and try to distort the mold out of shape.
3. These studies suggest that the equipment is inadequate.
4. The video tape was too long.
5. The underground filter system might encounter some problems. Those reports are quite a bit behind schedule.
6. The software in that department needs updating.
7. A number of departments are frequently late in submitting results.
8. The project should be attended to properly.
9. The camera has a system which gives good pictures.

**Exercise:** Given below is a project description. The description lacks precise details and clarity. Rewrite it fixing this issue. You can invent necessary details. [5]

### **Automated Canteen Ordering System using Android**

This project developed an automated canteen ordering system which enables a person to order his/her food through the cell phone and also offers suggestions based on the person's past orders to save time. The application has everything that a user may expect from an automated order placement system. It also uses artificial intelligence to suggest what to order on a certain day. The AI system requires the user to input certain information and then based on this input, the system recommends food and drinks. The users can get the application easily without any effort.

**Exercise:** Which of the following are general and which are concrete?

- excessive heat
- four inches of rain in 48 hours
- 120 degrees Fahrenheit
- select the appropriate key
- click Alt-B

### **FEATURE 3: SIMPLICITY**

The technical style demands formal yet simple language. Use technical words only when you really need to. Avoid unnecessary jargon and gobbledegook. Gobbledegook refers to unintelligible, pompous, and stiff language. Consider the following examples:

#### **Jargonized and Pompous language**

We will use the input of each department to finalize our game plan.

At this juncture, the aforementioned procedure should be utilized.

We should commence operational capabilities in systematic increments.

#### **Simple and Formal**

We will consider the suggestions of each department to complete our programming.

The plan which we discussed should be used now.

We should begin the project step by step.

It just isn't politically correct to suggest a purchase from a company whose sales are falling. It just isn't smart to suggest a purchase from a company that is played.

**Exercise: Simplify the language of the sentences below.**

1. Her worry was concerning the outcome of her exam.
2. As you requested at the commencement of the year, I am forwarding my regular quarterly missive.
3. Can you assist as in ascertaining the causes pertaining to yesterday's mechanism malfunction?

**FEATURE 4: OBJECTIVITY**

The technical style is characterized by objectivity and impersonality. Personal, subjective, emotionally stimulating, and judgmental style and tone is not used to eliminate the possibility of multiple interpretations. Objectivity establishes credibility in your writing. Objective writing is writing that presents the facts and does not pass judgments or give opinions. Usually to achieve an objective and impersonal style, the passive voice and the third person point view is adopted in scientific writing. However, there are places where the passive and the third person point view will be unnecessary.

The convention of 'objective' writing is that arguments use impartial language, which is not  
a) personal, b) judgmental, or c) emotive. Objective language, therefore, is considered fair and accurate. It avoids exaggeration and bias, and shows respect for the views of others.

Everyday language is 'subjective'. It is used to express opinions based on personal values, beliefs or preferences rather than evidence. Opinions tend to be based on subjective judgment rather than on information that can be verified.

To be objective, do the following:

1. Avoid personal language unless necessary. Compare the examples below:
2. Avoid Judgmental Language.
3. Avoid emotive language.

**Exercise: Which of the following sentences is objective and which one is subjective?**

1. The results of the test were incredibly wonderful.
2. Ninety percent of the tested samples met accepted criteria.

### **Rewrite with an objective tone and attitude.**

- a) I think that gender stereotyping dissuades many women from pursuing skilled trades careers.
- b) Gerard offers a useless solution to the problem of misusing biometric systems.
- c) I think that all rabbits should be immunized against the Calici virus.
- d) There is a shocking link between the overconsumption of dark chocolate and horrifying cases of severe indigestion.
- e) Upon testing, the algorithm performed brilliantly.
- f) The procedure is explained in a very dull way.
- g) I don't think we can approve your loan.

### **FEATURE 5: ECONOMY**

Economy/Conciseness is communicating complete information about a topic or idea in a few words. Concise writing also involves being mindful of word choice. Limiting your word count isn't enough to write concisely. You need to choose the strongest words to illustrate your point.

Wordiness is an easy habit to fall into. Some writers write the way they speak, using filler phrases and redundant words that might sound natural during the writing process. These unnecessary words can make your written message hard to understand.

Concise writing removes or replaces filler, repetitive, and purposeless words from sentences. You can edit your writing for conciseness in a few ways.

1. Identify passive voice: Passive voice might make sense if you're writing something formal, but sentences with passive voice use more words than active voice. Find areas of passive voice in the text and recast it into active voice using powerful words.
2. Replace commonly used phrases: Replacing overused phrases with substantive words is another way to write more concisely. In addition to writing succinctly, your writing has a greater impact because of your deliberate word choices.
3. Remove redundant pairs: Some common phrases use two words that have a similar meaning. To practice conciseness, choose the strongest one from the pair and remove the weaker word. Removing redundant pairs removes at least one unnecessary word from your writing.
4. Remove qualifiers: Qualifiers either amplify or reduce the intensity of another word, but they can lead to wordiness. Aside from conciseness issues, qualifiers that limit the impact of a word can also come off as unsure and compromise your

credibility. Scan through your writing and remove qualifiers that don't serve a purpose.

When conciseness isn't done well

1. **Example using passive voice:** The groceries were carried into the apartment by Paula. (9 words)
2. **Example using commonly used phrases:** The department is on a tight budget this month due to the fact that it overspent the previous month. (19 words)
3. **Example using redundant pairs:** Each and every year, the marching band advances to the national competition. (12 words)
4. **Example using qualifiers:** It was somewhat cold that late-October evening which made the atmosphere extremely weird. (13 words)

When conciseness is strong

1. **Example avoiding passive voice:** Paula carried the groceries into the apartment. (7 words)
2. **Example avoiding commonly used phrases:** The department is on a tight budget because of last month's overspending. (12 words)
3. **Example avoiding redundant pairs:** Every year, the marching band advances to the national competition. (10 words)
4. **Example avoiding qualifiers:** It was cold and eerie that late-October evening. (8 words)

**Exercise: Which description contains active verbs and which has nullified the effect of the verbs decreasing the concreteness?**

"The QMS Magicolor 2 Printer is equipped with two interfaces, one is known as the parallel interface, the other is known as the Ethernet interface. Whatever interface connection is needed, you will find that MS Windows 98 has already been preinstalled and your software applications are based on this platform."

"The QMS Magicolor 2 Printer has Parallel and Ethernet interfaces. Whatever interface you need, you will find your software applications will work on the preinstalled MS Windows 98."

**Exercise: Revise the following sentences by inserting more active verb forms.**

- a. The chromium plating provides protection against corrosion.
- b. Use dye penetrant for detection of surface cracks.
- c. The implementation of the new design procedures will require the cooperation of all supervisors.
- d. We purchased the computer for the purpose of increasing the efficiency of the department.

**Exercise: Make the following sentences concise:**

1. Due to the fact that the seat belt broke, the passenger sustained a high degree of injury.
2. In accordance with the will of the clients, we undertook the steps mentioned in the report.
3. During the month of April, we will begin to package our product in boxes rectangular in shape and yellow in color.
4. If we plan on showing an improvement of 20 percent, we will need to advance forward in our outlay and productivity.
5. The students and the faculty cooperated together to devise and develop a totally unique forum for discussion.

**Exercise: Rewrite the following sentences eliminating wordiness and redundancies.**

- a) Animal testing is cruel, barbaric, and merciless.
- b) Ahmer's skills are illustrative of the fact that he has studied with great dedication.
- c) It is necessary for students to fill in both questionnaires.
- d) There are eight instructors teaching in the Mechanical Engineering department currently.
- e) It seems that most North Americans think of motor scooters as vehicles that exist only in European countries.

**Exercise: The following sentences contain unnecessary nominalizations (verbs turned into nouns). Rewrite them by liberating the disguised verb (in the nominalization). Some sentences contain two nominalizations, so fix the one which leads to wordiness.**

- a) The scientists conduct an analysis to examine how X-factor impacts the B gene expression.
- b) A re-examination of the evidence led prosecutors to a reconsideration of the defendant's guilt.
- c) The steering committee raised an objection to the proposed parking garage north of the stadium.
- d) The parole board did not give an explanation for the early release of such a dangerous inmate.
- e) Negligence on the part of hospital workers was the reason for the failure of the kidney machine.

**More Exercises on Technical Style**

**A group of four students belonging to ANS university conducted a survey at a number of universities in Karachi to find out the most used mobile applications by undergraduate and graduate students. The following is an extract from their report.**

**Revise and edit the extract for completeness, clarity, and precision. Write the revised version in your answer copy.**

This survey investigated university students' most used mobile applications. Students belonging to many leading universities in Karachi participated in the survey. A great majority of the student respondents were young adults with very few being in their late twenties.

The results of the survey demonstrated that the most used mobile applications by the students were the messaging applications. Almost all the students regularly used all of the most popular messaging applications of today. The second category of most used mobile apps included social networking sites with many students preferring Facebook to Twitter. The next category included games of various kinds. Most of the students played war or combat related games. The last category included MS Office tools with a staggering majority of students using MS PowerPoint.

These results provide useful insight to the software developers targeting the youth at universities. The students expressed a desire for improvements in some of the war games they played. The students also expressed a need for mobile apps which could assist them in tackling various issues in their studies and academic life in general.

**Make the pronoun references clear. [3]**

1. The files arranged by the temporary workers were badly out of order, so we sent them back to the main office.
2. The car went over the bridge just before it fell into the water.
3. The senator opposes the bottle bill, which displeases many of his voters.

**John works at the IT department of a company. He received a complaint from a colleague at the accounts department. John's reply to the complaint is rude and subjective. Make it objective and professional. [2]**

We received your complaint via our website response system. As you neglected to include precise details about the issue you were facing in data entry, please be advised that your complaint has been ignored.

**Revise the following sentences for concreteness activating the hidden verbs.**

1. The theory makes the postulation that long-term stability of species (with only minor modifications) in paleontologic time is punctuated by bursts of time in which many species are extinguished.
2. Freshmen have frequently made complaints about the cafeteria food.
3. Species managed to achieve evolution from parental species that made an escape from extinction by virtue of their geographic isolation.
4. The Sumerians are credited with the invention of writing toward the end of the fourth millennium B.C.

5. Neither the clay tablet nor the papyrus roll underwent much change in form during the next three thousand years.

**Delete redundant categories**

- a. The table is round in shape, smooth in texture, and heavy in weight.
- b. The image is fuzzy in appearance.
- c. Redundant categories can leave your reader in a confused state of mind that is extreme in degree and perplexing in nature.

**Replace redundant word pairs with single words**

- a. Various and sundry alternatives were debated.
- b. I demand a full and complete explanation.
- c. Each and every one of the jury members voted “not guilty.”

**Rewrite the following statements using an objective style**

- I believe that there is a discrepancy between theory and practice...
- Gorard's (1999, pp.31-33) study provided an awesome classification model...
- These really lucky people may be advantaged by healthcare services that...

**Pompous words make the following sentences difficult to understand. Revise them by using simple vocabulary.**

1. I wonder if you would be so kind as to avail yourself of this opportunity to respond accordingly to our questionnaire.
2. The input from every department is vital to the survival of the organization.
3. Please be advised that the bank does not offer services on Saturday

## Writing the technical Prose

The technical prose is informational, defining, and instructional in nature. While writing the technical prose, you may be required to do one or more of the following.

1. Explaining
2. Description
3. Comparison
4. Following chronologies (series of events); for example, when discussing historical background and development of things/concepts over the period of time, writing steps in a procedure, etc.
5. Analysis and evaluation
6. Calculations
7. Referencing and citing
8. Using support material: Examples (Real or Hypothetical)
  - Facts and Figures, Statistics
  - Events, incidents
  - Quotations, insightful observations
  - Analogies, metaphors, similes, etc.

### Analyzing Purpose

Writing is done for a purpose, and to accomplish something. A document has two purposes:

**The writer's purpose:**

Why the writer is writing the document?  
What the writer wants the reader to know and do?

**The reader's purpose:**

Why is the reader reading?  
What the reader wants to know or do?

A writer may have one of the following purposes if writing a technical document:

1. **To Instruct:** If you are writing to instruct, things to consider are:
  - The purpose of the procedure/task
  - How to perform a task/procedure (all the steps)
  - Why it should be done
  - Special conditions that affect the procedure

Example Documents: Training and operator manuals, policy and procedure statements, consumer instructions, etc.

2. **To record:** Things to consider are:

- Tests or research performed and results
- Decisions made and responsibilities assigned
- Actions and their consequences

Example Documents: Minutes, file reports, lab reports, etc.

**3. *To Inform (for decision making):*** Things to consider are:

- Accurate information and thorough data analysis to enable the reader to make decisions
- Specific facts

Example Documents: Progress reports, performance evaluation, feasibility reports, investigative reports, etc.

**4. *To Inform (without decision making):*** Things to consider are:

- The specific who, what, where, when, why, and how of the subject
- A sequence of events showing cause and effect
- The relationship of the information to the company's interest

Example Documents: Information bulletins, literature reviews, product descriptions, process explanations, etc.

**5. *To recommend:*** Things to consider are:

- Reasons for the recommendation
- Expected benefits
- Why the recommendation is preferable to an alternative

Example Documents: Simple proposals, feasibility studies, recommendation reports, etc.

**6. *To persuade:*** Things to consider are:

- Sound evidence
- Counter arguments
- Importance of the action suggested
- Consequences of not taking the suggested action
- Benefits

Example Documents: Construction bids, grant applications, technical news release, reports dealing with sensitive topics, etc.

You can consider the following questions to determine the reader's purpose:

- a. What action (or decision) do I want my reader to take (make)?
- b. How does the reader intend to use this document?
- c. What effect will this document have on the reader?
- d. Do my purpose and my reader conflict in any way?

Write the purpose statement before you begin your research for material.

### Determining and Analyzing Document Type

What specific document type is required or will be appropriate?

Search for the internationally accepted standards regarding format and organization.

### Analyzing the Writing Situation/Context

No writer works in isolation. Employees work in a certain organizational environment which may have a particular communication atmosphere, preferences for specific documents, formats, or types of information, the organization's relationship with externals, government regulations, professional standards or ethical codes the organization follows, etc. In analyzing your writing situation, consider these questions:

1. Is the subject controversial within the organization?
2. What events created the need for this document?
3. What continuing events depend on this document?
4. Given the deadline for this document, what information can be included?
5. What influence will this document have on company operations or goals?
6. Is the subject under the control of a government agency or specific regulations?
7. What external groups are involved in this subject, and why?

## Analyzing Audience

The audience of a technical report—or any piece of writing for that matter—is the intended or potential reader or readers. For most technical writers, this is *the most important* consideration in planning, writing, and reviewing a document. You "adapt" your writing to meet the needs, interests, and background of the readers who will be reading your writing.

To communicate effectively and maintain receptivity in the readers, a good writer generates an audience profile before writing. In this way, s/he can select style, language, organization, and form of expression suitable and appropriate for the target readers.

### Technical Readers

Unlike most of the other types of writings, audiences of technical writing are

- Well-defined
- Sometimes writers may have personal knowledge of the reader(s)
- Technical readers have a professional or organizational

responsibility to read the material. The readers of technical documents will fall into one or more of the following categories:

Reader	Purpose
Executives	To make decisions based on applicability, and profitability. They want conclusions and alternatives rather than details.
Technologists, engineers, & scientists	Interested in information transfer. They need facts, details, theory, methodology, and conclusions.
Technicians	Need information to troubleshoot, modify, upgrade, and maintain or repair equipment. They need practical information in format that is easy to use. To facilitate understanding, they rely on visuals.
Operators	Need instructions to operate equipment or to perform procedures. They need a set of easy to understand commands in a step by step format with visuals.
Non technical persons	They read for interest and information

**EXERCISE:**

**Match the writers below with their correct target readers:**

Writer	Readers
Computer specialist designing a computer system for a bank	Supervisors and drug manufacturers
Chemist writing a report about tests on a certain drug	The company, bank managers, city engineers, etc.
Consulting engineer writing a city.	Supervisors, managers of the bank, and the programmers who will have to learn the new system.

**Conducting audience analysis and generating an audience profile**

Questions to consider are:

1. Who is/are my specific reader(s)?
2. What is the position of the reader(s) in the organization or are they external?

External: outside the organization	Internal: inside the organization
Customers, vendors, stockholders, employees of government agencies or industry associations, competitors, and the general public.	<ul style="list-style-type: none"> <li>• Supervisors: executives who make decisions based on information in the document. Supervisors who may be semi experts.</li> <li>• Subordinates: they rank lower than the writer.</li> <li>• Peers: equals.</li> </ul>

**EXERCISE:**

What issues will you discuss and emphasize when writing in the following scenarios? Match the following:

If you are writing a report to superiors about a new company computer system, your readers would be interested in...	How the system will link departments and functions, change current procedures, support company or department goals
If the same report is meant for peers, you may focus on...	Overall costs, the effect of the system on company operations, expected benefits company wide, and projections of future computer uses and needs

If the same report is for subordinates, you will probably emphasize information about...

Specific models and programs, locations for the new computers, how these computers support specific tasks and systems, and how the readers will use the computers in their jobs.

### 3. Why do they need this document?

Usually, technical readers read to gain information. For a writer, an important issue to investigate is

- What particular information does the reader need?
- Why does s/he need it?
- Considering readers' needs, what material would be appropriate, and what sequence would be the most suitable one?

#### EXERCISE:

Match the following by analyzing the readers and the order of material most suitable for them.

Readers	Order of material
A decision maker	A brief summary of recommendation from the investigation.
A dissertation advisor	The answer or the conclusion first.
An engineering manager	A retelling of steps of a research or development procedure with answers at the end.

### 4. How will they use it?

Technical documents usually are not read, nor are meant to be read, from the beginning to the end like a mystery novel. Readers may be interested in specific information in the document depending on their needs and reading habits.

#### EXERCISE:

What sections of the technical document (manual, reports, brochures) would the following readers be interested in? Choose from the options in the box and also explain why?

- Summaries or abstracts
- Specific sections of the document:  
(correct operating procedures,  
section on maintenance,  
description of machines)
- The entire document

- A. a customer trying to decide what automobile to buy
- B. an executive
- C. a service technician

- D. someone who opposes the project
- E. someone who needs to change an automobile tire
- F. a psychologist searching for research studies about abused children

5. Do they have a hostile, friendly, or neutral attitude towards the subject?

Considering this question will help you in deciding upon techniques for being persuasive and assertive.

**EXERCISE:**

**Match the following:**

Readers	Techniques
A person with a negative attitude about the subject	Adjusting your document to international standards
a reader with strong personal preferences regarding formats	Using lists, headings, indexes and other design features to make the text more useful and emphasizing the importance of suggested action
A reader reluctant to read and act	Organizing information from goals to opposing points

6. What is the level of their technical knowledge about the subject?

Expert level	Semi expert level	Non expert level
They require few definitions and explanations of principles.	They may vary a great deal in how much they know and why they want information. They will require more definitions and explanations of general principles than the expert reader does.	They have no specialized training or experience in the subject. Usually, they are given a glossary of technical terms, checklists of important points, simple graphics, and summaries.

**EXERCISE:**

How may you describe the following readers?

1. A manager who understands some engineering principles in a report but probably is more interested in information about how the project affects company planning and budget subjects in which the manager is an expert.
2. A person reading a document to learn how to install a heat lamp in the

- bathroom.
3. A marketing manager reading a report explaining possible strategies for selling a home appliance in selected regions of the country.
  4. An equipment operator who knows little about the scientific basis of a piece of machine but is more interested in information about handling the equipment properly.
  5. A person reading an article in a general science magazine about the disappearance of the dinosaurs from earth.
  6. A scientist who wants to duplicate a new genetic test, and so wants information about every step in the test.

#### Multiple Readers

**Primary Readers:** They are the people for whom the document is originally intended and written. They will take action or make decisions based on the document. Primary readers can be one or many.

**Secondary Readers:** They might be affected or influenced by the document.

For multiple primary readers, the following steps may be useful:

1. Precede all information with headings that direct different readers to sections of the report relevant to them.
2. Write a different cover letter that emphasizes the relevant sections of the report and add any other relevant information.
3. Sometimes you may be required to separate, similar report for each audience.

#### **Exercise: What to include? What to leave out? [5]**

Table 1 contains a collection of details about a research project you have just completed on thunderstorms. Imagine that you're writing documents for each of the 5 following audiences:

- A. Your boss**
- B. Scientists**
- C. The general public**
- D. Politician**

What information about thunderstorms might each ask you for? As you go down the list, write in the blank spaces in front of each detail the letter that correspond to the audiences that you think would find this detail most relevant.

**Table 1. Details About Your Research Project On Thunderstorms**

	1. The damage caused by thunderstorms in your country each year.
	2. A literature review of previous research on thunderstorms.
	3. Some basic physics of how thunderstorms work.
	4. How much your project costs.
	5. A list of everyone who worked on the project.
	6. Specifications of a new instrument to measure hail size.
	7. A new result showing a connection between lightning intensity and total rainfall.
	8. Advice on how protect oneself during thunderstorm.
	9. Procedures you used to avoid statistical biases in your data.
	10. Your recommendations for future research.

# WRITING USER DOCUMENTATION

What problem can low quality documentation create for both the readers and the writers?  
Discuss with reference to user guides?

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Key terms and their definitions are given below:

**INSTRUCTIONAL WRITING:** It is that writing which gives instructions to readers regarding a well-defined and specific topic.

**INSTRUCTIONS:** Instructions direct/teach/guide a person to do something, furnish with information needed to accomplish something.

**TASK:** A specific piece of work, a distinct specific action/activity

**PROCEDURE:** It refers to

1. manner of proceeding; a way of performing or effecting something; standard procedure.
2. A series of steps taken to accomplish an end: a medical procedure; evacuation procedures.
3. A set of established forms or methods for conducting the affairs of an organized body such as a business, club, or government.
4. Computer Science: A set of instructions that performs a specific task; a subroutine or function.

Can you name some tasks for which instructions are written?

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## WRITING INSTRUCTIONS

Instructions are provided in user guides, manuals, tutorials, training videos, etc. All such documents may contain instructions for different tasks, procedures, etc.

*In the context of technical writing, instructions are those step-by-step explanations or guidelines which teach/guide/help/direct users regarding how to do accomplish tasks.*

They explain how to carry out a procedure in order to achieve an objective. They usually teach how to assemble something, operate something, repair something, or do routine maintenance on something.

Before we move on to study how to write instructions, there is an important thing you need to bear in mind about readers before you start working on writing instructions for them.

- Users usually read the documentation in desperation, after what they tried to do failed.
- They're now frustrated, they have messed up things.
- They're lost as to how to proceed to complete their goal.

### **How to write instructions to explain the procedure to accomplish a well-defined and distinct task:**

1. Conduct a thorough research on the task and identify all the steps that are followed to complete the procedure. Find all minute details. Visualize the procedure and show this awareness in writing. Work on achieving a technically advanced understanding of the procedure and all the steps. Make a list of all the steps. This is your rough draft.
2. Identify special requirements, conditions, cautions, warnings, any other vital background information that is needed. Inform the reader about it before beginning to instruct about the task (steps).
3. After audience analysis decide on the level of detail, organization, style, and vocabulary.
4. Write a clear heading for the task. Instructions are usually titled as "How to do task ABC", making sure that the instructions under this heading all have to do with accomplishing task ABC (and nothing else). Headings should be descriptive, informative, and direct.

Bad	Good
<ul style="list-style-type: none"><li>• Reports</li><li>• Files</li><li>• Backups</li></ul>	<ul style="list-style-type: none"><li>• Printing Duplex Reports, How to Print Duplex Reports</li><li>• Saving XML Files To Shared Networks,</li><li>• Creating and Archiving Backups</li></ul>

5. Use imperative sentences. Use precise, concrete, and image building verbs. For example,  
“**Press** the emergency button” rather than “**Hit** the emergency button.”

6. Always use active voice.
7. Address the reader directly using the pronoun "you". Avoid third person pronouns.
8. Put the steps/commands in chronological order. Enable readers to visualize the procedure.
9. Explain with the help of graphics.
10. Use a numbered list when the order is important. Use a bulleted list (like this list) when the order is not important (for example, when the reader can choose between different options).
11. Specify conditions before the primary part of the instructions. For example, at step 5 of some stocktaking instructions, do not write, "Before you start the stocktake, make sure that..." (This type of problem frequently occurs.)
12. Avoid lists of more than approximately ten steps. If possible, divide a long list of instructions into two or more different tasks.
13. Specify what the reader does when the task is complete. If a reader asks, "Now what?", the instructions are not complete.

For software, follow the guidelines given below:

- a) Orient the users: tell the users where they are and what they should be seeing on their screen, such as the name of the window they should be looking at.
- b) Tell them what button(s) to click on the current window and/or what text they need to type into what field(s).
- c) Explain with the help of graphics (screen shots).
- d) Tell them how to get to the next step/location and describe what they should see onscreen when they take that action.

In short,

***tell the reader where they are→tell them what to do→describe the results of their actions***

For example:

1. From the **Main Window**, select any one option you want to activate. Click **OK**. The **Second Window** appears showing the current status of the options you selected.
2. On the **Second Window**, verify that all of the options selected are correct. If all options are correct, click **Activate Options** and the **Third Window** appears otherwise click **Back** to return to the **Main Window** and select different options.

**Critically analyze the following instructions taken from the user guide of "Photo Meister Professional version 2". Find out the problems with the instructions.**

## **Managing Photos**

In helping you manage your photo collection, PhotoMeister allows you to move, delete, dump, and copy photos within PhotoMeister photo albums.

### **Using the clipboard**

To copy the current photo into the clipboard, select **Copy** from the Edit menu. Then you can paste the photo into any other Windows application that supports the clipboard. (Please note that it may be a better idea to open the file of the photo directly within the other application to create less memory load!)

To paste an image stored on the clipboard by another application into the current album, **Paste** is selected from the edit menu. PhotoMeister will ask you for a name for the new photo and then stores the photo into the album's folder.

### **Moving and Copying Photos**

Moving and Copying Photos are accomplished in exactly the same manner

- Select a photo
- Appropriate option from the file menu should be chosen.
- Move Single Photo to Album (or Move Selected Photos to Album if working with multiple photos)
- Copy Single Photo to Album (or Copy Selected Photos to Album if working with multiple photos)
- Selecting an option will bring up the appropriate window.
- From the list of albums, choose an album to which to copy or move the selected photo(s) or create a new album by clicking "New Album"
- Click next to complete the transfer
- An informational message will appear informing you the transfer was successful.

## **EXERCISES:**

**Correct the errors in the following instructions. Some might be correct:**

1. Allow the glue to dry adequately.
2. Drag and drop to quickly and in an easy manner rearrange headings and the content beneath them.
3. Just save the document to see changes from other editors as you work. Your changes also become available to other editors each time you save.
4. Push the stem into the fork tube a few inches in as shown in the figure.
5. After having used the equipment, sliding the temperature sensor back into its holder on the side of the control base is highly recommended.

**Write instructions for the following tasks.**

1. Inserting pictures in power point slides.
2. Changing font type and size in MS Word.
3. Inserting tables in MS Word.
4. Printing MS Word Document.
5. Sharing files via Bluetooth from one mobile phone to the other.

## **USER DOCUMENTATION:**

A common user guide can be defined as

- ▶ A **user guide** or **user's guide**, also commonly known as a **manual**, is a technical communication document intended to give assistance to people using a particular system.
- ▶ Manuals are written guides or reference materials which are used for training, assembling mechanisms, operating machinery or equipment, servicing products, or repairing products.

Software user documentations

1. Provide helpful references to specific system functions.
2. Help the user to find the information they need quickly and easily to get right back to work.
3. Explains how to use software to do procedures. A user guide answers the question, "How do I...?"
4. A user guide can contain operating instructions, maintenance instructions, technical descriptions, flow charts, drawings, and diagrams.
5. A common user guide is the "Getting Started Guide" that is developed to help the user get comfortable using the software. A user guide should cover how to run the system, how to enter data, how to modify data, and how to save and print reports.
6. This guide should also include a list of error messages and advice on what to do if something goes wrong.
7. The user manual is vital for learning both basic and more advanced techniques of a program or application.

Manuals are typically short, but if more detail is needed, they can be much longer. The length of a manual will depend solely on the type of software and how much detail it must include. ***Users will appreciate manuals with easy to find, concise information, with enough detail to prevent confusion.***

## **IMPORTANCE OF SOFTWARE USER GUIDES:**

Computer documentation, when done correctly, enhances the value of the software described by making it easier to use and therefore more accessible. Think of more benefits of user documentations and write below:



### **TYPES OF USERS:**

Types of user and their typical needs are explained in the table below:

User type	Comment
Absolute beginners	Require handholding, no assumptions, simple step-by-step instructions. Many pictures. Only one method of achieving a required result.
Novice	Require handholding, no or few assumptions, simple step-by-step instructions (but less detail than absolute beginners). Encouragement to learn alternative methods.
Competent	Require brief reminders, explanations of options, alternatives, comparisons with other methods.
Advanced	Require brief reminders, trade-offs, alternatives, minimum text and few screen shots. Unusual functions, oddities, shortcuts.

### **TYPES OF USER DOCUMENTATION:**

User documentation includes user guides, manuals, tutorials, help systems, quick reference cards, guided tours and *Getting Started* sections, often used for installation and set-up, as well as reference guides designed for referral only. For convenience, we will divide user documentation into two types:

1. Typical printed documentation
2. Typical Online documentation

#### **PRINTED DOCUMENTATION**

Type	Typical Users	Advantages and disadvantages to users
Reference manual	Advanced	Typically uses structural description. Usually focuses on how and what to do, not why. Most material is rarely used, but it must be available.
Introduction / Welcome guide	All	Useful for setting the context. Usually redundant as soon as the user is familiar with the software.
User guide	Beginner, competent	To be useful to novices, must set the context, and make everything clear. No or few assumptions, and therefore, quite verbose. Possibly, quickly becomes redundant.
Quick reference / Checklist	Competent, advanced	Compact. Users must know what they want to do before they can use these.

## ONLINE DOCUMENTATION

Type	Typical Users	Advantages and disadvantages to users
Online manual	Novice, competent, advanced	Easy to search on keywords (but not concepts). Those users who want a paper copy must print one themselves.
Context-sensitive help (window-level)	Novice, competent, advanced	<p>Typically, when a user calls the help, the help topic explains the functions of the buttons and entry boxes in the dialog box or window from which the help was called. This is excellent for reference information, but it is not particularly useful for getting the global picture.</p> <p>A large problem is that one <u>procedure</u> typically uses many dialog boxes, and sometimes, one dialog box is used in many procedures. Additionally, help topics are necessary to explain <u>processes</u>, procedures, and concepts. Usually, the help topics cannot be context sensitive.</p>
Popup help (What's This? help, field-level)	Novice, competent, advanced	Sometimes, useful as a short reminder. However, it is sometimes a waste of time. Typical example: an entry box says 'Name' and the help says 'Enter the name here'. Bad for explaining the general picture. Information must be

Type	Typical Users	Advantages and disadvantages to users
help)		duplicated in Help Topics window or HTML-based help, because otherwise it is difficult to print many items.
Online video	Novice, competent	Shows users how, but needs to be high quality and clear. (Implementation requires considerable memory.) Operations must be slow. Useful for beginners, but probably not as good for advanced users, because a sequence of menu options is faster to read. Mouse clicks and keyboard entry of non-printing characters is not explicit.
Computer-based training (CBT)	Novice	Useful in training environments where users do not expect to do useful work. Possibly, persuading users to use the material is difficult.

We will study how to prepare a typical user guide or online manual for a software application. We will target novice users.

A user guide can contain operating instructions, maintenance instructions, technical descriptions, flow charts, drawings, and diagrams. Sometimes, a user guide has full information about all the tasks that users do. Sometimes, a user guide has information only about the most frequent tasks or the most important tasks that users do.

Usually, a good combination of documentation is a user guide that contains only basic information, and online documentation that has full help about a product. This combination of documents has the following benefits:

- Users have all the information that they need.
- The user guide is relatively small.

Software developers can write the reference information in online documentation.

On the other hand, a reference manual is a document that explains the parts of a product. A reference manual answers the question, "What is x?"

Usually, a reference manual for software has the following features:

- Necessary background information and theory about the subject
- Full information about the product
- An explanation of each dialog box, screen, field, tab, and button

- An explanation of all the options that users have.

## **PREPARING SOFTWARE USER GUIDES:**

The procedure contains the following steps:

### **1. INTENSIVE RESEARCH ON THE PRODUCT, USERS, AND OTHER ESSENTIAL INFORMATION:**

It is very important that you conduct a professional inquiry on the users and the software. You can use the following attack strategies:

- a. Refer to the programmers to find out all the things that the software can do. Find out what tasks it can accomplish, what functions it can perform, how does it help? what it can do, precise description of the software and its objective, and so on.
- b. Interview potential users to find out how they will use the software, why they will use it, what do they want to accomplish, and so on.
- c. How does the software make things easier, efficient?
- d. List down all functions (basic to advanced), all tasks that can possibly be accomplished through the software, all options, accurate names and titles for everything, etc.

### **2. MAKE AN OUTLINE TO HAVE A PLAN TO FOLLOW:**

1. A typical software user guide consists of the following sections.

*The installation procedure, software purpose, menu descriptions, common tasks, advanced functions, and a troubleshooting section.*

Also, include sub-sections in your outline for specific tasks. Following is an example outline, starting with the introduction and advancing to complex features:

- Introduction of the system
- "Getting started" tasks
- Developing the system
- Modifying the system
- Customizing the system with advanced features
- Conclusion

### **3. WRITING DIFFERENT COMPONENTS OF A USER GUIDE:**

#### **a. Introduction:**

Introduces the software, describes it, and explains its purpose and objective. It explains what the software does.

Provide a detailed description of the software's purpose. Include what a user needs the software for and how they can benefit. For instance, if the software deals with accounting, explain common accounting tasks that the software makes easier. Explain which functions are the most important to the end user. This will give the user an idea of which functions to try to learn first. For instance, in music creation software, tell the user about how many tracks can be recorded at once, any included sounds and rhythms, and the formats the files can be saved in.

Include a brief description of advanced features that makes this software different from others on the market. For instance, your software may be able to generate more reports or supports more file types than any other program currently available.

#### **b. Installation Procedure:**

Detail the installation process, including computer requirements. Provide requirements before the main installation procedure so users can prepare their computer.

Include even the most basic steps for computer beginners. These steps may include "double-clicking the installation file" or "insert the CD into the CD-ROM drive."

Typical installation steps involve explaining installation options, such as a typical installation versus an advanced installation, walking the user step-by-step through each GUI screen they encounter, registering the software and entering any codes or serial numbers, and how to access the program once installed to verify correct installation.

#### **c. Orient Users:**

Explain how to navigate menus. Explain each item in the menus provided. Any items that cannot be explained in one or two sentences should be included in the Common Tasks section of the manual. These tasks could include changing fonts and colors, printing to different formats and file types, and organizing files and information.

#### **d. List Important Tasks Alongwith the Procedure:**

Give detailed instructions about accomplishing different tasks that the software can perform for you. Use graphics, notes to ease comprehension. Also, give instructions for task that a user will have to perform in order to achieve a higher objective.

#### **e. Advanced Functions and Extra Features:**

Write a separate section for advanced functions and extra features. This is the place to go into detail. For instance, a user manual for Microsoft Excel might include information on creating reports, links, and macros.

Extra features will include functions the end user may not expect. For instance, music creation software may come bundled with a music player. Take the time to explain extras that may come with your software, or unique uses of the software.

f. **Troubleshooting Section:**

Provide troubleshooting tips. Explain the meanings of any errors the user might encounter, how to solve the issue, and how to prevent it in the future. This is also the place to include contact and help desk information.

g. **The Title Page and Index:**

Design a title page with the software name, version. It may be followed by legal copyright details.

Design a clear content page with page numbers.

Design an index and place at the end of guide. An **index** (plural: **indexes**) is a list of words or phrases ('headings') and associated pointers ('locators') to where useful material relating to that heading can be found in a document. In a traditional back-of-the-book index the headings will include names of people, places and events, and concepts selected by a person as being relevant and of interest to a possible reader of the book. The pointers are typically page numbers, paragraph numbers or section numbers.

**THE ROLE OF A TECHNICAL WRITER IN THE PROCESS OF DEVELOPING SUGs:**

An effective way to write a user guide is to create all the content in an online help system, such as RoboHelp, and then create the user guide through the printed documentation feature. Single sourcing is the act of writing the content once and using it in many formats. This way, you have created the online help system for the computer application along with a user guide for your end users.

The writer of a user guide should have a good working relationship with the product development team. Usually, the technical writer works directly with the developers and documents the step-by-step instructions on how to perform a system function. Technical writers design, write, and organize documents to deliver clear and consistent technical information.

Well-written technical information can reduce human error, ease transition to a new system process, and reduce training and support costs.

Technical writers work closely with developers to write, test, rewrite, and retest the system features until they have a good draft for review. The next step is to submit the user guide for editorial review. At the same time, the quality assurance engineer should review the user guide for technical accuracy. Before publication, it is a good idea to double-check with the developers for last-minute system updates. After all the last-minute edits have been made, then the technical writer can send the user guide to the printer.

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**Exercise 1:**

**Arrange the following tasks in the correct logical order. Justify your choice:**

1. Picture Editing Tools New and Improved
2. Recover unsaved versions
3. Open type Typography New!
4. Additional SmartArt Graphics
5. Shapes and Effects Improved
6. Insert Screen Shots

**Match the headings with the text below: You can choose from the options below:**

**Contact Management / Write your CV / Job Offers Capture / Write Your Cover Letter**

**TEXT 1:** When you click on the following icon,



, the cover letter writing screen shows. Initially you can distinguish clear grey frames that separate the different fields of the letter : issuer, recipient, subject/objective and the body of the letter.

This letter is a template, and it is necessary that you keep the "variable" fields (<...>), as these important information must show on a cover letter.

To fill it easily, click on the "Initialize" button. The variable fields appear on the page. You don't need to modify them as they will be automatically replaced by the corresponding data of the contact you wish to send the cover letter to.

When you answer to a job offer, you can modify the cover letter you previously generated without modifying your pattern.

**TEXT 2:** A contact corresponds to a job offer, that is to say to a company. If several job offers are issued from the same company, it will be saved as several contacts.

To go to the contacts management screen, click on the corresponding toolbar button :

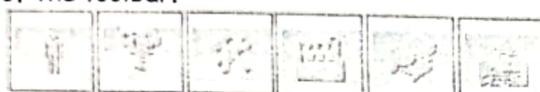


The screen separates in two parts. On the right is your contact list. If you select a contact clicking on it, its specific details show on the left part of the screen.

How can you create a new contact?

If you only have the contact e-mail (common for spontaneous applications), fill in the corresponding field and submit. CVitae should recognize in the e-mail the company name and the contact name (eg : [franklinroosevelt@semantis-software.com](mailto:franklinroosevelt@semantis-software.com)), and fill in automatically the corresponding boxes. But you need to check these information and correct them if needed.

**TEXT 3:** You write your CV step by step, each one being accessible using the first six icons of the toolbar.



For each step, a form shows every fields you need to fill in as well as information and advice on how to draft a good resume. As and when you fill in details, you can click on "Refresh CV" to see what the CV looks like.



You can choose your document format (Word or HTML) and color at any time.

The "Save" button allows you to save the information you filled in and to generate a word format CV. So if you wish to modify your CV using directly MS Word, remember to save first your folder clicking on the corresponding toolbar button or on "Save", both having the same function.

**TEXT 4:** Capturing a job offer saves you time, as every contact details is saved in your contact list. It is very useful when you wish to answer to the recruiter by email. When you have no choice but to fill in an application form directly on a website, you can nonetheless capture the job offer to keep record of it.



To capture a job offer, click on the corresponding toolbar button :

The Internet browser displays CVitae's home page.

Find job offer that corresponds to the position you are looking for. Starting with the job title, select the whole job offer text with your mouse. Make sure you select the company and contact information.

#### Questions to Consider:

- Comment on the headings used in the above guide.
- Comment on the style and language.
- What pattern does the writer follow?
- How does the writer give instructions?

# **IEEEDataPort**

## **How to Cite References: IEEE Documentation Style**

IEEE citation style is used primarily for electronics, engineering, telecommunications, computer science, and information technology reports. The three main parts of a reference are as follows:

- Author's name listed as first initial of first name, then full last.
- Title of article, patent, conference paper, etc., in quotation marks.
- Title of journal or book in italics.

This system allows the reader to identify the information source at a glance. All punctuation, dates, and page numbers depend on the type of reference cited, so follow the examples with care. Please note this style guide is wide ranging, but not all sources are identified. Further research may be required.

### **Citation Within The Text**

The first step of the reference citation process is within the report itself. Each citation must be noted within the text through use of simple sequential numbers. A number enclosed in square brackets, placed in the text of the report, indicates the specific reference. Citations are numbered in the order in which they appear. Once a source has been cited, the same number is used in all subsequent references in the report. No distinction is made between electronic and print sources, except in the citation reference details.

**Each reference number should be enclosed in square brackets on the same line as the text, before any punctuation, with a space before the bracket.**

#### **Examples**

“...end of the line for my research [13].”

“The theory was first put forward in 1987 [1].”

“Scholtz [2] has argued. . . .”

“For example, see [7].”

“Several recent studies [3, 4, 15, 22] have suggested that. . . .”

Note: Authors and dates do not have to be written out after the first reference; use the bracketed number. Also, it is not necessary to write “in reference [2].” Just write “in [2].”

The preferred method to cite more than one source at a time is to list each reference in its own brackets, then separate with a comma or dash:

[1], [3], [5]  
[1] – [5]

## **Reference Lists**

To finish citing sources, a numbered list of references must be provided at the end of the paper. The list is comprised of the sequential enumerated citations, with details, beginning with [1], and is not alphabetical.

## **Page Format**

- Place references flush left
- Single-space entries, double-space between.
- Place number of entry at left margin, enclose in brackets.
- Indent text of entries.

The following examples demonstrate the format for a variety of electronic and print sources. These citations are ones in widest use. Not everything is listed.

## **Electronic Documents**

### **E-books**

- [1] L. Bass, P. Clements, and R. Kazman, *Software Architecture in Practice*, 2<sup>nd</sup> ed. Reading, MA: Addison Wesley, 2003. [E-book] Available: Safari e-book.

### **Article in Online Encyclopedia**

- [2] D. Ince, "Acoustic coupler," in *A Dictionary of the Internet*. Oxford University Press, [online document], 2001. Available: Oxford Reference Online, <http://www.oxfordreference.com> [Accessed: May 24, 2007].

### **Journal Article Abstract (accessed from online database)**

- [1] M. T. Kimour and D. Meslati, "Deriving objects from use cases in real-time embedded systems," *Information and Software Technology*, vol. 47, no. 8, p. 533, June 2005. [Abstract]. Available: ProQuest, <http://www.umi.com/proquest/>. [Accessed November 12, 2007].

### **Journal Article in Scholarly Journal (published free of charge on the Internet)**

- [2] A. Altun, "Understanding hypertext in the context of reading on the web: Language learners' experience," *Current Issues in Education*, vol. 6, no. 12, July, 2005. [Online serial]. Available: <http://cie.ed.asu.edu/volume6/number12/>. [Accessed Dec. 2, 2007].

### **Newspaper Article from the Internet**

- [3] C. Wilson-Clark, "Computers ranked as key literacy," *The Atlanta Journal Constitution*, para. 3, March 29, 2007. [Online], Available: <http://www.thewest.com.au>. [Accessed Sept. 18, 2007].

## Internet Documents

### Professional Internet Site

- [1] European Telecommunications Standards Institute, "Digital Video Broadcasting (DVB): Implementation guide for DVB terrestrial services; transmission aspects," *European Telecommunications Standards Institute*, ETSI-TR-101, 2007. [Online]. Available: <http://www.etsi.org>. [Accessed: Nov. 12, 2007].

### General Internet Site

- [2] J. Gerald, "Sega Ends Production of Dreamcast," *vnu.net.com*, para. 2, Jan. 31, 2007. [Online]. Available: <http://nli.vnu.net.com/news/1116995>. [Accessed Sept. 12, 2007].

### Personal Internet Site

- [3] G. Sussman, "Home Page-Dr. Gerald Sussman," July, 2002. [Online]. Available: <http://www.comm.edu.faculty/sussman/sussmanpage.htm>. [Accessed Nov. 14, 2007].

### Email

- [4] J. Aston. "RE: new location, okay?" Personal email (July 3, 2007).

### Internet Newsgroup

- [5] G. G. Gavin, "Climbing and limb torsion #3387," USENET: sci.climb.torsion, August 19, 2007. [Accessed December 4, 2007].

### Microform

- [6] W. D. Scott, *Information Technology in the US*. [Microform]. W. D. Scott & Co., Canberra: Department of Science and Technology, 2004.

### Computer Game

- [7] The Hobbit: *The prelude to the Lord of the Rings*. [CD-ROM]. United Kingdom: Vivendi Universal Games, 2003.

### Software

- [8] Thomson ISI, *Endnote 7*. [CD-ROM]. Berkeley, CA: ISI ResearchSoft, 2006.

### Lecture

- [1] S. Bhann dahar, ECE 4321. Class Lecture, Topic: "Bluetooth can't help you." School of Electrical and Computer Engineering, Georgia Institute of Technology, Atlanta, GA, Jan. 9, 2008.

## **Print Documents**

### **Books**

#### **Single Author**

- [1] W. K. Chen, *Linear Networks and Systems*. Belmont, CA: Wadsworth Press, 2003.

#### **Edited Book**

- [2] J. L. Spudich and B. H. Satir, Eds., *Sensory Receptors and Signal Transduction*. New York: Wiley-Liss, 2001.

#### **Selection in an Edited Book**

- [3] E. D. Lipson and B. D. Horwitz, "Photosensory reception and transduction," in *Sensory Receptors and Signal Transduction*, J. L. Spudich and B. H. Satir, Eds. New York: Wiley-Liss, 2001, pp-1-64.

#### **Three or More Authors**

- [4] R. Hayes, G. Pisano, and S. Wheelwright, *Operations, Strategy, and Technical Knowledge*. Hoboken, NJ: Wiley, 2007.

#### **Book by an Institutional or Organizational Author**

- [5] Council of Biology Editors, *Scientific Style and Format: The CBE Manual for Authors, Editors, and Publishers*, 6<sup>th</sup> ed., Chicago: Cambridge University Press, 2006.

#### **Manual**

- [6] Bell Telephone Laboratories Technical Staff, *Transmission System for Communication*, Bell Telephone Lab, 2005.

#### **Application Note**

- [7] Hewlett-Packard, Appl. Note 935, pp.25-29.

**Note: Titles of unpublished works are not italicized or capitalized. Capitalize only the first word.**

#### **Technical Report**

- [8] K. E. Elliott and C. M. Greene, "A local adaptive protocol," Argonne National Laboratory, Argonne, France, Tech. Report. 916-1010-BB, 7 Apr. 2007.

#### **Patent/Standard**

- [9] K. Kimura and A. Lipeles, "Fuzzy controller component," U. S. Patent 14, 860,040, 14 Dec., 2006.

### **Data Sheet**

- [10] Texas Instruments, "High speed CMOS logic analog multiplexers/demultiplexers," 74HC4051 datasheet, Nov. 1997 [Revised Sept. 2002].

### **Government Publication**

- [11] National Aeronautics and Space Administration, *NASA Pocket Statistics*. Washington, DC: Office of Headquarters Operations, 2007.

### **Paper Published in Conference Proceedings**

- [12] J. Smith, R. Jones, and K. Trello, "Adaptive filtering in data communications with self improved error reference," In Proc. IEEE International Conference on Wireless Communications '04, 2004, pp. 65-68.

### **Papers Presented at Conferences (unpublished)**

- [13] H. A. Nimr, "Defuzzification of the outputs of fuzzy controllers," presented at 5<sup>th</sup> International Conference on Fuzzy Systems, Cairo, Egypt, 2006.

### **Thesis or Dissertation (unpublished)**

- [14] H. Zhang, "Delay-insensitive networks," M. S. thesis, University of Chicago, Chicago, IL, 2007.

### **Article in Encyclopedia, Signed**

- [15] O. Singh, "Computer graphics," in *McGraw-Hill Encyclopedia of Science and Technology*, New York: McGraw-Hill, 2007, pp. 279-291.

## **Journal Articles**

### **Article in Journal (paginated by annual volume)**

- [8] K. A. Nelson, R. J. Davis, D. R. Lutz, and W. Smith, "Optical generation of tunable ultrasonic waves," *Journal of Applied Physics*, vol. 53, no. 2, Feb., pp. 1144-1149, 2002.

### **Article in Professional Journal (paginated by issue)**

- [9] J. Attapangitta, "Social studies in gibberish," *Quarterly Review of Doublespeak*, vol. 20, no. 1, pp. 9-10, 2003.

### **Article in Monthly or Bimonthly Periodical**

- [10] J. Fallows, "Networking technology," *Atlantic Monthly*, Jul., pp. 34-36, 2007.

### **Article in Daily, Weekly, or Biweekly Newspaper or Magazine**

- [11] B. Metcalfe, "The numbers show how slowly the Internet runs today," *Infoworld*, 30 Sep., p. 34, 2006.

# How to Complete a Computer Science Project

## ***What is a computer science project?***

A computer science project uses coding language to develop information processes or programs to demonstrate, analyze, or control a process/solution. Sometimes robots or intelligent machines are used to use the coding language and perform tasks.

## ***1. Get an Idea for Your Computer Science Project***

Like a science fair project, a computer science project starts with a problem, but the problem is a bit different. In science, you might be asking a "What if?" question, such as "What will happen if I add food coloring to saltwater before I evaporate the water?" Computer science, on the other hand, looks at the real world, sees a problem, and uses coding language to try to solve the problem. In other words, what do you see in the real world that you think you can fix, change, or improve? Examples could include developing an application, designing a game, writing a program for a robot, or programming a microcontroller (Raspberry Pi, Arduino, AdaFruit Circuit).

There are two categories in the Computer Science division of the Science and Engineering Fair.

- ***Robotics and Intelligent Machines*** projects use machine intelligence to complete a task or reduce the reliance on human intervention. If you have an interest in computer science, you might look at a career in:
  - biomechanics
  - cognitive systems (artificial intelligence)
  - robot kinematics (how robots move)
- ***Coding*** focuses on the study or development of software, information processes or methodologies to demonstrate, analyze, or control a process or solution. Learning to code could lead to a career in many fields, including:
  - algorithms
  - cybersecurity
  - databases
  - programming languages
  - operating systems
  - machine learning
  - application development

## ***2. Start Programmer's Log Book***

A detailed Programmer's Log Book with accurate records allows programmers to describe their coding processes and reflections on program development and debugging so others can follow the process. Your log should be a bound notebook (such as a composition book). It should be

done fully in ink. That's because it can be used as a "legal document" to prove your code is your creation. In the real world, the Programmer's Log Book is used as proof for patents and copyright. It can even be used as evidence in lawsuits over who was the first person to come up with a new idea. That's a pretty powerful book!

Don't worry about making mistakes or making a messy drawing. Mistakes are part of the process of learning and discovering. If you make a mistake, just draw one line through the mistake and keep going. Don't tear out pages or scribble out anything. It's possible that a string of code you thought wouldn't work early in the process turns out to be the solution to your problem.

### Setting Up Your Programmer's Log Book

- You will only have one section in your log book so it is very important that you record detailed notes about the work you complete on your project each day. Each entry will have two parts: **Daily Work** and **Daily Reflection**. Be sure to label each part for every entry that you make.
- If you make a mistake, draw a line through it and re-write it. Do not erase or white out a mistake.
- In the **Daily Work** part of each entry, write down all the things you do or plan concerning your project each day. **Make sure you date every entry.** Think of it as a blog post each day:
  - What did you do today for your project?
  - Did you record any ideas for your program (sketches of characters, tasks for your robot, story ideas for your game, input/output for your microcontroller)?
  - Did you change any of your code today? Did you take screenshots before and after you made changes to your code?
  - Who did you talk to about your project?
  - What did you research? Make sure to add the bibliography information for each source.
  - Give details! Each day's entry should show the progress on your project.
- In the **Daily Reflection** part of each entry, think about what you learned today:
  - What roadblocks or obstacles did you run into today?
  - What resources did you use to solve your problem (tutorials, asking a teacher for help, looking up code)?
  - If you made changes to your code, what did you learn from it? How will your new learning help you be successful next time?
  - What new ideas or questions have come about as a result of working through the roadblock or obstacle?
  - What successes did you have today?
  - Did your successes spark new ideas for your code/program?

- Why do you think what you learned is important?
- Do you notice any patterns or repeated structures in your code?

### ***3. Complete the Project Approval Form***

This form lets your teacher know what you've chosen for your project. It gives an overview of your project with enough detail that anyone who reads it can get a pretty good idea of what you will be doing. Once your teacher approves the project, he/she will give this form back to you. It will have a list of other forms you will need to complete for your project. ***Make sure you keep this signed form and all forms you complete--they are required to be with your project.***

### ***4. Become an Expert in Your Problem***

The research phase of your project is very important. This is where you learn everything you can about the topic of your project. If you are trying to solve a problem, you need to understand the problem. Spend some time getting background information. Good research will help you become an expert on your topic. Remember to write down the bibliographic information about each source you read, consulted, or tried to contact. Some ideas of places to go for research are:

- library
- internet—Make sure it is a ***reliable*** source of information (talk to your school media specialist about this).
- experts in the field
- Write to companies involved in your field.

### ***5. Complete Ethics Agreement and Risk Analysis and Designated Supervisor Form***

By signing the *Ethics Agreement*, you are saying that you won't copy someone else's work. You can refer to someone else's work, but you have to cite it in your log and on the bibliography. Copy-and-pasting images, words, etc. from the internet is considered plagiarism. If you identify *where* you got each part of what you copied (cite the source), you have done your job.

The *Risk Analysis and Designated Supervisor Form* is used to state all the risks in your project. Risks might include:

- the materials and programs you are using. How can you stay safe when you use them?
- the location you are testing in. Is it close to a road or body of water?
- the tools you may use if building a robot or other intelligent machine.

In this handbook, the Risk Assessment and Safety Considerations section will help you complete this form.

### ***6. State the Problem in a Question Form***

Your project problem is how you will develop a program using a coding language to solve a problem. The problem should be a practical need. Are you coding a completely new program

or are you modifying (changing) existing code to make it work better in certain conditions? Whatever it is you are trying to do, your final program should be a process/solution to the problem you identified. Your problem should also be very specific. For instance, if you want to design a game, be very specific about which coding language and tasks your program will perform. For example, you might ask, "How can I use Scratch to design a chase style game?" Also, be sure to consider real world applications of your program.

### **7. Research**

Computer scientists need to get a full picture of the problem they are addressing before they start developing their programs. That's where research comes in. For example, if you are programming a robot, find out the coding languages that are compatible with that robot. If you are using a microcontroller to program circuits, research what you will need to build the circuits, how the parts of the microcontroller operate, and the most efficient coding language for the microcontroller. Research helps you to fully understand the problem and possible solutions before you start your design.

For the Science and Engineering Fair, at least **3 sources** are required for the research phase. These sources must be documented in the both Programmer's Log and on a bibliography. Interviewing a computer programmer or other expert in the field of your project is an acceptable source.

### **8. Develop a Project Goal**

Your project goal should start as a brainstorm of several solutions/processes to your problem. Don't stop at just one. Brainstorm alternative solutions/processes that might solve the problem, then choose the one that you think best fits the specifics of your project goal. At judging time, you will be asked about different ideas your brainstormed and why you thought your solution/process was the best. All of your solutions/processes should be in your log book, with detailed labels and components of your program. Programmers might include designs of a maze a robot navigates through, sketches of a character they are developing for Scratch, illustrations of circuits, or a display menu for an application .

### **9. List Materials and Programs**

Include any materials you plan to use, including specific robots, devices, and materials you need to complete tasks when appropriate (tape, construction paper, batteries, sensors, wire, LED lights, etc.). Also include a list of the programs and coding language you will use (Scratch, Arduino IDE, MakeCode, Tynker, JavaScript, HTML5, Xcode, C++, etc.).

### **10. Write an Algorithm (Step-by-Step Procedure)**

An **algorithm** is a to-do list for a computer. A recipe is a good example of an **algorithm** because it tells you what you need to do step-by-step. It takes inputs (ingredients) and produces an output (the completed dish). The algorithm is your procedure to developing your

program. Using statements, write the steps you will need to code to perform the tasks for your solution/processes. Your algorithm could be written as an outline, a list of steps, in a flow map, or in a storyboard.

### ***11. Develop/Test/Debug/Modify the Program***

Using your algorithm (step-by-step procedure), write your code to perform the tasks of your project goal. Good programmers run their programs after they write each line of code. They are testing that the code runs correctly. If an error in the code is discovered, it is easier to find the error in the string of code when you test your program frequently. Finding and correcting errors in your program is called **debugging**.

On your board, you will be required to display changes you have made as you develop your program. Screenshots will help you document these changes. Projects should include screenshots of your initial program, several changes as you debug and modify your code, and your final program. You also might want to take screenshots of strings of code that you feel are significant to your project goal, a complicated design, or were challenging to develop.

### ***12. Final Reflection***

Your final reflection should demonstrate your thinking about what you have learned. You could create a timeline with descriptions or steps in the process that show the creation of your project from start to finish. Discuss lessons learned from your project, including ideas you have for future research, steps or processes you would do differently, and other lessons you have learned that will help you with your program next time.

- Tell the story of your project. Why did you choose to create this digital product?
- Describe the design process you used in your project. Imagine you are telling a classmate about it who is interested in working on a similar project.
- Tell the story of how you solved roadblocks or obstacles that came up in the development of your program. Give examples of a few challenges you encountered and how they created problems in your code.
- What resources did you use to problem solve?
- How did the ideas for parts of your program change after you started?
- What new ideas, questions or goals have come about as a result of your work on this project?

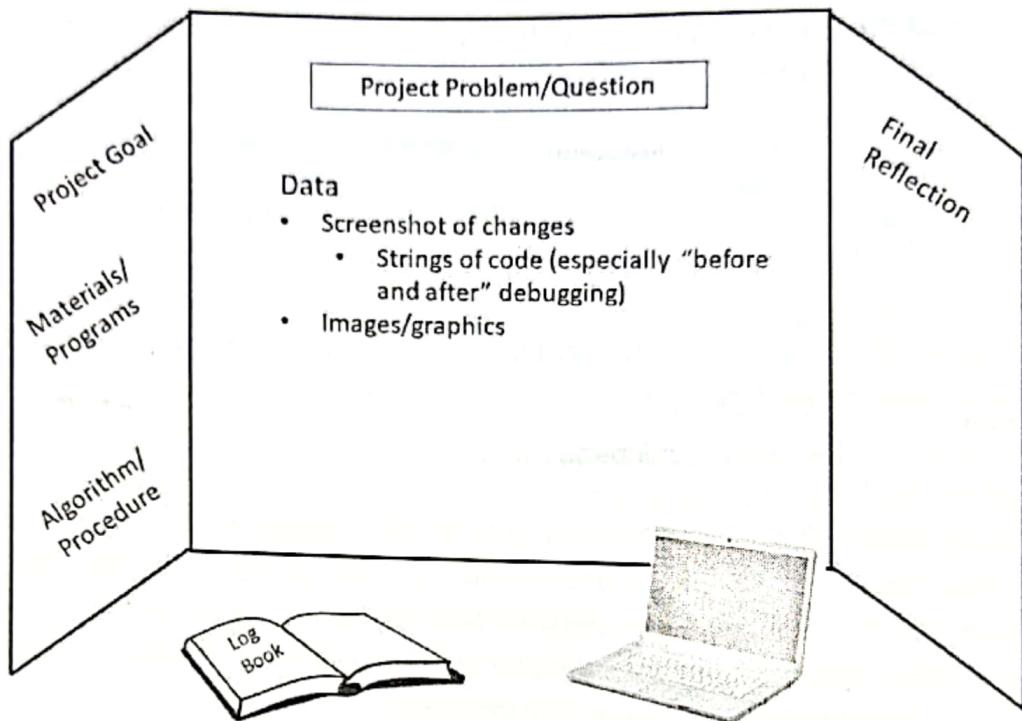
### ***13. Communicate Your Results/Construct a Display***

Computer scientists share their findings with others. If your program solves a problem, it is good to let others know about it! You should be able to fully explain all parts of your project:

- How did you come up with the problem?
- Explain why you chose this coding language (Scratch, Arduino IDE, MakeCode, Tynker, JavaScript, HTML5, Xcode, C++, etc.).
- Describe the process you used for debugging your program.

- Share a specific string of code, and explain its importance in the program.
- Which string of code are you most proud of, and why?
- What modifications did you make? Why did you make them?

Below is a sample of a Computer Science Project Display Board. Your board does not have to match this exactly, but it MUST have your problem and tell the story of your project.



## **How to Read a Computer Science Research Paper**

by Amanda Stent

### **Where are CS research papers found?**

CS research papers may be published as: technical reports, conference papers, journal papers or book chapters. Frequently, an author will write a technical report that expands on the information in a conference paper. Results from several conference papers may be combined and expanded into a journal paper. A conference paper may also be expanded later into a book chapter. Finally, PhD dissertations are frequently revised into either journal papers or book chapters.

The timeline, then, is usually: conference paper, technical report, journal paper, book chapter. To get the most recent, "hot off the presses", information, look for conference papers. To get more considered papers with more explanation, look for journal papers.

Conference papers and most journal papers are "peer-reviewed", that is, have been examined by other computer scientists prior to publication. Technical reports are typically not peer-reviewed, but are still excellent sources of detailed information about algorithms and computer systems.

More and more authors post their papers on their personal web sites. If an article is posted on the web, it will probably end up in Citeseer ([www.citeseer.com](http://www.citeseer.com)). Other places to look for papers include Science Index (available through the library) and preprint servers available from journal publishers such as Elsevier and Kluwer, which may even post copies of papers not yet published!

### **What are the different types of CS research paper?**

There are three basic types of CS research paper: theoretical, engineering and empirical.

A theoretical paper describes a theory or algorithm or provides a mathematical proof for some hypothesis.

An engineering paper describes an implementation of an algorithm, or part or all of a computer system or application. Engineering papers are now frequently required to include descriptions of system evaluation.

An empirical paper describes an experiment designed to test some hypothesis.

All three types of paper are found in computational linguistics.

## **How can I tell whether a research paper is good before I read it?**

The short answer to that is, it is always best to read it. However, every year thousands of papers are published by the ACM, IEEE, AAAI, ACL and other professional societies. You can't read them all!

Usually, you want to read a research paper either because you have a specific problem you need to solve, or to keep up with your field. In either case, as you read research papers you will begin to get an idea of which venues and which researchers publish good research in your area. Citeseer can help with this, as it tracks citations (so that you can find out what papers other researchers consider to be excellent or at least popular).

In addition to learning what are good publication venues in your field and checking citations, you can sometimes tell if a paper is likely to be good by looking for structural clues in the paper itself. Here are some indicators of a good research paper:

- 1) The problem the paper addresses is clearly stated, both in the abstract and early on in the paper itself. The technical importance and broader impacts of the paper are described.
- 2) The paper includes a clear description of the experiment, system or theory the problem addresses. This is usually the second section of the paper.
- 3) The paper describes and analyzes the results of the work described (either experimental or evaluation results).
- 4) The authors have some sound, non-trivial ideas for future work. This usually appears at the end of the paper.
- 5) Related work is described and cited correctly. You can get an idea of this by looking at the list of references at the end of the paper.

If you know that a researcher has been working in an area for awhile, that is usually an indicator that the research is sound; however, do not underestimate the contributions of people new to a field or the impact of politics on research.

## **How should I read a research paper?**

First, skim the paper to check that it has the elements described above (clear problem statement, clear description of method or system, clear presentation of results, appropriate citation of related work). At the end of this quick skim you should be able to write down the type of the paper (theoretical, engineering or empirical), the area of computer science the paper is about, and the problem the paper addresses.

Now read the introduction carefully, looking for the problem statement, theoretical importance and broader impact. Sometimes related work is also addressed in the introduction. Consider: are the author's claims reasonable and realistic? Do the authors present evidence that they know why they are doing this piece of research? Do they have an idea of the larger picture?

Now read the methods section carefully (this section might be called “experiment” or “system description”, or may involve statement of theorems and their proofs). Ask yourself:

1. Can you think of counter-examples for examples given?
2. Is the approach clearly described? Can you outline the steps or summarize the approach?
3. Does the work address the problem stated earlier in the paper?
4. Does the approach seem to require unreasonable amounts of human guidance?
5. Does the approach seem objective?

Computer science papers are often written in English by non-native speakers of English. Syntactic errors or awkwardness of phrasing do not indicate that the research is bad; you should try distinguish between the writing style and the research itself. If you get confused, you can reread or write down your questions to check in other work by the same authors.

If, at the end of this section, you think the approach is sound (even if you disagree with it!), read the results, evaluation or analysis section. (If there is no such section and the paper dates from post-1995, there is a problem!) Ask yourself:

1. Do these results address the problem stated at the start of the paper?
2. Do the authors use commonly-accepted terminology and methods?
3. What is the conclusion of the research?

Finally, look at the conclusions and future work (last section of the paper). These can be good sources of topics for your own research.

A brief note about older research papers: computer science is a rapidly evolving field and is still very young compared to many of the fields closest to it (mathematics, engineering). Research papers that date from before the 1990s may appear very different from newer papers. They may be more speculative, include less evaluation or no evaluation, and typically involve the use of much less data. There are very practical reasons for this (slower computers, less data available). These are not reasons to discount these papers!

### **How can I remember the papers I have read?**

I strongly recommend that you make an electronic file for your own bibliography. A BibTeX file is a good idea. After you read a paper, if you think it is worth remembering, write an entry for that paper in your bibliography file. You should note: authors’ names, paper title, how paper was published (conference proceedings, journal etc.), date of publication and page numbers (if possible). Add a 2-3 sentence description of the paper in which you summarize for yourself the problem addressed by the paper, the solution proposed or results learned, and the future work proposed.

Some people publish their bibliographies, see: <http://liinwww.ira.uka.de/bibliography/>.

# **WRITING TECHNICAL REPORTS**

## *A Reconstruction of an Investigation*

A technical report is a document that describes the process, progress, or results of technical or scientific research or the state of a technical or scientific research problem.

A report is written to communicate factual and objective information obtained after a careful scientific research or scrutiny. It is usually written for a well-defined audience. The audiences require this document for an important well-defined purpose.

### **Importance of a Report**

- Reports are written for specific individuals because these individuals need the information for future actions.
- Reports add to the body of knowledge by conveying important opinions and findings which then serve as a basis for further progress and advancement.

### **Types of Reports**

1. **Research Report:** It communicates the results and the procedure of scientific investigation.
2. **Project Report:** It provides details about a project undertaken to solve a problem by investing a software or hardware.
3. **Feasibility Report:** It tells whether a project is feasible—that is, whether it is practical or financially and technologically possible.
4. **Recommendation Report:** It studies a problem or opportunity and then makes a recommendation. It may compare two or more alternatives and recommend one.
5. **Laboratory Report:** It documents laboratory procedures and their results.
6. **Periodic, Progress, and Trip Report:** It communicates progress on projects and events to those concerned with their completion and success. Readers review, and may revise, scheduled courses of action as a result of information included in these reports.
7. **Personnel Evaluation Report:** It reviews the performance of employees.

## **Elements/Components of a Report with a Standard Organizational Pattern:**

### **COVER MATERIALS:**

- Cover and title page
- Cover letter or memo (optional)
- Invoice (optional)
- Letter of Transmittal
- Abstract
- Acknowledgements
- Executive Summary
- Table of contents
- List of figures or illustrations
- List of tables

### **BEGINNING OF THE REPORT:**

- Introduction:
  - The purpose of the investigation
  - The research problem (its nature)
  - Significance of investigating the problem
  - Scope or limitation of the research
  - A list of personnel engaged in the research with a brief sketch of their background and duties (optional)
  - Organization of the report
- Historical Background (Review of Literature):
  - Background information on the problem
  - Known facts, opinions are discussed
  - Nomenclature, definitions are given for new or unusual terms or those having a specialized meaning
  - A list of symbols, acronyms, and abbreviations

In small scale research reports, all the items above are written in a single chapter with clear defining headings. However, in large scale research reports, 'Introduction' and 'Historical Background' are written as two separate chapters as there would be a lot of information and details to convey.

### **BODY OF THE REPORT:**

- Discussion of research methodology (for a small scale research, this would be very brief)
- Analysis of data, results, findings, Discussion of results

### **ENDING OF THE REPORT:**

- Conclusions
- Recommendations and alternatives (optional)
- References
- Bibliography

- Appendix

- Raw data (Questionnaires, interview questions, checklists)
- Notes taken during observations
- Rough results of experiments
- Tables or charts, photographs, etc

## How to Write the Elements of the Report

### COVER & TITLE PAGE:

The title page must have the following features:

1. Neat and organized
2. Clearly indicates the subject title in the upper half of the page
3. The title of the report should specifically identify both the report's function and subject
4. The person or organization writing the report and the person or organization receiving the report, the date of submittal appear in the lower half of the page

Look at the example below:

---

FEASIBILITY STUDY OF OFFICE EXPANSION  
FOR UNITED COMPUTER TECHNOLOGIES, INC.

Prepared for  
Joanne R. Galloway  
Senior Vice President  
United Computer Technologies, Inc

By  
William D. Santiago  
Senior Partner  
PRT Management Consultants, Inc.

March 3, 1999

---

**EXERCISE: Design a title page using the information given below:**

1. Geologic Report on The Physiographical Development of the Colorado Piedmont Area
2. By Maurice De Valliere, Geology Student
3. Submitted to Dr. Herman M. Weisman, Professor of Technical Journalism, Colorado Polytechnic University, Fort Collins, CO 80521
4. November 30, 2008

### LETTER OR TRANSMITTAL:

The letter of transmittal is addressed to the official who authorized the report and is signed by the official authorized to produce the report. It is the official acknowledgement of completion of the report and includes a statement of its transmittal. It contains the following information:

1. The title and subject of the report
2. Can include a very brief summary
3. It can acknowledge those who assisted in preparing the report
4. It has a formal tone.

Study the sample letter of transmittal below and try to write one for your own project.

December 9, 1982

David McMurrey, Chairman  
Coastal Real-Estate Developers  
400 Baywater Blvd.  
Corpus Christi, Texas

Dear Mr. McMurrey:

As agreed in our September 21 contract, we are submitting the attached report entitled *The Effects of Increased Atmospheric Carbon Dioxide*.

This report examines the problem of CO<sub>2</sub> accumulation in the earth's atmosphere. The climatic changes caused by excessive CO<sub>2</sub> concentrations in the atmosphere, and the implications of these changes, will be discussed. Also discussed are the mechanisms of the greenhouse effect, the sources of atmospheric carbon dioxide, and some possible remedies to the problem.

I hope you find this report satisfactory.

Sincerely yours,

William R. Waters, President  
Environmental Research Associates, Inc.  
1212 Trace Dr., Suite 3  
Austin, Texas 78741

WRW:mb  
Enclosures

#### **ABSTRACT:**

An abstract tells the potential reader the contents of the report. An abstract gives the gist of essentials of the investigation or the contents of the report. It may explain the problem and how it was studied. It gives enough description that would be sufficient for the reader to determine whether the report pertains to their interest or not. It has a standard word limit from 100-250 words depending on the size of the report.

**Exercise: Read the abstract below and perform the tasks that follow:**

- 1. State the research problem of the abstract in your own words.**
- 2. What is the motivation for this study? Explain in 1 to 2 sentences only.**
- 3. Name the games that the study worked with?**
- 4. What are the strengths of the study as indicated by the results?**

## **ABSTRACT**

Board games applications usually offer a great user experience when running on desktop computers. Powerful high-performance processors working without energy restrictions successfully deal with the exploration of large game trees, delivering strong play to satisfy demanding users. However, nowadays, more and more game players are running these games on smartphones and tablets, where the lower computational power and limited power budget yield a much weaker play. Recent systems-on-a-chip include programmable logic tightly coupled with general-purpose processors enabling the inclusion of custom accelerators for any application to improve both performance and energy efficiency. In this paper, we analyze the benefits of partitioning the artificial intelligence of board games into software and hardware. We have chosen as case studies three popular and complex board games, Reversi, Blokus, and Connect6. The designs analyzed include hardware accelerators for board processing, which improve performance and energy efficiency by an order of magnitude leading to much stronger and battery-aware applications. The results demonstrate that the use of hardware/software codesign to develop board games allows sustaining or even improving the user experience across platforms while keeping power and energy low.

**Read the following abstracts and answer the questions that follow: [10]**

### **Abstract 1**

This report summarizes what the computing research community knows about the role of trustworthy software for safety and effectiveness of medical devices. Research shows that problems in medical device software result largely from a failure to apply well-known systems engineering techniques, especially during specification of requirements and analysis of human factors. Recommendations to increase the trustworthiness of medical device software include (1) regulatory policies that specify outcome measures rather than technology, (2) collection of statistics on the role of software in medical devices, (3) establishment of open-research platforms for innovation, (4) clearer roles and responsibility for the shared burden of software, (5) clarification of the meaning of substantial equivalence for software, and (6) an increase in FDA's access to outside experts in software. This report draws upon material from research in software engineering and trustworthy computing, public FDA data, and accident reports to provide a high-level understanding of the issues surrounding the risks and benefits of medical device software.

### **Abstract 2**

In the past, Wall Street used to be the center for most of the Stock Exchange and Brokerage firms due to the limitations of communications technology. Today, with the advancement in ICT, investors can use revolutionary Internet Client-server technology to trade stocks nearly anywhere, anytime, independent of brokers' fee and service limitations. This Project JTrade is a stock market trading program in Java that supports portfolio management, charting, technical analysis, paper

trading, and experimental methods like genetic programming. It has features such as equation storing, quotes storing, graphical analysis of stock, maintaining portfolios, paper trading, etc.

The application provides public low-cost transactions and cutting-edge, real-time market information that formerly belonged only to brokers. It has opened up extraordinary new investment opportunities as well as a crucial need for state-of-the-art information.

#### **Questions:**

1. State the research problem of Abstract 2 in your own words.
2. According to Abstract 1, how many sources are used to collect data regarding understanding the pros and cons of medical device software?
3. What is the motivation/justification offered by Abstract 2 for developing JTrade? Explain in your own words.
4. State any two recommendations presented by Abstract 1.
5. Describe the functionalities of JTrade.

**Exercise:** Read the following technical report and write an ABSTRACT for it within 200 to 250 words.

#### **INTRODUCTION**

With the advent of mobile network communication system, users have been offered lots of services such as ability to send multimedia messages like SMS, Video, Data files, Images etc. This paper describes the design and implementation of a system (Result Alert System) that conveniently provides examination results to students with the use of Email and SMS technology via their Mobile phones and devices. Mobile phones and devices are necessary assets, most especially to students as it makes communication and the spread of information a lot easier.

Result Alert System takes advantage of some of the technologies that Mobile devices provide, technologies such as the Email and Short Message Service (SMS). The implemented system allows registered students to access their results, including past results, provided they are available in the system's database.

#### **OVERVIEW OF THE EXISTING WORK**

Most Institutions make use of a web based platform to provide Examination results to their students when it is available; this is a common practice by various Universities. The students provide certain information before they are able to access their results as this provides protection from unauthorized access. Web based platforms (websites) are readily available platforms and can provide various options such as saving and printing. But this platform becomes inaccessible if the user has no access to the internet. Web based Result Alert System is a good option in a country where internet is readily available, but in a country where internet services are poor, it can be inconvenient and expensive. Students would have to visit a cyber café and pay to gain access to their results.

#### **METHODOLOGY**

The result alert system with email and SMS was designed to work as an online application or software. The system was designed to have a point of Entry which is to be used by the Administrator with the login privilege and role granted.

The Administrator is responsible for the following: registration of students, result upload for registered students and generating alert reports to all concerned students when new result updates are available. These alerts would be sent to the phone number the student provided at the point of registration.

This system was designed using the following: PHP programming language, PHP designer, Javascript, Css.

### **SYSTEM ARCHITECTURE**

The diagram in Figure 1 shows the system architecture of the proposed system. Student initiates the examination results retrieval process by sending SMS to the specific number provided by the system.

The required information to be written in request SMS are Full name, Matric number, department, semester and session. This information is set as requirements for request SMS in order to suit with the institution's regulations. This information together with the sender's mobile phone number are then sent to the GSM modem via GSM network.

### **RESULTS AND DISCUSSION**

Figure 2 shows the screen shot of where the user (student) can provide his or her unique identifier in order to gain access to his or her results.

### **CONCLUSION**

Result Alert System with Email and SMS is an innovative addition to the education sector, as it makes the availability of results and grades a lot easier and efficient. Also it makes Email and SMS technology relevant in Educational sector.

### **EXECUTIVE SUMMARY:**

Executive summaries are written for busy administrators and decision makers who will not have the time to read the entire report. Also, executive summary is written to save a person from reading a report on issues or subjects in which s/he lacks the required background. Guidelines for writing a good ES are:

1. Read the entire report to grasp its full content.
2. Your summary should be one-quarter of the original text.
3. Write persuasively to motivate readers to read the report.
4. Discuss your research problem, the purpose of the study, the methodology used, the findings and results. Also, make recommendations if required.
5. Use headings to facilitate reading.
6. Be simple and formal.

Study the example ES below:

<b>Executive Summary</b>	
This report provides an analysis and evaluation of the current and prospective profitability, liquidity and financial stability of Outdoor Equipment Ltd. Methods of analysis include trend, horizontal and vertical analyses as well as ratios such as Debt, Current and Quick ratios. Other calculations include rates of return on Shareholders Equity and Total Assets and earnings per share to name a few. All calculations can be found in the	subject matter  methods of analysis

<p>appendices. Results of data analysed show that all ratios are below industry averages. In particular, comparative performance is poor in the areas of profit margins, liquidity, credit control, and inventory management.</p> <p>The report finds the prospects of the company in its current position are not positive. The major areas of weakness require further investigation and remedial action by management. Recommendations discussed include:</p> <ul style="list-style-type: none"> <li>• improving the average collection period for accounts receivable.</li> <li>• improving/increasing inventory turnover.</li> <li>• reducing prepayments and perhaps increasing inventory levels</li> </ul> <p>The report also investigates the fact that the analysis conducted has limitations. Some of the limitations include: forecasting figures are not provided nature and type of company is not known nor the current economic conditions data limitations as not enough information is provided or enough detail i.e. monthly details not known results are based on past performances not present</p>	<p><b>Findings</b></p> <p><b>Conclusions</b></p> <p>Recommendations (note that conclusions and recommendations can be bulleted)</p> <p>Limitations of the report.</p>
<p><b>Executive Summary 2</b></p> <p>This report was commissioned to examine why the sales volume of Choice Chocolate has dropped over the past two years since its peak in 1998 and to recommend ways of increasing the volume.</p> <p>The research draws attention to the fact that in 1998, the market share of Choice Chocolate was 37%. The shares of their key competitors such as Venus and Bradbury were 22% and 18% respectively. The size of the chocolate market then was \$36 million. Over the next two years, although Choice Chocolate retained its market share the volume of sales in the whole market decreased to \$29 million. Further investigations reveal that this market shrinkage coincided with an increase in health awareness amongst consumers who regard the milk and sugar ingredients in chocolate as negative; moreover, since the second half of 1999, an increasing number of rival 'health candies' had appeared on the market. These claimed to offer the consumers a healthy alternative. These factors appear to be the major causes of the decreased sales volume of Choice Chocolate.</p> <p>Slim Choice is the latest chocolate range put forward by the R &amp; D Department of Choice Chocolate. The report evaluates this range and concludes that it would be an ideal candidate to meet the challenge presented by the market and could satisfy the new consumer demand since it uses significantly reduced</p>	<p>Terms of reference Statement of problem/ topic</p> <p>Formal language appropriate to report writing</p> <p>Key findings summarised</p> <p>Problem solution summarised</p>

<p>milk and sugar ingredients and is endorsed by renowned health experts. According to 97% of the 2000 subjects tested recently, it also retains the same flavour as the original range. It is recommended:</p> <ul style="list-style-type: none"> <li>† that Choice Chocolate take immediate measures to launch and promote Slim Choice alongside its existing product range;</li> <li>† that Slim Choice adopt a fresh and healthy image;</li> <li>† that part of the launch campaign contains product endorsement statements by renowned health experts;</li> <li>† that Slim Choice be available in health food shops as well as in traditional chocolate retail outlets</li> </ul>	<p>Recommendations summarized</p>
<p><b>Executive Summary 3</b></p> <p>Every time a business or consumer purchases products or services they display forms of buyer behaviour that are influenced by many factors. The following report looks at the fast food industry and will analyse four McDonalds' key products and services. It highlights what type of consumer buying or business buying behaviours are displayed in the purchase of a product or service and explains why each behaviour may occur. This enables a conclusion to be drawn from applying theory to reality. Although a full comprehension of buying behaviour is impossible, since everyone is an individual, it is useful to reflect on common behaviours and attempt to divide behaviours in types and stages. Even McDonalds, a leader in marketing cannot always predict consumer behaviour.</p>	<p>Background to problem</p> <p>Report's aims</p> <p>Outlines what information the report deals with but FAILS to provide a summary of the results gained, conclusions drawn and recommendations made. These are the functions of an executive summary and are absent in this example. The information in this executive summary is vague rather than summarising what the report found.</p>

## TABLE OF CONTENTS/LIST OF FIGURES/TABLES:

A well-constructed table of contents helps readers determine the subject matter of the report, its organization, and the location of sections of interest. Divide the material into major headings, subheadings, and further subheadings. Number all the headings for quick reference. Two formats for numbering headings are:

1. The traditional (I., I.A., I.A.1, and so on)
  2. The multiple decimal format (1.0, 1.1, 1.1.2, 1.2, 1.2.1 and so on)
- Study the example below:

### TABLE OF CONTENTS

Letter of Transmittal.....	i
Abstract.....	ii
Executive Summary.....	iii
1.0 Introduction.....	
1.1 Review of Related Literature.....	1
1.2 Statement of the Problem.....	1
1.3 Objectives of the Study.....	3
1.4 Research Questions.....	3
	4

1.5 Significance of the Study.....	4
1.6 Limitation and Delimitation of the Study.....	4
1.7 Research Methodology.....	5
1.8 Sampling Technique.....	5
1.9 Research Instrument.....	6
1.10 Instrument's Reliability.....	6
1.11 Ethical Consideration.....	7
1.12 Research Procedure.....	7
<b>2.0 Data Analysis and Statistical Tool.....</b>	<b>8</b>
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<b>2.1.2 Theme 2- Instructional leaders establish linkages at whole-school level.</b>	<b>10</b>
<b>2.1.3 Theme 3. Principal's indirect involvement in instructional leadership meant empowerment of vice-principals and teachers .....</b>	<b>11</b>
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<b>3.0 Discussion.....</b>	<b>13</b>
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<b>Appendixes</b>	

# **Writing Effective Project Reports**

## **What is a Project Report?**

A project report is a detailed explanation of the project you've completed (generally in a science, engineering, or business-related course.). The project report is the formal record of the entire process you undertook to complete your Personal Project.

## **What is the Purpose of the Project Report?**

The purpose of the project is, in the context of the degree you are studying, to integrate various aspects of the taught material and to demonstrate your (academic) research skills and your (professional) analysis, design and implementation skills. It gives you the opportunity to conduct in-depth work on a substantial problem to show individual creativity and originality, to apply where appropriate knowledge, skills and techniques taught throughout the degree programme to further oral and written communication skills, and to practise investigative, problem-solving, management and other transferable skills. The management and execution of the project is your responsibility, but you should seek and take advantage of advice from your supervisor.

When you choose a project, you should do so carefully, to reflect the focus of the degree programme you are enrolled in, your personal interests (the project needs to keep you interested for the whole the academic year) and the ability of the academic staff to support you throughout your project. Projects vary widely in the problem they address and the products they deliver at the end. While the main product of some projects is a piece of software or hardware, other projects produce a systems model or design, and yet others may address some research hypothesis using a theoretical or experimental approach. This means not every project produces a piece of software. In brief, the better defined the problem that your project addresses, the further through the systems lifecycle you should expect to progress in the course of your project. If instead you are addressing a research hypothesis, your main product may be the evaluation of some experiments or a theoretical result.

So, for example, a project that seeks to develop a logistics planning system for a small business or voluntary organisation would be expected to provide a fully operational, fully tested program that meets all the identified needs of the client. However, a project that aims to validate a government policy in a particular area might only achieve the development of a model to confidently simulate the main factors influencing that policy, and identify the research agenda in terms of specifying precisely the data requirements to allow a full investigation of the relevant factors. A scientifically oriented project may focus on the practical or theoretical evaluation of a new rendering approach

and compare it with existing approaches, which may involve some implementation, but does not require fully functional software.

In short, the project report should contain information on

- Your specific topic and goal
- Your inquiry question and the product or outcome you created
- Your Global Context
- Your plans and the process you implemented
- The resources you used
- The techniques you applied to complete the project and product
- The challenges and issues you faces and perhaps solved
- What you learned about your topic, global context
- What you learned about yourself as a learner from the Personal Project experience

## How can I write and Structure a Project Report?

### Approaches to Writing

- Top-Down Approach
- Evolutionary Delivery

Note: You can adopt one of them, and you can use both!

#### Top-Down Approach

- Use Chapter Breakdown Structure to identify the structure of the report
  - Identify all chapter names, sections and sub-sections
- Identifying the contents of each chapter, makes writing much easier
- You concentrate on a certain target in each chapter, and you don't misdirect to another target
- Helps in time management

#### Evolutionary Delivery

- You write separate parts of your reports as the thoughts come by.
- You can re-write these parts as your project proceeds, and your information increase.
- So, each part evolves and matures over a period of time as new ideas emerge.

These two approaches (Top-Down and Evolutionary Delivery) can be combined by:

- Specifying the chapters, sections and sub-sections heading and contents.
- By, taking the previous point as your road-map, you can start writing these parts, taking into consideration any probability of re-writing that might be needed while the project in progress.

## How do I get the Content for my Project Report?

Most of the necessary material will consist of your own ideas and experiences gained while carrying out the project, and your approach to solving the problem you have decided to address. For the background study or literature review you will also need references to various resources such as key books and papers, policy documents, Internet resources, related software, etc. While working on the project you may find it helpful to keep a notebook handy and record all relevant information. Typically, such information will include:

- references such as papers, books, websites with full bibliography details;
- lessons learned, for inclusion in the “reflective” part of your report;
- notes from meetings or interviews with
  - your supervisor;
  - potential end-users and other stakeholders;
  - technical experts;
- and so on.

Also, we recommend that you keep a diary of all your project-related activities. This will show the progress made during the life of the project and will provide a record of how you spent your time. In particular, when you are validating, testing and debugging your work, keep a running log of your activities and their outcomes. You will then have a record of the unforeseen difficulties you met and, hopefully, how you resolved them. Summaries of these may well be worth including in the project report (see Section 3.4).

In general you should supplement the material you generate yourself with relevant material from other sources. A good project report will show that you are aware of relevant work that other people have done (see Section 3.2). You should include relevant references to such work in your project report. References to work in periodicals, i.e. magazines and journals, and conference proceedings *may* be more useful than references to textbooks, as periodicals and conferences are usually more specialised and up to date. References to technical manuals and national and international standards should also be included, where appropriate. You may also cite web sites as sources, if suitable. However, keep in mind that web sites may often contain incomplete or wrong information and in general textbooks or papers are a better reference and show that you have done a more extensive literature review than just searching for some keywords on the Internet.

## **What will be the Format of the Project Report?**

**Suggested report structure for a project which implements a piece of software**

Title Page
Abstract
Acknowledgements
Table of Contents
Table of Figures
1. Introduction
2. Background
3. Specification
4. Design
5. Implementation
6. Results and Evaluation
7. Future Work
8. Conclusions
9. Reflection on Learning
References
Glossary
Table of Abbreviations
Appendices

**Suggested report structure for a project addressing a "softer" problem**

Title Page
Abstract
Acknowledgements
Table of Contents
Table of Figures
1. Introduction
2. Background
3. Selection of Approach
4. Application of Selected Approach
5. "Deliverables" from Selected Approach
6. Results and Evaluation
7. Future Work

8. Conclusions  
9. Reflection on Learning  
References  
Glossary  
Table of Abbreviations  
Appendices

### Suggested report structure for comparing algorithms

Title Page  
Abstract  
Acknowledgements  
Table of Contents  
Table of Figures  
1. Introduction  
2. Background  
3. Description of Algorithms  
4. Implementation  
5. Experiment Design  
6. Algorithm Comparison Results  
7. Future Work  
8. Conclusions  
9. Reflection on Learning  
References  
Glossary  
Table of Abbreviations  
Appendices

### Suggested report structure for the design and analysis of an algorithm

Title Page  
Abstract  
Acknowledgements  
Table of Contents  
Table of Figures  
1. Introduction  
2. Background  
3. Problem Statement

4. Alternative Designs and Final Algorithm
5. Implementation
6. Experimental and Theoretical Results
7. Future Work
8. Conclusions
9. Reflection on Learning
References
Glossary
Table of Abbreviations
Appendices

## How can I write the Different Sections of the Project Report?

### I. Writing the Introduction

A good introduction should tell the reader what the project is about without assuming special knowledge and without introducing any specific material that might obscure the overview. It should anticipate and combine main points described in more detail in the rest of the project report. Also, importantly, it should enthuse the reader about the project, to encourage them to read the whole report. Normally it should include such things as:

- **Motivation (Do not make headings for the following; just include discussion on the following items)**
  1. Why the area is important
  2. Giving background information
  3. Reviewing previous research
  4. Identifying a problem or a need
  5. Establishing a specific problem or need
  6. End with statement of the problem
- **The Project (You will have to make headings of the following items)**
  1. Project description
  2. Purposes, aims or objectives
  3. Justification or importance of the project
  4. Project category
  5. Scope
  6. Planning & Project Management
  7. Outline of the structure of the report

## Examples of Scope Statements

1. This project will consist of creating a marketable game based upon the *Bouncy Bunny Counts Money* comics on our website. The project will be completed by December, 2010. Modules of the game will include a simple shopping game, a way for Bouncy Bunny to earn money, and a way to motivate players to continue to play.
2. This project involves building a fence between the house at 10 ABC Boulevard and 12 ABC Boulevard. The fence will consist of steel posts within concrete-filled holes. The fence will be built out of cedar and it will be 8 feet tall. This is anticipated to keep the dog at 10 ABC Boulevard contained within the yard at a reasonable cost. The fence will be located as close to the property line as possible and reach from the garage on the west side to the house on the north side.
3. This project is for the creation of a construction safety app for cell phones. There will be an app for iPhones and Android based systems. The user interface will be designed as part of the project but will contain, as a minimum, the ability to create and edit tailgate meetings, field level hazard assessments, safety inspections, and audits. Each of these will have a built-in checklist for typical projects in typical industries. There will be a corresponding web application whereby anyone using the app can log in to view and print the reports. The app must include a tutorial to make it easy to get started.

## Organization

Chapter 1 gives an overview of lifelong learning and discusses the aim of this project. Chapter 2 talks about the related work done in lifelong learning and online learning. Chapter 3 explains Decision Theoretic Online learning (DTOL) and the adaptive algorithms used in online learning setting, AdaHedge and Follow the Leader with dropout perturbations (FTL-DP). Chapter 4 introduces the lifelong learning problem and explains EWA-LL and FTL-DP in lifelong learning setting. Chapter 5 explains the dataset and experimental setup. It evaluates the regrets suffered by different algorithms in lifelong learning setting. Chapter 6 gives a conclusion for the project and discusses the future work which can be carried forward from this project.

### Exercise: Critically read the following "Introduction" and insert appropriate headings.

#### **Introduction: Automatic Marking of Exam Papers Using Semantic Parsing**

'Automated Essay Scoring' has been a large area of research since the 1960s. In such a process, a variety of 'features' are extracted from essays, such as word and sentence length and the structure of sentences, before the data is collated to provide a final classification [SHERMIS 03].

'Automated Exam Scoring' is a more objective mode of classification, in which answers are analysed for the presence of concrete facts or statements instead of using any continuous measure.

This has been the subject of much research in the Computational Linguistics department at Oxford University, using an online study as the source of data, in which students completed a GCSE Biology paper [PULMAN 05]. The techniques employed are varied, but fall into two main categories. One simulating a human style marker defines the marking scheme via patterns inputted by an administrator, allowing for as many variants of an answer as possible. The clear disadvantage of this method is the hours of work required to painstakingly write these patterns, but this method yields high accuracy. Average accuracy in excess of 95% was obtained.

The latter method adopts a machine learning approach using a set of pre-marked answers for the training process. [PULMAN 06] experimented with a system in which the answers are treated as a 'bag of words' with no semantic structure incorporated. A technique known as 'k nearest neighbour (KNN)' was used...

This naive method is subject to a number of problems, as highlighted by Professor Stephen Pulman...

"You can't just look for keywords, because the student might have the right keywords in the wrong configuration, or they might use keywords equivalents".

Thus if the answer requirement is a statement such as 'the cat chased the mouse', then an answer of 'the mouse chased the cat' would be accepted despite the clear semantic inequality, due to the identical set of words.

This project aims to extend this method by incorporating the semantic structure of sentences, so that for the above example 'the mouse chased the cat' would be marked as incorrect, whereas 'the mouse was chased by the cat' would be marked as correct.

The CAndC (Clark and Curran) parser uses statistical methods and 'supertagging' to convert English sentences into a tree representing their structure, as detailed in [CLARK 07]...The output of the parser is a CCG (Combinatory Categorial Grammar) file, representing this sentence structure.

Alone, this representation is insufficient for machine learning use, given that the semantic interpretation of the sentences is our concern. We therefore use a tool called Boxer, which uses Prolog to convert the CCG into a form called DRS (Discourse Representation Structure). This is compatible with first-order logic, and thus can be used to make reasoned logical deductions (with its application extending to other systems such as Question Answering).

**Exercise: Read the following Introduction and insert headings given below:**

- Assignment definition
- Claims for the project
- The purpose

- The scope and limitations of the project
- The field of study
- Existing work related to the project

<b>Component</b>	1 The principle of a "robot" is an ancient one. The word robot in Czech means labourer or worker. Commercial robots do not have the 'intelligence' to think independently. This project aims to address this inadequacy by improving existing robotic technology.
<b>Component</b>	2 Thomas Ross built the first robot mouse in the 1930s, but subsequently robotics developed at a very slow pace until the late 1970s, when useful industrial robots became a practical proposition.
<b>Component</b>	3 The project team had to build a computer controlled maid robot that could successfully serve drinks and food as ordered.
<b>Component</b>	4 The mini-robotic toy described here, which we have built and called RoboMaid, is an important step in this direction in that it can serve cold drinks and food only. The use of computer control not only greatly increases the scope and capabilities of the robot, but the machine itself takes programming out the two dimensional world of the visual display unit into the three dimensional world.
<b>Component</b>	5 Our objective was to produce a mini-robot which consisted of three units: the computing and processing unit, the transceiver unit and the driving unit.
<b>Component</b>	6 A range of programming was developed so that the robot can sense its environment via the sensing device coupled to its "shell". Although the robot is able to serve cold drinks, it works most effectively if only one type of drink is ordered.
<b>Component</b> <b>Outline of the process/procedures</b>	7 We designed it to be controlled by 4 data lines derived from the Motorola G4 AltiVec computer processor. Binary bits are used to control the motor drive circuits. By turning on, or off, different combinations of the bits 0-4, quite a variety of movements can be executed. The action of the control will be described in the software part. We used a transceiver unit which transmitted or received infra-red and the signal was manipulated by the computing and processing unit.

**Exercise: Write problem statements/project definitions using the following information. Use verbs such as design/propose/develop/offers.**

1. Biometric system+biometric device+identify students' finger prints+uses data of registered students
2. Intelligent crime combating system+track illegal acts+find perpetrators
3. Computerized restaurant menu system+automate order placement+track order
4. Computerized census system+automate recording, retrieval of data+enable direct access to required data

**Exercise: Write the Introduction section for a report using the information below:**

The group developed an Educational Game called "Numbers in order" for primary school children. The game requires the user to click the bubbles as fast as possible in a specific order. Each time the order will change between all, odd, or even and increasing or decreasing.

**Instructions for the Game are as follows:**

Click "Tap Now" to begin the game.

A number of balls will drop from the top of the screen. Each ball has a number in it.

At the bottom of the screen it will say ODD or EVEN or BLANK at the bottom left and INCREASE or DECREASE at the bottom right. You must click the balls in this order. The first ball to click is blinking. If the bottom left is BLANK (says nothing) you click all the balls in order.

**Example:**

If it says ODD and INCREASE at the bottom and the first number is 1.

Then you click the bubbles 1, 3, 5, 7, 9, etc. until the level is complete.

Tip: Check the order at the bottom before you worry about the numbers in the balls.

Tip: There is a limited amount of time to finish. The timer is at the bottom center of the screen. This game should work on all platforms including safari and mobile (we hope, but make no guarantees).

**Exercise: Imagine that your group was required to develop a software program as a mandatory part of a course. Your group developed an Airline Reservation System. This system is a complete application for airline reservation programmed in VB.net. Airline Reservation System can inform clients regarding all flights, their arrival, their departure, and seat availability. Through this system, the clients can book, cancel, and print tickets according to the scheduled flights.**

**Write the Introduction section for this Project. You are required to write the following sections only.**

1. Motivation (150 to 200 words; follow the format taught)
2. Project Definition (1 to 2 sentences; follow the correct format)

**NOTE: Brainstorm to get ideas and make an outline to organize your thoughts. Do not use the internet. You can invent details and use imaginary citations. [10+3]**

## **II) Review of Related Researches/Background**

The purpose of the Background section is to provide the typical reader with information that they cannot be expected to know, but which they will need to know in order to fully understand and appreciate the rest of the report (see Section 4.1 for details of who a typical reader might be). It should explain why the project is addressing the problem described in the report, indicate an awareness of other work relevant to this problem and show clearly that the problem has not been solved by anyone else. This section may describe such things as:

- the wider context of the project;
- the problem that has been identified;
- likely stakeholders within the problem area;
- any theory associated with the problem area;
- any constraints on the approach to be adopted;
- existing solutions relevant to the problem area, and why these are unsuitable or insufficient in this particular case;
- methods and tools that your solution may be based on or use to solve the problem;
- and so on.

The wider context of the project includes such things as its non-computing aspects. So, for example, if you are producing software or any other products, including business recommendations, for a specific organisation then you should describe aspects of that organisation's business that are relevant to the project.

Relevant existing products, documents or artefacts that you should mention could be ones that, for example,

- are similar to the one you are proposing;
- support your project;
- your project aims to extend or replace;
- demonstrate the "deficiencies" your project intends to address.

You need only describe things that will be unfamiliar to the potential reader, or are unique to the organisation or topic your project addresses. Your project, if it involves software development, will almost certainly use all kinds of existing software such as language compilers, subroutine libraries, etc., but you can assume that the reader will be fully acquainted with, for example, general purpose programming languages such as Java, C/C++, Fortran, Pascal, Python, PHP, etc. Also, it may involve the better known specialised packages such as MySQL, ORACLE, OpenGL,

etc. You should mention the particular variety and possibly version number, e.g. Java SE 6, but you need say nothing more than that.

If your project depends on any specialist or uncommon software such as specialised subroutine packages or a more obscure or specialised programming language, you should describe them briefly and discuss whatever features are relevant to your project. Often this can be done by comparing it to some well-established piece of software, for example

The Descartes language is like a restricted version of Pascal but with the following extra features:

Your background section should end with a clear

statement of the research questions problem your project is trying to answer. These will reflect the aim of your project, but will be different in that they explain the problem you are attempting to solve, e.g.,

**Example 1:**

*Aim:*

The aim of this project is to develop software for the improved planning of the routing of delivery vehicles to customer locations, that reflects the forecast availability of each customer to receive goods.

*Research question(s):*

In order to demonstrate the achievement of the stated aim, this project will identify route planning software currently in use and the underpinning algorithms, define appropriate performance metrics, determine how to express constraints on an alternative algorithm, develop an improved algorithm and demonstrate on what basis it is judged an improvement, and implement the improved algorithm in a usable and robust software package.

**Example 2:**

*Aim:*

The aim of this project is to develop a business strategy for organisation X that will improve the survivability of X in the face of increasing global competition.

*Research question(s):*

In order to develop a business strategy, it will be necessary to identify key stakeholders and determine their vision for the organisation at the end of the strategic planning timeframe, assess

the likely outcome, in terms of the organisation's survivability, of maintaining the current strategy, and develop and assess an alternative set of activities to achieve the stated vision.

## General Steps for Writing a Literature Review

Here are general steps to write a literature review.

1. **Stage One: Annotated Bibliography.** As you read articles, books, etc., on your topic, write a brief critical synopsis of each. After going through your reading list, you will have an abstract or annotation of each source you read. Later annotations are likely to include more references to other works since you will have your previous readings to compare. But at this point the goal is to get accurate critical summaries of each individual work.
2. **Stage Two: Thematic Organization.** Find common themes in the works you read and organize them into categories. Usually, each work in your review can fit into one category or sub-theme of your main theme. But sometimes a work can fit in more than one. Write some brief paragraphs outlining your categories, how in general the works in each category relate to each other, and how the categories relate to each other and to your overall theme.
3. **Stage Three: More Reading.** Based on the knowledge you have gained in your reading, you should have a better understanding of the topic and of the literature. You have discovered specific researchers who are important to the field or methodologies you were not aware of. Look for more literature by those authors, on those methodologies, etc. You may be able to set aside some less relevant areas or articles which you pursued initially. Integrate the new readings into your literature review draft. Reorganize themes and read more as appropriate.
4. **Stage Four: Write Individual Sections.** For each section, use your annotations to write a section which discusses the articles relevant to that theme. Focus your writing on the theme of that section, showing how the articles relate to each other and to the theme, *rather than* focusing your writing on each individual article. Use the articles as evidence to support your critique of the theme rather than using the theme as an angle to discuss each article individually.
5. **Stage Five: Integrate Sections.** Now that you have the thematic sections, tie them together with an introduction, conclusion, and some additions/ revisions in the sections to show how they relate to each other and to your overall theme.

The following can be the format for a literature review. You can modify it as per your needs.

1. Establishes research territory
2. Establishes significance of territory
3. Establishes research niche. (Briefly reviews the major achievements in the field)
4. Reviews the chronological development of research in this area (an approach that is useful at times, but not always the best). Discusses one key paper at a time by describing its

- methods and key findings, but then **identifies weaknesses in the method and/or limitations in the findings**. Then discusses how the next researchers tried to address these problems.

5. Uses the found weaknesses to justify the project topic and aim
6. End with a summary and states the research problem with force and conviction

**Exercise: Critically read the following Literature Review and comment on its strengths and weaknesses.**

### 1.1 Related Works.

Surface reconstruction from unorganized point samples has been extensively studied in computer graphics, computational geometry and computer vision (see [Dey 2007] and references therein). Our main goal, however, is different. We focus on acquiring and understanding large 3D indoor environments.

**Scanning technology.** Powered by recent developments in realtime range scanning, everyday users can easily acquire 3D data at high frame-rates. The individual frames, however, are poor in quality. Hence, researchers have proposed algorithms to accumulate multiple scans for better quality acquisition [Henry et al. 2010; Izadi et al. 2011]. Unfortunately, such methods lead to ghosting artifacts if the camera or the scene moves abruptly in course of scanning. Furthermore, the raw scans do not provide any high-level understanding of the scene. Scan processing. Rusinkiewicz et al. [2002] first demonstrated the possibility of real-time lightweight 3D scanning. In their framework, the user rotates a handheld object while the system continuously updates the model to provide real-time visual feedback guiding the user where to scan next. In other related efforts, researchers have used template models to learn the space of human bodies [Allen et al. 2003], morphed database models to fill in regions of missing parts [Pauly et al. 2005], used non-rigid alignment to better align (warped) multiple scans [Li et al. 2009], or exploited non-local repetitions to consolidate point clouds for urban facades [Zheng et al. 2010]. The methods, however, are not suitable for extracting a high-level scene understanding along with appropriate deformation models from sparse and unorganized inputs.

**Shape analysis.** Man-made objects populating indoor scenes typically have low-degree of freedom and are often arrangements of simple primitives. Schnabel et al. [2007] introduce an algorithm to automatically extract basic shapes (e.g., planes, cylinders, spheres, etc.) from unorganized point clouds. Subsequently, the GlobFit [Li et al. 2011] framework extracts a set of mutually consistent relations (e.g., coplanar, coaxial, equal length, etc.) and conform to the recovered relations for reverse engineering. Alternately, temporal information across multiple frames can be used to additionally track joint information in order to recover a deformation model ([Chang and Zwicker 2011] and references therein).

In the context of image understanding, Lee et al. [2010] construct a box-based reconstruction of indoor scenes using volumetric considerations, while Gupta et al. [2010] apply geometric

constraints and mechanical considerations to obtain a block-based 3D scene model. In the context of 3D scans, there has been little efforts towards scene understanding of large datasets. Notable exceptions include: Triebel et al. [2010] present an unsupervised algorithm for segmentation and object detection in indoor scenes. They apply a graph-based clustering on pre-segmented input data and assign part labels using a Conditional Random Field (CRF). The method, however, does not consider object variability and cannot be applied to unorganized pointsets, as is our goal. Boyko et al. [2011] extracts high level information of road in noisy outdoor point sets. We also extract high level information in the context of indoor environments for quick and effective scene understanding.

### III) The “Specification & Design”

The purpose of the Specification and Design sections is to give the reader a clear picture of the system you plan to create, in terms of the capability required. A specification should tell the reader what the software system is *required* to do. The design then gives the top-level details of how the software system meets the requirement. It will also identify constraints on the software solution, that are important in guiding decision making throughout the development process.

Describing what a software system does (specification) and how it does so (design) effectively usually means describing it from more than one viewpoint. Each viewpoint will convey some information about the system that other viewpoints omit. (You would use the same technique when describing any complicated construction such as a building, an aircraft, a novel or a painting). Possible viewpoints might be:

- the business model the software supports;
- the user interface;
- the dynamic behaviour of the system;
- how data flows through the system;
- what data types are implemented in the system;
- what algorithms are implemented in the system;
- the static architecture of the system, i.e. how the code is partitioned into modules, etc.

A common approach is to first define the user or business requirements, then describe the static architecture, identify modules and groups of closely connected modules, and then to apply other views to each of these groups. Fine details, specifically details of code, should be left out. We strongly recommend that you make extensive use of diagrams, such as entity-relationship diagrams, UML diagrams, state charts, or other pictorial techniques.

As well as describing the system, it is important that you *justify* its design, for example, by discussing the implications of constraints on your solution and different design choices, and then

giving reasons for making the choices you did. Typically these implications will relate to the aims of the project and to aspects of it discussed in the Background section.

The design of the system will almost certainly have evolved while you were developing it. Obviously you should describe its final state but often there are good reasons for describing intermediate states, too; for example, if you want to discuss the details of the design method used or to highlight learning that you later refer to in the Reflection section. If you do this, take special care to make sure the reader does not get confused between different stages of the design.

If you are not designing a system, but testing a hypothesis for a more scientifically oriented project, specification and design sections may not be required in quite the same form. The specification instead becomes a description of the problem and what is required of a solution. The design becomes a description of your approach to solving the problem and your suggested solution(s). For instance, if you are designing an algorithm to solve a particular problem you would have a problem statement section and then a section describing one or more suggested algorithms to solve the problem. Later in the Results and Evaluation section you then describe how to design experiments to test how well the algorithm(s) solve the problem and present your experimental results with an evaluation of your suggested solutions.

## IV) The “Implementation”

The Implementation section is similar to the Specification and Design section in that it describes the system, but it does so at a finer level of detail, down to the code level. This section is about the realisation of the concepts and ideas developed earlier. It can also describe any problems that may have arisen during implementation and how you dealt with them.

Do *not* attempt to describe all the code in the system, and do *not* include large pieces of code in this section. Complete source code should be provided separately. Instead pick out and describe just the pieces of code which, for example:

- are especially critical to the operation of the system;
- you feel might be of particular interest to the reader for some reason;
- illustrate a non-standard or innovative way of implementing an algorithm, data structure, etc.

You should also mention any unforeseen problems you encountered when implementing the system and how and to what extent you overcame them. Common problems are:

- difficulties involving existing software, because of, e.g.,
  - its complexity,
  - lack of documentation;
- lack of suitable supporting software;

- over-ambitious project aims.

A seemingly disproportionate amount of project time can be taken up in dealing with such problems. The Implementation section gives you the opportunity to show where that time has gone.

## V) The “Results and Evaluation”

In this section you should describe to what extent you achieved your goals. You should describe how you demonstrated that the system works as intended (or not, as the case may be). Include comprehensible summaries of the results of all critical tests that were carried out. You might not have had the time to carry out any full rigorous tests – you may not even got as far as producing a testable system. However, you should try to indicate how confident you are about whatever you have produced, and also suggest what tests would be required to gain further confidence.

This is also the place to describe the reasoning behind the tests to evaluate your results, what tests to execute, what the results show and why to execute these tests. It may also contain a discussion of how you are designing your experiments to verify the hypothesis of a more scientifically oriented project. E.g., describe how you compare the performance of your algorithm to other algorithms to indicate better performance and why this is a sound approach. Then summarise the results of the tests or experiments.

### Exercise 2: Critically read the Requirements section of a report.

#### 3D Modelling in Java

The 3D modelling system required for this project **must be cleanly accessible** from within our Java code, allow for dynamic changes to the 3D world, and **provide a high-level intuitive interface** for doing so. **What we require is** a system which can interface cleanly with the Eclipse window, and allow user-interaction with the underlying 3D objects.

**One such three-dimensional modelling language satisfying these requirements is Java3D. The reason for this is that** it provides a way to create a three-dimensional scene, completely in Java, and in a high-level manner...

In designing any program, one must consider the requirements, in terms of fulfilling and achieving certain goals, whilst also adhering to the requirements in efficiency and usability enforced by an end-user. **I will now discuss what these requirements are:**

Accuracy... Efficiency... Usability... Extensibility... Integration...

This list prescribes themes which should feature throughout the design process, whilst giving an overview of what we plan on achieving. We will now continue to describe various aspects of the design which aims to meet these requirements.

### Exercise 3: Critically read the Design and Testing section of a report.

#### Design

##### 4.1 Preliminaries

This section will discuss the methods used in setting up a framework to allow for the dynamic placement of 3D visual objects.

###### 4.1.1 Creating the Eclipse Plug-in

Creating an Eclipse plug-in is a straightforward process. Dave Springgay gives a good outline of the processes necessary [13]. However, essentially we are concerned with creating an Eclipse 'View'...

###### 4.5.5 A Different Approach to Determining Object Size

As we have seen in the Divide and Resize algorithm, the visual objects size can play a vital role in the usability of the general layout. The halving method employed in the divide and resize algorithm seems rather naive, even if it works well visually. Given that the model has access to an importance score for each object, it would seem nonsensical for two objects to be of the same size, when one is vastly more important than the other. Hence, I suggest a sizing algorithm based solely on the importance of the object...

#### Testing

We have already seen some screen shots of the working program; however, we provide two stringent tests for our program to ensure it works as intended, along with a test rig to fully analyse the program. In both test programs, I will run through the whole series of options available to the user, and ensure its correctness. However, I will also demonstrate its ability to visualise code, and hopefully provide valuable insights whilst debugging.

##### 5.1 Simple Program -BFS and DFS using the Visitor Pattern

This test program begins by creating an underlying tree structure...

This kind of debugging is intuitive, and simple to do within this framework. If you have an intuitive understanding of what the underlying model in your program should look like, it is fairly straight forward to spot bugs like this in small code samples. Assuming a larger program is in use, the user must delve a little deeper into the part of the graph which they suspect the bug to exist in. This is obviously heavily aided by the JDT debugger itself. However, this test still shows the usability of

the code in a small program, and shows that the code can cope with the different types of back links and cross links that can occur in a memory graph.

## VI) The “Conclusions”

The Conclusions section should be a summary of the aims of project and a restatement of its main results, i.e. what has been learnt and what it has achieved. An effective set of conclusions should not introduce new material. Instead it should briefly draw out, summarise, combine and reiterate the main points that have been made in the body of the project report and present opinions based on them. The Conclusions section marks the end of the project report proper. Be honest and objective in your conclusions. You must also critically evaluate your results in the light of these tests, describing its strengths and weaknesses. Ideas for improving it can be carried over into the Future Work section. Remember: no project is perfect, and even a project that has failed to deliver what was intended can achieve a good pass mark, if it is clear that you have learned from the mistakes and difficulties. This section also gives you an opportunity to present a critical appraisal of the project as a whole. This could include, for example, whether the methodology you have chosen and the programming language used were appropriate.

## VII) The “Future Work”

It is quite likely that by the end of your project you will not have achieved all that you planned at the start; and in any case, your ideas will have grown during the course of the project beyond what you could hope to do within the available time. The Future Work section is for expressing your unrealised ideas. It is a way of recording that „I have thought about this“, and it is also a way of stating what you would like to have done if only you had not run out of time. A good Future Work section should provide a starting point for someone else to continue the work which you have begun.

### Exercise 4: Critically read the Conclusion section of a report.

#### Efficient Local Type Inference

I have successfully developed a novel local type inference algorithm from an initial specification of the problem. I first provide an intuitive derivation of the algorithm and then offer a formal proof of correctness. I go on to offer generalizations to the algorithm, supporting more language features, and finally achieve local type inference in Jimple.

I have carried out careful experimental evaluation to compare the performance of my algorithm to that of Gagnon et al. [2], which is the only implemented alternative for local type inference in Jimple. Experiments showed a typical 4-fold to 5-fold execution time improvement across a

wide range of benchmarks, and a much greater increase where very large methods exist. Experiments were not confined to code compiled from Java, and include code compiled from very different languages like Scala and Scheme. My algorithm is proven to always give a tightest possible typing. Experiments show that Gagnon's algorithm rarely but sometimes gives suboptimal typings.

The theoretical worst case complexity of my algorithm is exponential: whereas Gagnon's algorithm is polynomial. But experiments of execution time against method length show a typically linear trend whereas Gagnon's show a cubic trend. My algorithm is very much optimized for type hierarchies in which most pairs of types have a single least-common-ancestor, which probably includes most Java bytecode in existence today. Of course if a language appeared that made much greater use of multiple inheritance then my algorithm may not be appropriate. But as a practical 'workhorse' implementation I believe this is seriously worthy of consideration. And this is supported by the decision of the Soot framework's maintainers to replace their existing type inference algorithm with mine.

## 7.1 Future Work

The greatest scope for future work is extending the application of my algorithm from local type inference to global type inference. This involves inferring types for method signatures and public fields as well as local variables. The global type inference problem is currently an area of active research, most of which builds upon the work of Palsberg and Schwartzbach [6]. One could begin by treating method parameters, return values and fields in the same way as local variables, and then using my algorithm on the program as a whole.

## WRITING A PROGRESS REPORT

A *progress report* (also called a *status report*) informs readers about a project that is not yet completed.

### Purpose

The number of progress reports for any project usually is established at the outset, but more might be called for as the project continues. Progress reports are often required in construction or research projects so that decision makers can assess costs and the potential for successful completion by established deadlines. Although a progress report may contain recommendations, its main focus is to provide information, and it records the project events for readers who are not involved in day-to-day operations. The progress reports for a particular project make up a series, so keep your organization consistent from report to report to aid readers who are following one particular aspect of the project.

### Organization

Model 12-4 is a progress report written by the on-site engineer in charge of a dam repair project. The report is one in a series of progress reports for management at the engineering company headquarters. The writer addresses the report to one vice president, but copies go to four other managers with varying interests in the project. The writer knows, therefore, that she is actually preparing a report that will be used by at least five readers. Progress reports include the following sections.

### Introduction

The introduction reminds readers about progress to date. Explain the scope and purpose of the project, and identify it by specific title if there is one. Follow these guidelines:

- State the precise dates covered by this particular report.
- Define important technical terms for nonexpert readers.
- Identify the major stages of the project, if appropriate.
- Summarize the previous progress achieved (after the first report in the series) so that regular readers can recall the situation and new readers can become acquainted with the project.
- Review any changes in the scope of the project since it began.

2024

The writer in Model 12-4 numbers her report and names the project in her subject line to help readers identify where this report fits in the series. In her introduction, she establishes the dates covered in this report and summarizes the dam repairs she discussed in previous reports. She also indicates that the project is close to schedule, but that the expected costs have risen because another subcontractor had to be hired.

### Work Completed

This section describes the work completed since the preceding report and can be organized in two ways: You can organize your discussion by tasks and describe the progress of each chronologically, or you can organize the discussion entirely by chronology and describe events according to a succession of dates and times. Choose the organization that best fits what your readers will find useful, and use subheadings to guide them to specific topics. If your readers are interested primarily in certain segments of the project, task-oriented organization is appropriate. If your readers are interested only in the overall progress of the project, strict chronological organization is probably better. Follow these guidelines:

- Describe the tasks that have been completed in the time covered by the report.
- Give the dates relevant to each task.
- Describe any equipment changes.
- Explain special costs or personnel charges involved in the work completed.
- Explain any problems or delays.
- Explain why changes from the original plans were made.
- Indicate whether the schedule dates were met.

The engineer in Model 12-4 organizes her work-completed section according to the repair stages and then lists them in chronological order. She also includes the date on which each event occurred or each stage was completed.

### Work Remaining

The section covering work remaining includes both the next immediate steps and those in the future. Place the most emphasis on the tasks that will be cov-

ered in your next progress report. Avoid overly optimistic promises. Follow these guidelines:

- Describe the major tasks that will be covered in the next report.
- State the expected dates of completion for each task.
- Mention briefly those tasks that are further in the future.

The work-remaining section in Model 12-4 describes the upcoming stage of the repair work and states the expected completion date.

### Adjustments/Problems

This section covers issues that have changed the original plan or time frame of the project since the last progress report. If the project is proceeding on schedule with no changes, this section is not needed. If it is necessary, follow these guidelines:

- Describe major obstacles that have arisen since the last progress report.  
(Do not discuss minor daily irritations.)
- Explain needed changes in schedules.
- Explain needed changes in the scope of the project or in specific tasks.
- Explain problems in meeting original cost estimates.

The writer in Model 12-4 includes an adjustments section in her report to explain unexpected costs and a short delay because of the deteriorating condition of the dam area.

### Conclusion

The conclusion of a progress report summarizes the status of the project and forecasts future progress. If your readers are not experts in the technical aspects of the project, they may rely heavily on the conclusion to provide them with an overall view of the project. Follow these guidelines:

- Report any progress on current stages.
- Report any lack of progress on current stages.
- Evaluate the overall progress so far.

2024

✓ Model 12-4

TO: Mark Zerelli  
Vice-President  
Balmer Company

October 13, 1989

FROM: Tracey Atkins *TA*  
Project Manager

SUBJECT: Progress Report #3-Rockmont Canyon Dam

#### Introduction

This report covers the progress on the Rockmont Canyon Dam repairs from September 15 to October 15 as reported previously. Repairs to the damaged right and left spillways have been close to the original schedule. Balmer engineers prepared hydraulic analyses and design studies to size and locate the aeration slots. These slots allowed Balmer to relax tolerances normally required for concrete surfaces subjected to high-velocity flows. Phillips, Inc., the general contractor, demolished and removed the damaged structures. To expedite repairs, construction crews worked on both spillways simultaneously. Construction time was further reduced by hiring another demolition company, Rigby, Inc. The project costs rose during the first month when Phillips, Inc., had to build batching facilities for the concrete because the dam site had no facilities.

#### Work Completed

Since the last progress report, three stages of work have been completed:

1. On September 18, aggregate for the concrete mix was hauled 230 miles from Wadsworth, Oregon. The formwork for the tunnel linings arrived from San Antonio, Texas, on September 20.
2. Phillips developed hoist-controlled work platforms and man-cars to lower workers, equipment, and materials down the spillways. Platforms and man-cars were completed on September 22.
3. Phillips drove two 20-foot-diameter modified-horseshoe-shaped tunnels through the sandstone canyon walls to repair horizontal portions of the tunnel spillways. A roadheader continuous-mining machine with a rotary diamond-studded bit excavated the tunnels in three weeks, half the time standard drill and blast techniques would have taken. The tunnels were completed on October 15.

Mark Zerelli

-2-

October 16, 1999

**Work Remaining**

The next stage of the project is to control flowing water from gate leakage. Phillips will caulk the radial gates first. If that is not successful in controlling the flow, Phillips will try French drains and ditches. After tunnels are complete, both spillways will be checked for vibration tolerance, and the aeration slot design will be compared with Balmer's hydraulic model. Full completion of repairs is expected by November 15.

**Adjustments**

Some adjustments have been made since the last progress report. During construction work on both spillways, over 50 people and 200 pieces of equipment were on the site. Heavily traveled surfaces had to be covered with plywood sheets topped with a blanket of gravel. This procedure added \$3500 to the construction costs and delayed work for half a day.

**Conclusion**

The current work is progressing as expected. The overall project has fallen three days behind estimated timetables, but no further delays should occur. The final stage of the project will require measurements at several areas within both spillways to be sure they can handle future flood increases with a peak inflow of at least 125,000 cfs. Balmer expects to make the final checks by November 25.

TA:ss

c: Robert Barr  
    Mitchell Lawrence  
    Mark Bailey  
    Joseph Novak

## QUESTION 03

## Introduction

This report is the progress report of QUERY BASED VIDEO SUMMARIZATION Project from September 1<sup>st</sup>, 2023 to December 1<sup>st</sup>, 2023.

The aim of our project is to develop an AI model which will take two inputs: a video and a user query related to the same video and produce a summary based on the query which user provided.

As mentioned in the last progress report we have already done an extensive literature review on this project. In literature review we analyzed the results of already existing models on this topic along with the methodology used in each paper. Now we have progressed further on our project which is as follow.

## Work completed

The work completed is as follows:

- After literature review, all group members searched for the dataset in order to perform video summarization. The aim was to find a diverse dataset along with sample user queries. The diversity of dataset refers to the different genres of videos a dataset should contain. Hence, one such dataset was found called QV-Dataset.

This dataset contains random youtube videos of 2 to 3 minutes each along with queries. Each video has one query. The size of dataset 134 GB, and it contains more than 1000 videos. This work was done from September 1<sup>st</sup> to October 28<sup>th</sup>.

• After dataset search, we proceeded to implementing our model. We started with the implementation of our Query Model. By using the existing dataset queries of QV-Dataset we created more queries in order to make our model more efficient and accurate. First we used object detection model called YOLOv7 in order to identify objects present in each video. After this natural language programming techniques were used in order to create sentences from using identified objects in each video, maintaining the context of the video. By doing this we increased the size of queries in our dataset to get accurate results. For the final step we implemented transformer called DistilBert in order to convert queries into embeddings which is mathematical representation of text. This work was done from October 29<sup>th</sup>, 2023 to November 30<sup>th</sup>, 2023.

### Problems & Adjustments

One of the major problems which we faced was finding relevant datasets. The benchmark datasets which are TVSUM and SUMME are not diverse datasets. Hence, summarizing these videos will be of no use. This problem was resolved as we found a new dataset along with queries called QV-Dataset. Another major problem which we faced was to download dataset as the size was too large; 134 GB to be stored on our laptops. To solve this problem we took the help of IT department of our University. The IT department downloaded the dataset for us and provided the dataset in Hard drive.

(16/10)

### Question 3.

#### 1- Introduction:

The purpose of this report is to state the tasks accomplished regarding our project "Amniotic Fluid Analysis", held between 1<sup>st</sup> January 2023 to 20<sup>th</sup> January 2023. Amniotic Fluid is the liquid a mother produces in her womb during her pregnancy when the fetal grows to provide nutritions and growth of the fetus and protect the fetus from diseases. Utilization of Computer Vision techniques on Ultrasound Images was a trailblazer to revolutionize the field of obstetrics and aim of better health outcomes. The tasks you assigned have been accomplished.

Words: 59

(2)

#### 2- Work Completed:

##### 1- Data Collection:

- We applied for the ERC form at Patel Hospital for the data Acquisition at 1<sup>st</sup> Jan. While waiting for their response we started downloading the ultrasound images dataset from various sources like Zenodo, Krigshare, PhysioNet.
- We downloaded 5.3 GB dataset in total from web sources having 231,035 ultrasound images of around 56000 patients.
- On 5<sup>th</sup> Jan, ERC form got approved from Patel Hospital. We met Dr. Fizza to explain her about our project and ~~got to~~ got to know the critical considerations for this project. I have mailed you the details.

- We will be receiving 4 NFI ultrasound images per patient of 20 patients on a weekly basis from Patel Hospital.

## 2- Data Annotation:

- We uploaded our collected dataset on Roboflow environment in chunks.

- 5 practitioners from the Patel Hospital were aligned with us for the annotations. We started at 7<sup>th</sup> January and each day annotated around 1000 images on average by ~~this~~ each practitioner.

- Till date (20<sup>th</sup> January 2023), 120,000 images have been annotated.

- On a daily basis, a 2-hour session was conducted with Dr. Fakhra for the verification of the annotations.

Words: 115

## 3- Problems and Adjustment

However, we faced a great challenge of a conflict in between the practitioners who were annotating the images. 2 of the practitioners were considering subtle greyish region in ultrasound images as amniotic fluid and 3 of them were not considering that region. This would produce biasness in our project. At January 15, we decided to sign an agreement between the fraction practitioners named as Inter Annotator Agreement. The common area of interest and conflict of interest were numerically jotted down, image by image. And later on evaluated on Cohen Kappa metric denoting the confidence of 79% in

Words: 65

10  
10

## Conclusions and Recommendations

In your final section, summarize the significant results of your trip, whether positive or negative, and state any recommendations you believe are appropriate. Follow these guidelines:

- Mention the most significant information resulting from the trip.
- State whether the trip was successful or worthwhile.
- Make recommendations based on information gathered during the trip.
- Mention any plans for another trip or further meetings.

In Model 12-5, the writer uses the final section to repeat her recommendation. She also mentions other materials she has from the trip and an offer of help from the trainer at the other company.

## WRITING A PROPOSAL

*Proposals* suggest new ways to respond to specific company or organization situations, or they suggest specific solutions to identified problems. A proposal may be internal (written by an employee to readers within the company) or external (written from one company to another or from an individual to an organization).

### Purpose

Proposals vary a great deal, and some, such as a bid for a highway construction job on a printed form designed by the state transportation department, do not look like reports at all. In addition, conventional format varies according to the type of proposal and the situation. Proposals usually are needed in these circumstances:

1. A writer, either inside or outside a company, suggests changes or new directions for company goals or practices in response to shifts in customer needs, company growth or decline, market developments, or needed organizational improvements.
2. A company solicits business through sales proposals that offer goods or services to potential customers. The sales proposal, sometimes called a *contract bid*, identifies specific goods or services the company will provide at set prices within set time frames.

3. Researchers request funds to pay for scientific studies. The research proposal may be internal (if an organization maintains its own research and development division) or external (if the researcher seeks funding from government agencies or private foundations).

Proposal content and organization usually vary depending on the purpose and reader-imposed requirements. External proposals, in particular, often must follow specific formats devised by the reader. This chapter discusses the conventional structure for a proposal that is written to suggest a solution to a company problem—the most common proposal type.

In general, this type of proposal persuades readers that the suggested plan is practical, efficient, and cost effective and suits company or research goals. Readers are decision makers who will accept or reject the suggested plan. Therefore, a successful proposal must present adequate information for decision making and stress advantages in the plan as they relate to the established company needs. In a high-cost, complicated situation, a proposal usually has many readers, all of whom are involved with some aspect of the situation.

Proposals are either solicited or nonsolicited. If you have not been asked to submit a proposal for a specific problem, you must consider whether the reader is likely to agree with you that a problem exists. You may need to persuade the reader that the company has a problem requiring a solution before presenting your suggested plan.

## Organization

Model 12-6 is an unsolicited proposal written by a manager of a city water treatment plant to his superior. The writer identifies a serious safety problem resulting from the current method of installing portable generators during rain storms. His proposal suggests changes to eliminate the safety hazard.

The writer of this formal proposal includes an informative abstract on the title page. His transmittal letter stresses the seriousness of the problem and notes the attached supplementary reports. He also requests authority to proceed with the project and offers to discuss the matter further. The body of the proposal represents the traditional organization for such a document.

## Problem

The introductory section of a proposal describes the central problem. Even if you know that the primary reader is aware of the situation, define and describe the extent of the problem for any secondary readers and for the record, and also explain why change is necessary. If the reader is not aware of the problem, you may need to convince him or her that the situation is serious enough to require

changes. The first section of the proposal also briefly describes the recommended solution. Include these elements:

- A description of the problem in detail. Do not, for instance, simply mention "inadequate power." Explain in detail what is inadequate about the generator.
- An explanation of how the situation affects company operations or costs. Be specific.
- An explanation of why the problem requires a solution.
- The background of the situation. If a problem is an old one, point out when it began and mention any previous attempts to solve it.
- Deadlines for solving the problem if time is a crucial factor.
- An indication that the purpose of the proposal is to offer recommendations to solve the problem.
- Your sources of data—surveys, tests, interviews, and so on.
- A brief summary of the major proposed solution, for example, to build a new parking deck. Do not attempt to explain details, but alert the reader to the plan you will describe fully in the following sections.
- The types of information covered in the proposal—methods, costs, timetables, and so on.

The writer in Model 12-6 begins by stating that there is a safety problem in the current method of installing portable generators and then describes the method in detail, pointing out where the hazards occur. He also warns the reader that the department is in violation of the Occupational Safety and Health Administration regulations.

### Proposed Solution

This section should explain your suggestions in detail. The reader must be able to understand and visualize your plan. If your proposal includes several distinct actions or changes, discuss each separately for clarity. Follow these guidelines:

- Describe new procedures or changes in systems sequentially, according to the way they would work if implemented.
- Explain any methods or special techniques that will be used in the suggested plan.
- Identify employees who will be involved in the proposal, either in implementing it or in working with new systems or new equipment.

2-21

- Describe changes in equipment by citing specific manufacturers, models, and options.
- Mention research that supports your suggestions.
- Identify other companies that have already used this plan or a similar one successfully.
- Explain the plan details under specific subheadings relating to schedules, new equipment or personnel, costs, and evaluation methods in an order appropriate to your proposal.

The writer in Model 12-6 proposes four new installations—all designed to simplify the current method of installing portable generators. He uses subheadings to direct the reader to specific information about the schedule, costs, and coordination of the project.

### Needed Equipment/Personnel

Identify any necessary equipment purchases or new personnel required by your proposal. Follow these guidelines:

- Indicate specific pieces of equipment needed by model numbers and brand names.
- Identify new employee positions that will have to be filled. Describe the qualifications people will need in these positions.
- Describe how employee duties will change under the proposed plan and how these shifts will affect current and future employees.

### Schedules

This section is especially important if your proposal depends on meeting certain deadlines. In addition, time may be an important element if, for instance, your company must solve this problem in order to proceed with another scheduled project. Follow these guidelines if they are appropriate to your topic:

- Explain how the proposed plan will be phased in over time or on what date your plan should begin.
- Mention company deadlines for dealing with the problem or outside deadlines, such as those set by the IRS.
- Indicate when all the stages of the project will be completed.

2024

The proposed changes in Model 12-6 will require the department to call for bids by contractors, obtain city permits, and review the design. Because of these requirements, the writer describes the necessary schedule in detail. For the reader's convenience, the writer separates the process into four stages.

### Budget

The budget section of a proposal is highly important to a decision maker. If your plan is costly relative to the expected company benefits, the reader will need to see compelling reasons to accept your proposal despite its high cost. Provide as realistic and complete a budget projection as possible. Follow these guidelines:

- Break down costs by category, such as personnel, equipment, and travel.
- Provide a total cost.
- Mention indirect costs, such as training or overhead.
- Project costs for a typical cycle or time period, if appropriate.

In Model 12-6, the writer includes a table to supplement the cost section. Because government units operate under budgets established by legislative bodies, the writer also explains how to cover the costs of this proposal under current budget allocations.

### Evaluation System

You may want to suggest ways to measure progress toward the objectives stated in your proposal and for checking the results of individual parts of the plan. Evaluation methods can include progress reports, outside consultants, testing, statistical analyses, or feedback from employees. Follow these guidelines:

- Describe suggested evaluation systems, such as spot checks, surveys, or tests.
- Provide a timetable for evaluating the plan, including both periodic and final evaluations.
- Suggest who should analyze the progress of the plan.
- Assign responsibility for writing progress reports.

The writer in Model 12-6 offers to accept the responsibility of directing this project. As part of this responsibility, he will train employees in the new system, write monthly progress reports, obtain necessary permits, and monitor compliance with building regulations.

### Expected Benefits

Sometimes writers highlight the expected benefits of a proposal in a separate section for emphasis. If you have such a section, mention both immediate and long-range benefits. Follow these guidelines:

- Describe one advantage at a time for emphasis.
- Show how each aspect of the problem will be solved by your proposal.
- Illustrate how the recommended solution will produce advantages for the company.
- Cite specific savings in costs or time.

Because this proposal involves a safety hazard, the writer in Model 12-6 uses the benefits section to emphasize how the proposed changes will solve the problem and bring the plant into compliance with existing safety regulations.

### Summary/Conclusions

The final section of your proposal is one of the most important because readers tend to rely on the final section in most reports and, in a proposal, this section gives you a chance to emphasize the suitability of your plan as a solution to the company problem. Follow these guidelines:

- Summarize the seriousness of the problem.
- Restate your recommendations without the procedural details.
- Remind the reader of the important expected benefits.
- Mention any necessary deadlines.

The writer in Model 12-6 uses his conclusion to emphasize the safety hazard and stress the need for changes.

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## CHAPTER SUMMARY

This chapter discusses the conventional content and structure for the six types of reports most commonly written on the job. Remember:

- A feasibility study analyzes the alternatives available in a given situation.
- An incident report records information about accidents or other disruptive events.

## 2. Workplace Problem-Solution Proposals

Workplace proposals are documents that aim to persuade another person to approve a particular project or action and to support its implementation.

This project or action normally helps to improve a situation or solve a problem. For example, you may write a proposal to suggest a venue for an event, open a new shop or update the IT system, alternatively it could be a way to improve sales or suggest a location for new offices. Proposals are normally written by the person or team seeking approval of their suggestion.

People may be persuaded by your reasons and by the evidence you provide but also by the clarity of your explanations. One of the main difficulties with real-life problems is that they are messy. Well-structured communication can reduce the apparent complexity to the point where you can envisage a starting point for a solution.

A clearly structured and well-argued proposal is likely to be very persuasive. A clear structure not only helps the reader to quickly gain an understanding of what you are proposing and see its rationale, but also inspires them with confidence that the solution will be workable.

### Writing a proposal

Here, you will look at a typical proposal structure. You will do this by focusing on each section of a typical proposal and looking at an example.

A workplace proposal typically consists of five contributory sections aiming to persuade the reader that a problem needs to be resolved and the course of action that should be taken. These five steps are:

- Problem statement
- Statement of goals
- Solution statement
- Benefits statement
- Call to action or management/action plan

### Sample Proposal

#### Problem statement

Following our expansion, grievances put forward by bar assistants and cooks against our restaurant managers have increased. Common themes in these grievances are managers' authoritarian style and micro-management. While some members of staff perceive this behaviour as bullying, in-depth

investigation has established that in fact managers lack the skills necessary to lead large teams and work under pressure. For example, eight out of ten of our central London managers have been found to communicate ineffectively with staff and nine out of ten lack teamwork skills. This has led to low staff morale which, in turn, has negatively affected productivity and motivation.

### **Statement of goals**

Our goal is to create highly supportive and positive working environments that motivate and engage all staff. In these environments managers will adopt a management style appropriate to the situation and person, and one that fulfils our company's core values of open-minded and respectful communication.

### **The solution statement**

In order to develop our restaurants as positive environments in which staff are valued, supported and motivated, we propose training for our restaurant managers in core management capabilities.

Under the management of the HR training department, the development of our restaurant managers will involve three phases. In the first phase, the HR training team will conduct further analysis of the current situation in each restaurant to identify the specific training needs of each manager. This involves helping them to devise their individual objectives, learning plans and evaluation criteria. In the second phase, the training team should select an appropriate management course for each employee. These courses should be selected from the range offered by the organisation that provides training to our company. The final phase will consist of a meeting with each manager to help them evaluate the attainment of their objectives and, in particular, their improved ability to create a positive working environment.

The cost of the training will be met by HR. It will amount to no more than £1000 per manager. This will include access to online training materials, the assessment fees and travel to the assessment centre.

### **Benefits statement**

We are convinced that training our managers in line with the proposed action will enable us to make significant improvements to working environments and eliminate grievances. The training will allow restaurant managers to remedy the current situation by teaching them to adopt the management style that is most appropriate to their contexts and which reflects our core values. By the end of the training period they will be able to build better working relationships and communicate more effectively which, as a result, will increase staff motivation and productivity.

It could be argued that training is expensive and not the best use of the company's limited resources. It may also be suggested that an online course would be sufficient in these circumstances. This approach would be cheaper and would not require arrangements for the release of staff for the duration of the course.

However, such an approach would not be successful in this case. Team members are already under

considerable time pressures and to expect them to study in their own time is likely to provoke resentment. Such an approach may therefore prove ineffective in the long run. We recommend the proposed training course to the management team for approval.

**TASK:**

Write a proposal to the librarian in your university suggesting three books that should be added to the library. Explain their value to the students, give publication data and prices. Organize the proposal using clear, defining headings. Your proposal should have the following sections:

- a. Introduction and Problem Background
- b. Proposed Solution
- c. Benefits of the Proposed Solution
- d. Work plan (costs, suggested publishers and a timeline to procure the books) [20 marks]



## Workplace Problem-Solution Proposal

### Introduction:

ABC Corp faces considerable challenges: productivity falls short, an inexperienced workforce, and strained professional relationships. These issues pose significant threats to the company's market position and financial health. Low productivity hinders innovation, while inexperience jeopardizes quality and operational efficiency. Furthermore, strained relationships within teams can breed toxicity, impacting both teamwork and morale, ultimately risking market share and the company's reputation.

Recognizing the severity of these challenges, urgent action becomes imperative. This proposal addresses these issues, aiming to enhance productivity, encourage innovation, and strengthen professional relationships within ABC Corp. The aim is to address current issues and guide the company towards an innovative culture and stronger teamwork.

To achieve this, the proposal introduces various strategies: a Comprehensive Employee Development Program to improve skills, 'Idea Incubators' for promoting innovation, and Team Dynamics Workshops to enhance professional relationships. These initiatives aim to fix identified problems and rejuvenate ABC Corp for long-term success.

### Proposed Solution:

#### Employee Development Program

The first step of our proposed solution is the initiation of a Comprehensive Employee Development Program. This program aims to address the skill gaps in our workforce through a series of targeted training sessions, workshops, and mentorship programs. These initiatives are designed to cater to the specific needs of different departments and roles within ABC Corp, ensuring that each employee receives the most relevant and effective training. By focusing on both hard and soft skills, this program promises to elevate the overall competency and efficiency of our workforce.

We suggest the establishment of 'Idea Incubators' - dedicated spaces where employees can collaborate and brainstorm. Regularly scheduled 'Innovation Challenges' will be held to stimulate creative thinking and encourage employees to develop and present new ideas. These initiatives aim not just to foster a culture of innovation but also to make ABC Corp a more dynamic and forward-thinking organization.

The training programs can be conducted in-house or through external facilitators, depending on the specific needs and existing resources of the company. The cost of setting up 'Idea Incubators' can be minimized by repurposing existing spaces within the office. Moreover, 'Innovation Challenges' can be



integrated into regular work schedules, ensuring minimal disruption to daily operations while maximizing employee engagement and creative output.

### Team Dynamics Workshops

To improve professional relationships among employees, we propose implementing Team Dynamics Workshops and Interdepartmental Collaboration Projects. These initiatives are designed to enhance understanding and cooperation among different departments, thereby fostering a more harmonious and collaborative work environment. The workshops will focus on team-building, conflict resolution, and effective communication skills, crucial for nurturing a positive workplace culture.

The feasibility of improving professional relationships lies in the incremental implementation of these initiatives. Team Dynamics Workshops can be conducted as part of regular training sessions, thus requiring minimal additional resources. Interdepartmental Collaboration Projects can be integrated into existing project management frameworks, ensuring that they complement rather than disrupt ongoing work. The benefits of these initiatives are manifold, including reduced conflict, enhanced teamwork, and a more engaged and motivated workforce.

## Implementation Plan:

### Workflow:

#### Initial Assessment and Planning Phase:

- Conduct a thorough assessment of current employee skills, creativity levels, and the state of professional relationships. This includes surveys, interviews, and performance reviews.

#### Design and Setup Phase:

- Develop tailored training modules focusing on both technical and soft skills.
- Establish 'Idea Incubators' – creative spaces equipped for brainstorming and innovation.
- Plan Team Dynamics Workshops focusing on improving professional relationships.

#### Implementation and Launch Phase:

- Roll out the training modules across various departments.
- Launch the first 'Innovation Challenge' to kickstart creative thinking.
- Conduct the initial series of Team Dynamics Workshops.

#### Ongoing Execution and Collaboration Phase:

- Continuously monitor and adapt training programs based on feedback.
- Regularly organize 'Innovation Challenges' and encourage ongoing use of the 'Idea Incubators'.
- Facilitate Interdepartmental Collaboration Projects to enhance teamwork.



#### Evaluation and Adjustment Phase:

- Conduct regular evaluations of all initiatives to assess impact and areas for improvement.
- Gather feedback from employees and management to refine and adjust programs.

#### Budget Breakdown:

Estimated Year 1 Cost: \$6,000

Training Resources: \$2,500

- This includes the cost of creating and sourcing materials for the various training modules, both for technical and soft skills. It covers printed materials, digital resources, and access to online training platforms.

Setup of 'Idea Incubators': \$1,500

- Allocation for setting up creative spaces within the existing office environment. This budget will cover the cost of basic furniture (e.g., tables, chairs), whiteboards, projectors, and other brainstorming tools.

Facilitator Fees: \$1,500

- Covers the cost of hiring external facilitators for specialized training sessions and workshops. This includes Team Dynamics Workshops and sessions on innovation and creativity.

Materials for Team-Building Exercises: \$500

- This budget is allocated for materials needed for team-building activities. It includes supplies for exercises conducted during workshops and any additional resources needed for interdepartmental collaboration projects.

#### Conclusion:

In response to ABC Corp's challenges, the proposed Employee Development Program and Team Dynamics Workshops provide a comprehensive solution. With a \$6,000 investment in the first year, the company can address skill gaps, enhance creativity, and strengthen teamwork. This ensures the foundation for positive transformation for the employees. It guarantees not only their professional growth but also sustained competitiveness in the market.

# Writing Proposals

There are three types of proposals:

1. Business Proposals
2. Workplace problem-solution proposals
3. Academic research proposals

## 1. Business Proposals

1 Read the information box and the summaries of the three parts of a business proposal (a–c). Then read the sections (A–C) of the model proposal. Match these to the three summaries, then put them in a logical order 1–3.

In a business proposal, a company tries to win a contract from a client by showing that it understands the problems the client faces, that it can offer solutions to those problems, and that it has the experience and market knowledge to be trusted.

- a) The problem statement In this section, the proposal shows an understanding of the problems the client faces.
- b) The proposed solution In this section, the proposal offers expert solutions to all the problems.
- c) The promise of reliability In this section, the proposal makes a statement of your company's credentials, experience, knowledge, reliability and costs.

### UNIVERSAL OFFICE SOLUTIONS

A) It is strongly recommended that *Ostrich Publications* promotes its products on all of the major social media channels. However, that is just a first step on the road to an effective marketing strategy. While showing the products on social media platforms is all well and good, it is vital that the company creates a revitalised brand that is more suited to being promoted on social media platforms. Notwithstanding the company's wide range of publications, few of them are obviously adapted to this new and expanding market. It is clear that this has to change.

A marketing campaign must be created which engages with its young audience. In order for this to be successful, it is essential that *Ostrich Publications* acquires fans, followers and subscribers. Moreover, it is advisable to make connections with subscribers by inviting them to join in particular discussions or attend specific events. The purpose of this is not only to promote *Ostrich Publications*, but also to gather useful feedback from the target audience.

B) At *Universal Office Solutions*, we pride ourselves on our expertise in the growing sector of social media marketing. In contrast to other marketing solution providers, we have experts worldwide who have unrivalled experience in dealing with the marketing problems of evolving businesses in a wide variety of contrasting sectors. For further details and a breakdown of costs please contact our head office.

C) Although *Ostrich Publications* continues to be a significant player in the world of magazine publishing, it is beginning to lose market share. This is a consequence of the company's reliance on a traditional approach to marketing. In today's digital world, it is necessary to make the leap to social media marketing. Our research shows that rival publishing companies have increased their market share by 10 to 20% as a direct result of adopting social media marketing techniques. It is likely that this trend will continue.

## 2 Following is a website proposal.

### 1. Introduction

Thank you for the opportunity to submit a proposal for the redesign of the Sample Company website. Working together, I believe we can create a site that is simple to navigate and has a professional yet welcoming design. Based on our preliminary discussion at your office, I have identified and listed below the Needs and Solutions that we will want to address in this project.

Sample Company needs a website to reach out to the community and also to serve and support the current Sample Company clients. Furthermore, Sample Company needs a website that can be maintained by a Sample Company employee, without the need to regularly employ Sunny Web Shops to make changes. The Sample Company employee needs to be able to add and revise both text and photos and additional pages if necessary.

### 2. Proposed Solution

Sunny Web Shops will provide Sample Company with a fresh new web design that is easy to navigate and provides useful information to current subscribers. The design will also convey to potential subscribers that Sample Company is a professional, reliable company.

The design will integrate the current logo and color palette so it will maintain a familiar look to current subscribers, but will at the same time show them that Sample Company is improving its web presence in order to serve them better.

#### 2.1 Content Management System

Central to the new design from Sunny Web Shops will be a robust Content Management System (CMS) that will allow Sample Company to make changes easily to the website, without requiring a dedicated workstation or additional software. Not only will the CMS save Sample Company website revision costs but it will also ensure that the website stays fresh and up to date.

#### 2.2 Website Organization

The new design will have five main landing pages:

- Home Page
- About/Contact
- Gallery
- Portfolios

- **Blog**

These five pages will be "hardwired" into the new design by Sunny Web Shops and links to them will appear in the horizontal menu bar at the top of the page (below the logo and other header content). On each of these pages, we will include a left-hand column that Sample Company can use to create links to as many "subpages" as they wish. Therefore, the CMS allows for as many pages as necessary, without incurring additional cost beyond the original design and landing pages fee.

### **3. Workflow**

#### ***3.1 Preliminary Design***

Working in conjunction with Sample Company, Sunny Web Shops will provide Sample Company with a preliminary design concept for the new website. That design concept will include the basic layout, color palette, font choices, etc.

Sample Company can at that point request one round of design revisions within the scope of the Fee Schedule (see below). If more revisions are deemed necessary at that point by Sample Company, the work will be done at our hourly rate of \$40. (This is rarely necessary, especially for a simple website project such as this, but if necessary will be discussed fully before any fees are assessed.)

#### ***3.2 Integration of Content Management System***

Once the design is approved, then Sunny Web Shops will incorporate the Content Management System into the design.

#### ***3.3 Training***

Sunny Web Shops will then run a two-hour training session with Sample Company employees, showing them how to use the Content Management System. This can be done on site or online.

#### ***3.4 Launch***

When Sample Company has finished incorporating all the content they wish to have at launch, they will ask Sunny Web Shops to move the website from the development sub-directory to the main root level of the domain, thereby making the site go live. Congratulations!

### **4. Fee Summary**

Website Design and Setup	\$395
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Includes:

- work with client to create a custom website interface - layout, colors, and fonts
- set up website architecture and navigation system
- implement nameplate/logo placement and design
- create website mirror for beta testing purposes
- integrate content management system

Website Pages - 5 @ \$40	\$200
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Using the webpage template developed during the initial design phase, this includes

integration of the main landing pages into site architecture and navigation:

- Home Page
- About/Contact
- Gallery
- Portfolios
- Blog

\$0

Free One Year Hosting

As part of our current CMS package, we are offering a free first year hosting.

\$0

Free Domain Name Registration

As part of our current CMS package, we are offering a free one year domain name registration.

**Project Total \$595**

**5. Fee Schedule**

If Sample Company wishes Sunny Web Shops to go forward with the project, here is the schedule for payments of the fee:

- 50% due upon acceptance of the proposal before work commences
- 25% due upon delivering the completed design with the content management system in place
- 25% plus any incurred additional hourly fees no later than 30 days from when the completed design was delivered to Sample Company

Sunny Web Shops will launch the website when requested, providing that there is no balance due.

**6. Terms and Conditions**

Once project fee is paid in full to Sunny Web Shops any elements of text, graphics, photos, contents, trademarks, or other artwork furnished to Sample Company for inclusion in website are owned by Sample Company.

Sunny Web Shops assumes Sample Company has permission from the rightful owner to use any images or design elements that are provided by Sample Company for inclusion in the website, and will hold harmless, protect, and defend Sunny Web Shops from any claim or suit arising from the use of such elements.

Sunny Web Shops retains the right to display graphics and other Web content elements as examples of their work in their portfolio and as content features in other projects. Sunny Web Shops also retains the right to place a discreet text link at the bottom of the website page(s). The agreement contained in this contract constitutes the sole agreement between Sample Company and the Sunny Web Shops regarding all items included in this agreement.

**7. Next Steps**

To proceed with this project, Sample Company is required to take the following steps:

- Accept the proposal "as is" or discuss desired changes. Please note that changes to the scope of the project can be made at any time, but additional charges may apply.
- Finalize and sign contract.
- Submit initial payment of 50% of total project fee.

Once these steps have been completed we will begin the project.

### Examples of Our Work and References

You can see a list of some of the current websites designed and developed by Sunny Web Shops here:

<http://sunnywebshops.com/work.php>

References are available upon request.

### Exercise

3 You work for *High Street Solutions*. Read the information about *Lemon Bookshop* and write an business proposal for it to suggest an e-bookshop.

### Lemon bookshop

- a. Traditional family-run shop selling fiction and non-fiction books
- b. Need to diversify to reflect changing trends in the book-buying industry
- c. Need to have website where customers can browse and order books

# BUSINESS PROPOSAL SAMPLE

## 1. Introduction

The exponential growth of e-commerce platforms like Daraz has redefined consumer behavior. With an upsurge in online transactions and user interactions, the need for efficient, personalized, and round-the-clock customer service has become increasingly vital. However, traditional customer support systems often struggle to keep pace with this surge, resulting in delayed responses, inefficiencies, and inconsistent service quality. This discrepancy between growing user expectations and available support resources poses a significant challenge for e-commerce enterprises like Daraz.

Our proposal addresses this pressing challenge by introducing cutting-edge AI-powered chatbots onto Daraz's website. AI chatbots are intelligent software programs that use machine learning algorithms and Natural Language Processing techniques to understand user queries in natural language and respond with relevant, context-aware answers. These bots continually learn from interactions, adapting and improving their responses over time. These chatbots are designed to mimic human-like interactions and provide instant, accurate responses to customer inquiries, product information, and troubleshooting assistance. They can efficiently handle multiple queries simultaneously, providing a seamless and personalized customer experience. With hands on experience on AI solutions and a comprehensive understanding of e-commerce dynamics position us as a reliable partner to elevate Daraz's customer service standards.

## 2. Proposed Solution

### 2.1. Seamless Integration:

Our proposal revolves around a seamless integration of AI-powered chatbots into the structure of Daraz's website. These chatbots, developed by our team, will seamlessly merge into the website interface, strategically positioned to enhance the user experience without disrupting the browsing or purchasing journey. The core engine of these chatbots lies in their utilization of state-of-the-art Natural Language Processing (NLP) algorithms. This technology empowers the chatbots to comprehend and respond to user queries in real-time, simulating human-like conversations. Through NLP, the chatbots can interpret language, understand intent, and deliver precise and contextually relevant responses.

## ***2.2. Enhanced User Assistance:***

These AI chatbots serve as virtual assistants stationed across Daraz's website, offering comprehensive assistance. From providing immediate answers to common queries, offering product details and specifications, to guiding users through the purchasing journey, the chatbots aim to elevate customer satisfaction by reducing delay and enhancing convenience.

## ***2.3. Customization and Personalization:***

Recognizing the significance of brand identity, the AI chatbots will be carefully customized to reflect Daraz's brand voice and standards. This customization ensures that every interaction with the chatbots aligns with Daraz's values, creating a consistent and reassuring experience for users, thereby reinforcing brand loyalty. Moreover, these chatbots will not be static; instead, they will possess machine learning capabilities that enable continuous improvement. By analyzing user interactions and preferences, the chatbots evolve, becoming increasingly adept at providing personalized recommendations and assistance. Over time, they learn from past interactions, allowing for more accurate predictions of user needs and preferences.

## ***2.4. 24/7 Support and Multilingual Capabilities:***

With their capacity to operate continuously, users will have access to support at any hour, addressing inquiries and concerns irrespective of time zones or working hours. Moreover, these AI chatbots break language barriers by supporting multiple languages. This inclusive approach creates engagement with a diverse customer base, catering to linguistic preferences and enhancing the overall accessibility of Daraz's services.

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## ***3. Workflow***

### ***3.1. Integration Planning***

Our approach involves collaborating closely with Daraz's technical experts to comprehensively analyze the website structure, user journey, and customer behaviour, facilitating a customized integration plan. Additionally, our team will align the chatbot interface with Daraz's branding guidelines, ensuring a consistent and seamless user experience throughout the website interaction.

### ***3.2. Development and Implementation***

Our team will initiate AI chatbot development, carefully configuring and training them with Daraz's product information, FAQs, and support guidelines to ensure accurate and relevant responses. Simultaneously, thorough integration testing will be conducted, assessing the chatbots' functionality, responsiveness, and integration with Daraz's website across various devices and browsers to guarantee optimal performance.

### ***3.3. Deployment and Optimization***

During the deployment phase, AI chatbots will be gradually introduced onto specific sections of Daraz's website. This phased approach allows for closely monitored performance evaluation and fine-tuning, ensuring a smooth transition before full implementation. Post-implementation, our team will engage in continuous monitoring of chatbot interactions, actively gathering user feedback, and employing iterative improvements using machine learning algorithms to enhance their efficiency and accuracy continually.

### ***3.4. Training and Support***

We'll provide comprehensive training sessions to Daraz's support team, ensuring they understand the chatbots' capabilities, allowing them to assist when needed, and enhancing the overall customer experience. Furthermore, our dedicated technical support team will remain steadfast in providing continuous assistance, ensuring smooth operations, and swiftly addressing any potential technical issues that may arise, thus upholding a consistent and reliable user experience.

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# BUSINESS PROPOSAL SAMPLE

## INTRODUCTION:

In the rapidly evolving landscape of e-commerce, the need for innovative solutions to enhance customer interaction has become more crucial than ever. Traditional methods of customer support are often time-consuming and resource-intensive. In this context, the incorporation of AI chatbots emerges as a transformative solution, offering unparalleled advantages to businesses seeking a competitive edge in customer service.

For an e-commerce giant like our imaginary company, the imperative to adopt AI chatbots is highly crucial. The exponential growth of online transactions has led to an increased volume of customer inquiries, ranging from product inquiries to order tracking and support issues. This surge in demand necessitates a scalable and efficient solution to provide timely and accurate responses, ensuring customer satisfaction and loyalty.

The incorporation of AI chatbots offers our client a host of advantages. First and foremost, it enhances the customer experience by providing instant, 24/7 support, addressing queries promptly and boosting overall satisfaction. Moreover, the cost-efficiency of automating routine queries reduces the need for an extensive human customer support team, leading to significant cost savings. As the business expands, the scalability of AI chatbots ensures consistent service quality, positioning our client for sustained growth.

Failure to integrate AI chatbots exposes our client to several threats. Customer frustration may mount due to delayed responses and an inability to meet increasing support demands, adversely impacting brand perception. Additionally, relying solely on human agents for customer support could lead to escalating operational costs as the need for a larger support team becomes unavoidable. In a competitive industry where customer service is a key differentiator, the failure to adopt innovative solutions may result in a significant disadvantage compared to competitors leveraging advanced technologies.

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## **PROPOSED SOLUTION:**

Our innovative AI chatbot solution is poised to revolutionize the customer interaction landscape for our client. These intelligent chatbots are driven by cutting-edge natural language processing and machine learning algorithms, granting them the capability to comprehend and respond to customer queries with remarkable accuracy. This transformative technology aims to redefine how our client engages with their customer base, ensuring a seamless and efficient communication process.

The primary purpose of our AI chatbots is to enhance and streamline customer interactions. Our AI chatbots are engineered to revolutionize user interactions with their adeptness in comprehending and responding to queries in a conversational manner, thereby significantly enhancing the overall user experience. Their multi-functionality is a standout feature, seamlessly facilitating tasks from order tracking to delivering personalized product recommendations. This versatility reduces dependence on human intervention, resulting in heightened operational efficiency. Moreover, the integration capabilities of our chatbots ensure a cohesive workflow by seamlessly connecting with existing customer support systems and databases. This integration not only streamlines the customer support process but also provides a unified and holistic approach, contributing to an overall improvement in operational efficiency and customer satisfaction.

Customers utilizing our AI chatbots stand to gain a multitude of advantages. With round-the-clock availability, our chatbots ensure instant responses, fundamentally shaping a positive brand perception and meeting the dynamic expectations of today's online consumers. The personalized interactions facilitated by leveraging advanced analytics contribute to an enhanced shopping experience. By analyzing user preferences and purchase history, our chatbots deliver tailored recommendations, fostering customer loyalty and satisfaction. Moreover, the seamless and swift resolution of common issues minimizes customer effort and frustration, allowing human agents to focus on more complex queries. In essence, our proposed AI chatbot solution not only signifies a paradigm shift in customer interaction but also positions our client at the forefront of technological innovation in the fiercely competitive e-commerce landscape.

## **Work Flow:-**

Our pricing model is designed to align with the client's needs and usage patterns. We offer a tiered pricing structure based on the volume of interactions and the level of customization required.

Our fee schedule offers a range of options to cater to diverse business needs. The Basic Package provides entry-level pricing suitable for businesses with moderate customer interaction, ensuring cost-effectiveness for those with less extensive support requirements. The Premium Package is tailored for high-traffic e-commerce platforms, offering a robust solution designed to meet the demands of extensive customer support needs. For clients with unique requirements, our Custom Solutions cater to those seeking specialized features or integration with proprietary systems, providing a flexible and tailored approach to address specific business challenges. This tiered structure ensures that businesses can select a pricing plan aligned with their individual needs and scale of operations.

The next steps in implementing our AI chatbot solution involve a strategic and collaborative approach. Initiating with a consultation, we schedule dedicated sessions to thoroughly comprehend the client's specific requirements. This phase serves as the foundation for customizing the AI chatbot solution to precisely meet the unique needs and objectives of the client. Moving forward, the implementation phase entails the development of a phased plan, meticulously designed to facilitate a seamless transition with minimal disruption to existing operations. This approach ensures that the integration of AI chatbots is executed in a systematic manner, optimizing effectiveness. Following implementation, our commitment extends to providing comprehensive training for client teams. This training equips them with the knowledge and skills necessary to leverage the full potential of the AI chatbots. Furthermore, our ongoing support ensures that the performance of the chatbots is continuously optimized, adapting to evolving needs and maximizing the long-term benefits of the solution for our client. This holistic approach to consultation, implementation, training, and support ensures a collaborative and successful integration of our AI chatbot solution into the client's operational framework.

## CORRESPONDENCE

Correspondence includes

- Letters
- Memos
- E-mails

Readers

- Readers usually react emotionally to correspondence.
- They can be one person or more than one person.

It is very important to consider tone and organizational strategy from the perspective of how your readers will respond emotionally as well as logically.

Writing Process

Correspondence calls for the implementation of the same principles and practices in the writing process as is necessary for other genres of writing. Give the same careful attention to readers, purpose, context, pre-writing, drafting, and editing that you do in all writing.

Letters:

Letters are written primarily to people outside the organization and cover a variety of situations, such as,

- Requests
- Claims
- Adjustments
- Orders
- Sales
- Credit
- Collections
- Goodwill messages
- Announcements
- Records of agreements
- Follow-ups to telephone conversations
- Transmittal of technical documents
- Job applications

Memos:

Memos are written primarily to people inside the organization. With the exception of job applications, memos cover the same topics as letters. In addition, many internal reports, such as, trip reports, progress reports, and short proposals may take memo form.

## E-mails:

E-mails allow transmission of letters, memos, and other documents. Millions of people use e-mails today because of speedy transmission. Managers can reach dozens of employees quickly. In very formal and crucial scenarios, e-mails must be used with caution.

## Essentials of Business Correspondence:

- 1. Developing Effective Tone:** Business correspondence should have a tone that sounds natural and conveys cooperation, mutual respect, sincerity, and courtesy. Create a pleasant and cooperative tone in your correspondence.
- 2. Natural language:** Use simple, clear, and natural language. Avoid using old-fashioned phrases that sound artificial.

Out-of-date	Natural
Attached hereto.....	Attached is....
We beg to advise.....	We can say that.....
Hoping for the favour of the reply.....	I hope to hear from you.....
As per your request.....	As you requested.....
Prior to receipt of.....	Before we received.....
The undersigned will.....	I will.....

- 3. Positive Language:** Keep the emphasis on positive rather than negative images. Stress on the positive rather than negative aspects of a situation.

*Negative:* When I received your complaint, I checked our records.

*Positive:* When I received your letter, I checked our records.

*Negative:* I am sending a replacement for the faulty coil.

*Positive:* I am sending a new coil that is guaranteed for one year.

*Negative:* Do not let carelessness cause accidents in the testing laboratory.

*Positive:* Please be careful when handling explosive compounds.

- 4. You-Attitude:** The you-attitude refers to the point of view a writer takes when looking at a situation as the reader would. Information is presented from the standpoint of how it will affect or interest your reader.

*Writer Emphasis:* We are shipping your order on Friday.

*Reader Emphasis:* You will receive your order by Monday.

*Writer Emphasis:* I was pleased to hear that the order was completed.

*Reader Emphasis:* Congratulations on successfully completing the project.

For you-attitude, do the following:

- Emphasize reader's benefits in a situation.
- Be pleasant.
- Offer a helpful suggestion or appreciative comment when possible.
- Do not choose insulting or words for your readers.

## **Components of a Letter and the Format:**

### **Date Line:**

Spell out the names of the months. Write your address above the date line.

1290 W. Fairway Street

Dayton, OH 4556-9897

May 12, 2001

12<sup>th</sup>, May, 2001

### **Inside Address:**

Place the reader's full name, title, company, and address 2-8 lines below the date. Avoid abbreviations and short forms.

### **Salutation:**

The salutation or greeting appears two lines below the inside address. In business letters, the salutation is always followed by a colon. When writing to a group or to a particular company position, use descriptive titles in salutations. For example,

Dear Members of Committee:

Dear Project Director:

Dear Customer:

When writing to a company department, use an attention line with no salutation. Begin the letter two lines below the attention line:

Stanford Electric Corporation

Plaza Tower

Oshkosh, WI 54911-2855

Attention: Marketing Department

According to our records for 1999.....

### **Omit Salutations:**

When writing to a company without directing the letter to a particular person or position, omit the salutation and begin the letter three lines below the inside address:

Stanford Electric Corporation

Plaza Tower

Oshkosh, WI 54911-2855

According to our records for 1999.....

**Use Subject Lines:**

Some writers prefer to use subject lines in letters to identify the main topic immediately. A subject line may also include specific identification, such as an invoice number, date of previous correspondence, or a shipping code.

Dear Ms. Valdez:

Subject: International Expo 2001

As you know, when the first contracts were.....

**Body:**

The body of a letter is typed single-spaced and double-spaced between paragraphs. It begins by telling why the writer is writing the letter. It explains all relevant points. It summarizes and ends with polite and standard expressions used to promote goodwill.

**Conclusion:**

It appears as a separate paragraph consisting of standard expressions.

**Complimentary Closing:**

It is two lines below the conclusion. Standard expressions along with the scenario in which they are used are indicated below:

Very truly yours [Formal/American]

Yours truly [Less formal/American]

Yours sincerely [If the addressee is addressed by name]

Yours faithfully [If addressee is addressed as Sir or Madam]

Yours respectfully [Shows power of the addressee over you]

**Signature, Name, and Position of the Writer:**

Sign before writing your name and designation details.

**Note:**

1. If the writer is not the typist, then place your initials in capital letters and the typist's initials in lowercase letters with the left margin two lines below the signature block. For example:

JSV:mt or JSV/mt

2. Next, if you are sending materials or documents with your letter, add an enclosure notation two lines below the typist's initials. For example,

Enclosure or Enclosures (2) or Enc: Photocopy of Cheque # 1023

3. If your letter consists of more than one page, do the following:

Or

Ms Sally Queen

-2-

July 23, 1998

**1 Read the three emails below and comment on their level of formality.**

Dear Ryan  I am writing in response to your message on my voicemail. I'd be delighted to give a talk to your business students on the subject of Modern Management Practices. I'd be grateful if you could send me any days and times you have in mind so we can finalise the exact date.  I look forward to hearing from you.  Best regards Corinne	Hi  I'm afraid my plane is delayed by two hours. Can you pick me up at around 2 instead?  See you soon. (I hope!)	Dear Mr Baker  With regard to your interest in the position of IT assistant, please find attached the full job description and application form. Please note that the closing date for applications is the 30th of this month. Unfortunately, due to the expected high number of applications for this post, we are only able to reply to those applicants who have been shortlisted. We thank you for your interest.  Yours sincerely  Alan Johnson
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**2 The verbs 1–10 tend to be used in more formal correspondence. Match the formal verbs 1–10 to the less formal verbs in the box.**

need	tell	change	say	sorry	get	ask	about	ask for	help	stop	give
------	------	--------	-----	-------	-----	-----	-------	---------	------	------	------

- |             |             |
|-------------|-------------|
| 1 inform    | 6 enquire   |
| 2 request   | 7 alter     |
| 3 apologise | 8 terminate |
| 4 receive   | 9 require   |
| 5 assist 1  | 0 provide   |

**3 How many of the verbs 1–10 have a noun form? e.g. inform – information**

**4 Find expressions in the texts in Exercise 1 to complete the table.**

	Formal	Informal
Opening	1 _____	Hello 2 _____
Reason for writing / Reference	Further to your letter ... 3 _____ 4 _____	It's about ...
Enclosure or attachment	I'm enclosing 5 _____	Here is ...
Give good news	We're happy to inform you that ... 6 _____	Good news!
Apologise / Give bad news	Sadly ... 7 _____ We regret to inform you that ...	Sorry but ... 8 _____
Request	Would it be possible for you to ...? 9 _____	Could you ...? 10 _____
Thanks / Refer to future contact	11 _____ 12 _____	13 _____ 14 _____
Closing	Kind regards Yours 15 _____	Bye Love

### SAMPLE POSITIVE BUSINESS MESSAGES

Dear Sir:

Translation Brochure

I should be grateful if you would send us your brochure and price list about your translation services.

We are currently developing our sales literature and web sites and are interested in translating these into five languages apart from English.

I look forward to hearing from you.

Yours faithfully

Dear Mr. Doe,

I am writing to ask whether it would be possible for you to provide a reference for me.

If you were able to attest to my qualifications for employment, and the skills I attained during my tenure at ABC Company, I would sincerely appreciate it.

I am in the process of seeking employment and a positive reference from you would enhance my prospects of achieving my career goals.

Please let me know if there is any information I can provide regarding my experience to assist you in giving me a reference. I can be reached at [jsmith@abcd.com](mailto:jsmith@abcd.com) or (111) 111-1111.

Thank you for your consideration.

Sincerely,

Dear Professor Milton:

On behalf of the North American Society for Computers and Learning in Secondary Education, we would like to recognize and thank you for your valuable assistance with our recent annual conference, held in Boston, in May of this year.

We very much appreciate that you gave freely of your time to assemble and organize the panel on Demystifying the Major Search Engines. You may be interested to know that the overall conference survey results were very positive, particularly with regard to the panel discussion itself. We recognize that the contribution of that panel was a key event at the conference and will figure prominently into the summary of proceedings which we will publish next month.

For your information, I have attached a few of the comments we received about your panel from the survey of conference participants.

We trust that you enjoyed your time at the conference and we certainly look forward to your participation in next year's event.

Sincerely,

Dear Mabel

I am proud to let you know that the 30 day leave of absence that you previously requested has been approved.

Starting on July 1st, 2009, you will be able to take 30 consecutive days off, while still collecting 25% of your pay. Before you leave, you will be required to train an intern to complete your job for the duration of 3 days. Upon the completion of your 30-day absence, you will return to work in your normal capacity. Your full salary will resume the day you return to work.

Everyone here at Evergreen Corporation wishes you the best of luck while you participate in a humanitarian mission to Cuba, and we eagerly await your return!

Sincerely,

John Treliving  
Evergreen Corporation

On March 17 I ordered a box of letterhead stationery for our central office in Springfield. We received your shipment within one week, but the letterhead carried another firm's address.

I am returning the stationery under separate cover, with the needed correction noted. I will appreciate your sending me the correct stationery as soon as possible. Also, I trust you will credit my account with \$4.86, the cost of returning the stationery.

Thank you for your attention to this matter.

Emporium Tea Ltd.  
Golf Club Road, Tongi, Gazipur

25th July, 04,

Manger  
State Tea Corner  
25, Dhanmondi, Dhaka-1211

Ref: Your letter dated July 21, 2015

Dear Sir,

We have received your letter of complaint dated July 21, 04 regarding shortage of quantity. It is probably first time that we get such complaint from a customer regarding shortage of quantity.

Where as you are our valued customer, we cannot deny any human error made by our dispatch workers. As a large concern in the country, we have to deal with large quantity each day and therefore a sudden error is possible. We therefore, are dispatching the shortage quantity as per your order.

We expect your co-ordination as before.

With thanks.  
Yours faithfully

Salam Ahmed  
Sales Manager  
Emporium Tea Ltd.

## **Negative news letters:**

Sometimes, your letter, memo, or e-mail contains "bad news" of some type--a rejection of a request for funding, a report that a project won't be completed on time, a notice that an order hasn't been shipped yet. In that case, you may need to adopt an indirect approach, one that strategically delays the bad news until your reader has been prepared to accept or deal with it in a positive way.

In this instance, organizing your message can be a bit more complicated and call for a bit more strategy. Think of situations in which you've had to communicate bad news orally--that someone has broken his or her arm at work, for instance. You generally don't go to that person's family and simply blurt out that their loved one has been hurt. You usually begin with something to soften the bad news a bit.

**For example**, you might begin by assuring them that their loved one is okay or is being taken care of. Then you might go on to explain the injury and what has been done and so forth. That bit of reassurance in this case is called the buffer--material designed to postpone the bad news and to win trust.

### *Parts of Negative news messages*

Part	Example Message
1. Buffer	Thank you for your order. We appreciate your interest in our product and are confident you will love it.
2. Explanation	We are writing to let you know that this product has been unexpectedly popular with over 10,000 orders submitted on the day you placed yours.
3. Bad news + redirect	This unexpected increase in demand has resulted in a temporary out-of-stock/backorder situation. Despite a delay of 2-3 weeks, we will definitely fulfill your order as it was received at 11:57 p.m. on October 9, 2018, as well as gift you a \$5 coupon towards your next purchase.
4. Positive action closing	While you wait for your product to ship, we encourage you to use the enclosed \$5 coupon toward the purchase of any product in our online catalog. We appreciate your continued business and want you to know that our highest priority is your satisfaction.

Be careful with buffers. What you don't want to do is create the impression that you're delaying, or attempting to hide the negative message, or just offering a line of down. If there is bad news to communicate, you have to be honest in communicating it, and you need to get to it in a way that doesn't waste your reader's time. However, a well-placed paragraph, sentence, or just a phrase can go a long way toward softening the blow and helping readers realize that, even though the news is bad, you still have their best interests in mind.

## **Bad-news Message Buffer**

Begin with neutral or positive statements that set a goodwill tone and serve as a **buffer** for the information to come. A buffer softens the blow of bad news. The following are some possible buffer strategies:

- **Good news:** If there's good news and bad news, start with the good news.
- **Compliment:** If you're rejecting someone's application, for instance, start by complimenting them on their efforts and other specific accomplishments you were impressed by in their application.
- **Gratitude:** Say thanks for whatever positive things the recipient has done in your dealings with them. If they've submitted a claim that doesn't qualify for an adjustment, for instance, thank them for choosing your company.
- **Agreement:** Before delivering bad news that you're sure the recipient is going to disagree with and oppose, start with something you're sure you both agree on.
- **Facts:** If positives are hard to come by in a situation, getting started on the next section's explanation, starting with cold, hard facts, is the next best thing.
- **Understanding:** Again, if there are no silver linings to point to, showing you care by expressing sympathy and understanding is a possible alternative.
- **Apology:** If you're at fault for any aspect of a bad news message, an apology is appropriate as long as it won't leave you at a disadvantage in legal proceedings that may follow as a result of admitting wrongdoing.

## **Damage Repair:**

Before we move to the verbal and written delivery of the negative news message, we need to offer a word of counsel.

You want to avoid legal problems when communicating bad news. You cannot always predict how others are going to respond, but you can prepare for and deliver your response in ways that lower the risk of litigation in the following ways:

1. Avoid contradictions and absolutes.
2. Avoid confusion or misinterpretation.
3. Maintain respect and privacy.

The negative message checklist given below can help keep things in perspective. Before conveying a negative news message, ask yourself if you have:

### **Negative Message Checklist**

1. Clear goal in mind
2. Clear instructions from supervisor (legal counsel)
3. Clear understanding of message
4. Clear understanding of audience/renderer
5. Clear understanding of procedure and protocol
6. Clear, neutral opening
7. Clear explanation without admission of guilt or culpability
8. Clear statement of impact or negative news
9. Clear redirect with no reminders of negative news
10. Clear results with acceptance or action on negative news

**Exercise:** Read the following statements and choose the one that provides the best buffer.

- a. Thank you for contacting Amitron about a marketing position. I received hundreds of applications from qualified college graduates just like you.
- b. Thank you for your order for one hundred flat screen PC monitors. We appreciate your patronage and hope to continue serving you in the future
- c. We were happy to receive your recent request for a refund price of your new XJL copier, the model *Consumers Annual* ranked top for efficiency and customer satisfaction.

### **SAMPLE NEGATIVE MESSAGES**

We have enjoyed a positive and profitable working relationship between [reader's company name] and XYZ. Over the last \_\_\_\_ years, we have found your company to be a great help in fulfilling our clients' needs. Your assistance has been invaluable.

As you are aware, the economic climate is changing, and therefore we are forced to examine our current needs. Although we have enjoyed a successful working relationship in the past, we find that we are no longer in need of your services. This is no reflection of the quality of your goods - we are simply going in a different direction.

We greatly regret the ending of our working relationship. If the current situation changes, we will gladly contact your company in hopes of resuming our use of your services. We wish your company continued success.

~~phrase can go a long way toward softening the blow and helping readers realize that, even though the news is bad, you still have their best interests in mind.~~

#### ~~Damaged Control~~

~~Before we move to the verbal and written delivery of the negative news message, we need to offer a word of counsel. You want to avoid legal problems when communicating bad news. You cannot always predict how others are going to respond, but you can prepare for and deliver your response in ways that lower the risk of litigation in four ways:~~

- ~~1. Avoid abusive language or behavior.~~
- ~~2. Avoid contradictions and absolutes.~~
- ~~3. Avoid confusion or misinterpretation.~~
- ~~4. Maintain respect and privacy.~~

#### **SAMPLE PERSUASIVE LETTER**

Dear [Recipients Name],

The tax system review is of top priority for this year's agenda. As per my experience with the tax system, I would like to suggest that the level of taxation be reduced to an affordable amount. Value added taxes should also be more economically liberal. And most importantly, the tax system should be made more understandable to encourage the support and cooperation of the citizens.

I believe that the improvements that I stated earlier are beneficial to the majority and would most like gain support from the public. We are all one in our desire to maximize the taxes collected yet at the same time not leaving the people shortchanged.

Please do make the most of your intentions and efforts for an effective tax reform. Keep working on it as what you have promised during the campaign. I believe you are a man of integrity, and I look forward to the change that we have all been wanting to see in the government's tax system.

Sincerely,

Dear Ms. Powell

I am a senior at Forest View High School and am studying entrepreneurship. I recently saw an article in the newspaper about your new product and was fascinated by the story of how you got started.

To help us really get a feel for what entrepreneurs do, my teacher often asks local entrepreneurs to visit the classroom and tell their stories. The students love to hear from people who are out there already, doing what we are learning about in school. For all of us, visitor's day provides the best class of the week.

I was given an assignment to find a local entrepreneur and ask him or her to speak to the class. The date and time of this talk would be Friday, November 6, at 10:00 a.m. in room 110. We could arrange to have any necessary equipment, such as an overhead projector, available for the presentation.

We've never had a speaker from your field before, so it would be a thrill for us to hear from you. Please consider joining us on November 6 and telling us about your success. I look forward to hearing from you soon. You may reach me at 555-8467.

Sincerely

## Writing a Successful CV

When applying for a new position, your CV will convey an important first impression to your potential employer. They may be faced with hundreds of applications for one position, and you want yours to go straight into the pile destined for interview, not the one bound for waste paper.

CV stands for 'Curriculum Vitae', which is Latin for 'life story'. We review how best to convey yours.

Here are 10 initial rules to follow:

1. **Simplicity:** don't overcomplicate a CV with too many categories or too much information.
2. **Highlights:** make sure that your CV highlights all of your achievements in your career and personal life to date. Think of your CV as an opportunity to market yourself.
3. **Truthful:** you want to highlight your achievements, but you do not want to sound overly boastful, and you certainly should not fabricate information as this will become obvious to your employer at some point.
4. **Unique:** use a style and tone which are personal to 'you', but do so subtly. Be positive, direct, and personal. Use 'I' statements.
5. **Tailor:** the content of your standard CV should be customised according to each individual job application in line with the job description.
6. **Word Processed:** complete your CV on a word processor and ensure that as well as using a spell check, you have checked the document over for any typing mistakes or formatting errors. Avoid poor English or slang.
7. **Succinct:** be concise. Employers will not be impressed by several pages of useless information. Keep it short (ideally two, but a maximum of three pages) but do not squash information in – keep it well spaced so that it is easier to read. You should leave employers wanting to find out more.
8. **Chronological:** put the information in reverse chronological order with the most recent events first under each heading.
9. **Review:** ask the opinion of a respected colleague or manager. Get a second pair of eyes to critically review what you have written.
10. **Quality:** use good quality (not coloured), A4 paper and always choose an appropriate type font, to ensure that your CV looks as neat and professional as possible. It should not be packed with text, but have some white space. Bullet points are a good way of displaying text.

As well as following the above golden rules, adhere to the following format:

### Personal details

This section should include your name and contact information only. Do not offer details of your date of birth, place of birth, children, health or marital status, which could lead to discrimination.

### Personal profile

It is up to you whether or not you want to include this section. It is usually one sentence which provides a concise insight into who you are and your strengths/achievements to date.

Carefully consider this section. Many end up in clichés, such as 'I work well both individually and in a team', which become statements that employers just ignore. Instead, site tangible competency-based examples of things you have done and achieved. This will show and prove that you have the skills they are looking for rather than just saying it.

### Work history

Work experience starting with the most recent or most relevant. Try not to leave any gaps; although you may not have been in paid employment, it is likely that you were doing something at the time which you learned new skills from. For each previous position, include the job title, organisation worked for, dates employed, projects involved in, responsibilities, achievements and experience gained.

### Education

Again, start with the most recent (or most relevant) e.g. university and then work back from there. Don't outline in detail your GCSEs/O levels/Highers (or equivalent exams). You can group these together, for example, 9 GCSEs. You may wish to include membership of any professional bodies here or in a separate section.

## **Skills**

This section may come before the work history on your CV, if you believe this is appropriate. Include languages and computing skills, noting level of fluency and evidence of using them.

## **Hobbies/Interests**

Ensure that this section is kept up-to-date.

## **References**

Some people wish to include two references here. Try to pick two reliable contacts from two different sources. Include their contact details, job title and link to you. Alternatively, many applicants omit this information, or state that references are available on request. Make sure you ask permission from your referees to use them as a contact.

## **Tips**

You need to grab the attention of the reader quickly. You might like to do this by putting your personal details to the end of your CV (but keep your name at the beginning).

The most prestigious point on your CV is on the first page, just above half way down. Make sure you put important information here, such as your personal profile, or your skills description. Another good place is at the top of the second page. These are the places that will attract employers' attention when scanning CVs.

Remember, don't just state what you have done, but include the skills you have used along the way.

There are computer packages that can help you write your CV, or commercial companies that will charge you to produce a CV. However, be aware that these are very impersonal ways of producing your CV. You need your personality to show through, and to develop a unique style. Some employers say they can spot CVs produced by these means.

A CV should always be sent with a tailored covering letter.

## **Covering letters**

Covering letters are a vital part of your CV. It is the first thing potential employees will see, so if it is of poor quality, they can dismiss your application before they even get to your CV.

Your covering letter is where you should make your sales pitch. It should encourage employees to read on and persuade them that you are worth pursuing.

- Make sure you address the letter to the right person. This will either be given on the job advertisement, or you will have to do some research (e.g. looking at their website or telephoning the organisation).
- It should be no longer than one side of A4 and three to four paragraphs long. It should be written in the style of a business letter with your address and the address of the employee at the top.
- Don't just repeat what is in your CV. You should aim to give employees a flavour of what is on your CV, by highlighting more your skills than your background.
- Ask someone to proofread the letter for you.
- Format:
  - a) Introduce yourself.
  - b) State the job you are applying for and where you saw it advertised.
  - c) Explain why you are interested in the job and their organisation. Do some research around the organisation so you can include some specific information.
  - d) Outline what makes you perfect for the job. What is it about your unique blend of knowledge, skills and experience that makes you ideal?
  - e) Conclude the letter positively.

## **Speculative applications**

Speculative applications are a highly successful method of gaining access to the hidden job market. Jobs that are not advertised account for about 80% of the available vacancies.<sup>[1]</sup> If you can show employees that you are motivated and enthused enough by their organisation to contact them directly, you are in with a good chance of gaining a response.

You are also likely to stay on their books, so will be considered first when positions become available.

Your covering letter is vital to a good speculative application, and it will need a slightly different tone, i.e. persuasive. You should state why you are interested in their organisation, and what line of work you are interested in. You should show that you know about the organisation and highlight why your skills and abilities suit the line of work.

Research who you should contact, you will probably have to telephone the organisation to ask for the appropriate name. Conclude the letter by saying you will follow up this contact with a telephone call within a certain period.

Include your CV into the speculative application, and make sure you tailor it to the type of job you are looking for.

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[1] Brain Sutton, *Career Networking: The Insider Guide* (The Industrial Society, 2000).

#### **Related Items**

#### **Related Resources**

- Tailor Your CV
- The Good CV Guide

# School of Computer Science

## Sample Resumes

Freshman Sample Resume .....

Undergraduate Sample Resume .....

Senior Sample Resume .....

Graduate HCI Sample Resume .....

Graduate Computer Science Sample Resume .....

# Cocoa Touch

[ctouch@gmail.com](mailto:ctouch@gmail.com) | 844-555-0990

## OBJECTIVE:

An internship or research opportunity that will allow me to utilize my problem solving skills and attention to detail to further develop my abilities in the field of computer science.

## EDUCATION:

**Carnegie Mellon University**, Pittsburgh PA

Bachelor of Science in Computer Science, May 2018

**Walnut Hills High School**, Cincinnati, OH

Diploma with Honors, June 2014      GPA 4.0/4.0

## COURSEWORK:

Analysis I and II; Introduction to Programming; Concepts of Mathematics; Principles of Imperative Programming, Great Theoretical Ideas in Computer Science

## PROJECT:

Programming Homework: An Adventure Game (Fall 2014)

\*Created a text-based adventure game with a graphical interface in Python.

## EXPERIENCE:

\*Intern for Dr. Richard M. Males, Cincinnati OH (November 2013 -January 2014):

Assisted in the reformatting of Excel files for data analysis of expert reviews of flood rates and how they impact different building structures.

\*Tutor for middle school students with East End Youth Projects (Fall 2014-Present)

## TECHNICAL SKILLS:

Proficient in Python.

## ACTIVITIES:

CMU KGB, Fall 2014-Present.

Varsity High School Cross Country, Fall 2012-Fall 2013 (Team Captain, 2013).

Varsity High School Track, Spring 2012-Spring 2014

Junior Engineering Technical Society, 2012-2014.

## HONORS:

Carnegie Scholarship, Fall 2014-Present.

National Merit Scholar, 2014

National AP Scholar Award, 2004

Cum Laude Society, 2014

# May Trix

888-888-8881 | [mtrix@andrew.cmu.edu](mailto:mtrix@andrew.cmu.edu)

## EDUCATION

### CARNEGIE MELLON UNIVERSITY

#### B.S. IN COMPUTER SCIENCE

Pittsburgh, PA | Expected May 2018

## SKILLS

Java • Python • C • SML • HTML5 •  
CSS • Django • Android • LATEX • Git  
Data structures • Software design  
patterns

## COURSEWORK

Parallel and Sequential Data Structures and Algorithms  
Introduction to Computer Systems  
Software System Construction  
Great Theoretical Ideas in Computer Science  
Web Application Development  
Principles of Imperative Computation  
Principles of Functional Programming

## LINKS

Github://sumkit  
LinkedIn:// summerkitahara

## EXPERIENCE

### CARNEGIE MELLON UNIVERSITY, HUMAN-COMPUTER INTERACTION INSTITUTE | RESEARCH ASSISTANT

February 2016 - Present | Pittsburgh, PA

- Make Android and web apps for NavCog, a tool that uses sensors, computer vision, and crowdsourcing to help blind people move in spaces. Target crowdsourcing effort to create 3-D models of buildings and maintain sensors.
- June 2015 - August 2015 | Pittsburgh, PA
- Led 3 person team developing mobile and wear apps for Chorus, a web-based crowdsourcing conversational assistant. Has text to speech and speech to text capabilities. Uses Yelp Search and Yahoo APIs.
- Made a natural language processor tool to be added to Chorus web application.

### BUSINESS GOLF ACADEMY | SOCIAL MEDIA MANAGER

May 2015 - Present | Pittsburgh, PA

- Manage the social media presence for BGA, which encourages women to use golf to advance their careers. Tripled Twitter followers

## PROJECTS

### UMBRELLA | LEAD ANDROID DEVELOPER, GIT REPO MANAGER

February 2016

- App uses crowdsourcing to fight gender-based violence and the bystander effect. Bluetooth-based messaging where users anonymously post situation.

### BUDGIE | LEAD ANDROID DEVELOPER, GIT REPO MANAGER

September 2015

- App to manage and categorize expenses. Implements Microsoft's Oxford Optical Character Recognition API. Pie charts show spending distribution.

## ACTIVITIES

### WOMEN'S VARSITY GOLF TEAM | CAPTAIN (2014-PRESENT)

August 2014 - Present | Pittsburgh, PA

- Won Thomas B. Craig & LaVerne Craig Tartan Award 2015-2016 (Most Valuable Player), University Athletic Association All Association First Team, Eastern College Athletic Conference Rookie of the Month Division III, University Athletic Association Women's Golf Athlete of the Week (3 times)
- Student Athlete Advisory Council | September 2014 - May 2015

### WOMEN@SCS | MENTOR

September 2014 - Present | Pittsburgh, PA

- "Big sister" in the Big Sister/Little Sister mentoring program.

### THE FIRST TEE OF PITTSBURGH | VOLUNTEER GOLF INSTRUCTOR

September 2014 - Present | Pittsburgh, PA

- Teach golf and life skills to 20 underprivileged children ages 8-16 years

**Al Gorithm**  
**azg@cmu.edu | (918) 555-6197**

**OBJECTIVE**  
To obtain a professional position in the consulting industry utilizing my relevant experience, technical expertise, and problem solving skills.

**EDUCATION**

*Carnegie Mellon University, Pittsburgh, PA*  
Bachelor of Science in Computer Science, May 2016      GPA: 3.0

*Selected Coursework:* Data Structures (Java), Web Applications, Database Applications, Distributed Systems, Computer Systems (C and Unix), Great Theoretical Ideas in Computer Science

**SKILLS**

*Coding:* C/C++, Java, x86 assembly, C#, PHP, Javascript, HTML, CSS, SML, Ruby, Perl  
*Technologies/Environment:* Windows, Win32 API/GUI, Linux, MySQL, OpenGL, ASP.NET

**EXPERIENCE**

*Artemia Health Systems, Cleveland, Ohio*

Student Intern (Summer 2015)

- Created new functionality for state-level prescription drug information system
- Worked with end users to determine their information needs
- Wrote application to create custom surveys
- Migrated existing website from SQL Membership to ASP.NET

*Carnegie Mellon University Computing Services Help Center, Pittsburgh, PA*

Student Consultant (September 2013 – Present)

- Resolved issues regarding networking (wired, wireless, and dialup), and email problems for Carnegie Mellon University users
- Answered questions about software supported by the university, such as MS Office
- Communicated with customers through email, telephone, and face to face

**PROJECTS**

*Vintage Foundation (Fall 2014)* – a consulting project in a nonprofit organization

- Advised on new technologies to help further the organizational mission
- Instructed program director on building a user-friendly website and relational database
- Assessed systemic problems and suggested possible solutions

*News Delivery System (Spring 2014)* - online information gathering/presentation system

- Integrated old code with new for web application delivering custom tailored web news
- Coded in Java using Model-View-Controller architecture

*Ebarter (Fall 2013)* - an online bartering system running on Apache Tomcat

- Applied software engineering principles along with J2SE Web Development Kit
- Led team in coding phase of development

# U.X. (Dee) Sign

[www.uxsign.net](http://www.uxsign.net)  
uxsi@gmail.com  
(844)555-1905

## Work Experience

**MHCI Capstone with NASA**--Design Lead, Jan – Aug 2014 Collaborated with a team of masters students to design for NASA engineers and the International Space Station, designed and developed a mobile application and RFID tracking system.

**CMU School of Design**--Teaching Assistant, Aug – Dec 2013 Aided two professors in teaching 41 first-year design students the basics of design principles. Guided the students, answered questions, attended their class, and helped document their work.

**Apple**--Visual Interface Design Intern, Summer 2013

Created usable interactions. Designed user flows. Worked on new features with the iTunes Apps Design team. Ideated new interfaces.

**Penguin Group (USA)**--Design/Art Intern, June – Aug 2012 Designed e-book covers. Assisted cover designers with type- setting on book jackets. Proposed full book covers to art director.

**Branding Brand**--UX Designer, Fall 2014

Designed mobile sites and apps for major e-commerce brands. Analyzed client sites and provided recommendations to improve. Devised and implemented A/B tests and measured results. Oversaw design of new products from conception to launch

## Involvement

CMU Spring Carnival Head of Marketing, 2013 – April 2014 CMU School of Drama's Playground Designer, 2013, 2014 Counterpoint A Cappella President, Jan 2011 – Nov 2013 CMU CMU Orientation Leader, Aug 2011 – Aug 2013

## Education

**Carnegie Mellon University**  
Masters of Human-Computer Interaction, Dec, 2014

**Carnegie Mellon University**  
BFA in Communication Design, May 2014  
Double major in HCI  
3.76/4.0 GPA, with highest honors

## Recognition

Phi Kappa Phi Honor Society, Sept 2013  
Andrew Carnegie Society Scholar, Sept 2013  
School of Design Merit Award, May 2012  
Carnegie Mellon Dean's List 6/8 semesters

## Skills

**User Research:**  
Contextual Design  
Think Aloud  
Persona Design  
Storyboarding  
Heuristic Evaluation

**Design:**  
Sketch  
Photoshop  
Illustrator  
InDesign  
AfterEffects

**Prototyping:**  
HTML/CSS  
Javascript  
MATLAB  
Arduino

**MACK CROLANGUAGE**  
844-555-2626 | mackerol@gmail.com

**EDUCATION**

**Carnegie Mellon University, Pittsburgh, PA**  
*Master of Science, Computer Science, December 2015*

Selected Coursework: Introduction to Machine Learning (10-601, Fall 2014), Distributed Systems (15-440/640, Fall 2014), Algorithm Design and Analysis (15-451/651, Fall 2014), Web Apps Development (15-637, Spring 2015), Machine Learning with Large Datasets (10-605, Spring 2015), Graduate Artificial Intelligence (15-780, Spring 2015)

**Birla Institute of Technology and Science, Pilani, India**

*Bachelor of Engineering (Hons.), Computer Science (Minor: M.Sc. Economics), July 2014*

**SKILLS**

**Programming/Scripting Languages:** (Proficient) Java; (Familiar) Python, C, SQL, Javascript, MATLAB, Perl  
**Frameworks and tools:** Hadoop, Django, DKPro for NLP, Maven, Git

**EXPERIENCE**

**Software Engineering Intern**

*Yahoo! Inc., Sunnyvale, CA, May - August, 2015*

- Interned with the user data team, which is part of cloud services at Yahoo!

**Research Intern**

*Ubiquitous Knowledge Processing Lab, TU Darmstadt, Germany, January - June, 2014*

- Developed an application (in Java) using the DKPro library to automatically solve multiple choice reading comprehension questions. Using text similarity and textual entailment measures, it obtained the 2<sup>nd</sup> best score in the CLEF Entrance Exams competition.

**Research Student**

*Computer Engineering and Networks Laboratory, ETH Zurich, Switzerland, July - December, 2013*

- Developed an application (in Python) to use a tree-based learning algorithm to model the deadline hit and miss patterns of periodic real-time tasks. The algorithm used formal verification techniques to generate a regular language-based guarantee to predict future deadline hits and misses.

**Developer (Google Summer of Code)**

*Student Developer for National Resource for Network Biology (NRNB), Summer 2012*

- Built an app (in Java) for Cytoscape, an open-source software for complex network visualization. The app helped users to visually analyze and modify molecular interaction networks.

**PROJECTS**

**MapReduce Engine**

*Carnegie Mellon University, Fall 2014*

- Implemented a Hadoop-like MapReduce facility, with master and worker nodes for map-reduce operations over large datasets, with a distributed file system, and fault tolerance to address datanode failures.

**Object Recognition Using CIFAR-10 Dataset**

*Carnegie Mellon University, Fall 2014*

- As part of an in-class Kaggle competition, several approaches were tried to train a model using 4000 images for the CIFAR-10 dataset. With GIST descriptors and a Kernelized (RBF) SVM, a test accuracy of 61% was obtained on a dataset consisting of 15000 images.

**Intelligent Indoor Emergency Response System**

*Carnegie Mellon University, Spring 2015*

- Developed a priority-based auctioning algorithm for task allocation in a multi-agent environment. Using a modified A\* algorithm, tasks were prioritized based on proximity to the location of the fire resulting in an efficient evacuation.

# How to write a computer science internship cover letter

If you're interested in learning how to write a computer science internship cover letter, you can follow these steps:

## 1. Study the position's requirements and job description for keywords

Before you start writing a cover letter, it's helpful to study the job description and any other information you can gather about the position, so you know what the employer wants from candidates. Look for specific industry keywords you can include on your cover letter, like *hardware troubleshooting*, *data analysis*, or *software development*. These keywords not only help show a reader you're a qualified candidate but also appeal to digital hiring algorithms, which many employers use. These computer algorithms use keywords to shortlist resumes and cover letters as potential matches, which can help increase your chances of advancing to the interview step.

## 2. Create a letter outline and write your header

A letter outline is a simple tool that can allow you to write your letter more quickly and accurately. Letter outlines or templates are often available online with a simple search. Try searching with your specific job title, such as *computer science internship cover letter template* to help focus the results and provide some examples you can use as a reference. Using your outline, create a general idea of where you want to include your information, then write your header. This typically includes your first and last name, location, contact information, the name of the company, and the date.

## 3. Introduce yourself and your goals

In the first paragraph, greet the reader with a salutation and their full name. Then, state your excitement for the role and include the name of the role and company. For instance, you may write *I'm excited to announce my candidacy for the computer science internship with Gunther Computer Sciences*. In the next sentence, introduce yourself and explain how the job aligns with your career goals. You might explain how a computer science internship can help you advance to computer scientist by providing valuable experience. You can also explain what attracts you to that specific company.

## 4. Quantify your credentials or computer science accomplishments

In the body paragraph of your letter, you can explain why you feel you're the best match for the internship position by quantifying skills, experience, or accomplishments in computer science. Focus on specific accomplishments that highlight your core skills or proficiencies in different areas of computer science. For instance, you can focus on specific skills you're currently learning in your courses, like hardware development, programming, or software development. Differentiate this section from what's on your resume by making it more specific, so you're not providing duplicate information.

## 5. Write a conclusion and sign your letter

At the end of your letter, thank the reader for their time and restate your interest in the role. You can also quickly summarize your core qualifications here as a reminder of why you're a good candidate. Then, include a call to action to inspire the reader to follow through with an interview. You can say something like, Please call me at or You can e-mail me anytime at, followed by your preferred contact method and availability. Write a complimentary close to finish the letter and include your name or signature to make it more authentic.

It's also important to always proofread your cover letter to ensure it's both complete and error-free. This not only helps your letter feel more professional, but also ensures you're including the right information so an employer knows how to contact you. Remember that anything you include on a cover letter may become a discussion topic during the interview, so be precise and honest with your credentials and accomplishments so you can discuss them later.

*Dear Amy Gao,*

*I'm excited to introduce my candidacy for the computer science internship with Dearborn Computer Services, Inc. My name is Dan Keller, and I'm currently a computer science student at The Quebec Computer Learning Academy. I'm pursuing a bachelor's degree in computer science, and believe that an opportunity to work as an intern can grant me valuable skills and experience to help with my career goal of becoming a certified Computer Scientist. I understand Dearborn is one of the best computer manufacturers in Canada and an employer that cares about employee development.*

*I'm a third-year student with a record of excellence in the areas of computer engineering, software development, and data analysis. Twice in the last year, I've received recognition for developing new software for the computer science classroom, and received a 99% on my final exam in computer science. I'm passionate about computer science and spend much of my free time working on software and hardware to expand my knowledge.*

*Thank you very much for your time and consideration for the computer science internship role. As a third-year computer science student, this is currently the best opportunity available to me and I'm looking forward to hearing from you about the next steps in the process. You can reach me anytime at my e-mail, d.keller@email.com.*

*Sincerely,*

## Computer Science Intern Cover Letter Example 1

Dear [Hiring Manager],

I am writing to express my strong interest in the Computer Science Intern position at your company. With a degree in Computer Science from XYZ University and experience in software development, I believe I have the skills and passion necessary to excel in this role.

During my time at XYZ University, I gained a solid foundation in computer science concepts and programming languages such as Java, C++, and Python. I also participated in multiple hackathons and coding competitions, where I developed my problem-solving and teamwork abilities.

In my previous internship at ABC Company, I gained practical experience in software development by working on a project that involved designing and implementing a database management system. This project allowed me to apply my knowledge of database design and SQL to a real-world scenario, and I was able to successfully deliver the project on time.

In addition to my technical skills, I am a highly motivated and hardworking individual who is eager to learn and grow as a software engineer. I am confident that my skills and experience make me a strong fit for this internship and I am excited about the opportunity to contribute to your team.

Thank you for considering my application. I look forward to discussing my qualifications further and how I can contribute to your company as a Computer Science Intern.

### **Computer Science Intern Cover Letter Example 2**

Dear [Employer],

I am writing to express my strong interest in the Computer Science Intern position at [Company]. As a recent graduate of [University] with a Bachelor's degree in Computer Science, I am excited to apply my skills and knowledge to a real-world setting.

During my time at [University], I completed various coursework in computer programming, data structures, and algorithms. I also had the opportunity to work on a team project where we developed a mobile app for a local non-profit organization. This project allowed me to gain valuable experience in software development and team collaboration.

In addition to my academic experience, I have also completed internships at [Company 1] and [Company 2], where I gained hands-on experience in web development and database management. These experiences have further fueled my passion for computer science and have allowed me to develop a strong foundation in the field.

I am confident that my skills and experiences make me a strong candidate for this internship. I am eager to contribute my abilities to the team at [Company] and further develop my skills in the field. Thank you for considering my application. I look forward to discussing this opportunity further with you.

Sincerely,

## **Computer Science Intern Cover Letter Example 3**

Dear [Hiring Manager],

I am writing to express my strong interest in the Computer Science Intern position at your company. As a recent graduate with a Bachelor's degree in Computer Science, I am eager to apply my skills and knowledge in a real-world setting and gain valuable hands-on experience.

Throughout my academic career, I have gained a strong foundation in computer science principles and programming languages such as Java, C++, and Python. I have also completed several internships and projects that have allowed me to hone my problem-solving skills and work as part of a team. I am confident that my skills and enthusiasm will make me a valuable addition to your team.

In my current role as a Computer Science tutor, I have been able to develop my communication skills and work with a diverse group of students. I have also gained experience in time management and the ability to meet deadlines, which I believe are essential qualities in any internship position.

I am excited about the opportunity to join your team and contribute to the success of your company. Thank you for considering my application. I look forward to the opportunity to discuss my qualifications further in an interview.

Sincerely,

A memorandum (memo) is used to communicate something of immediate importance to people within a business or organization. A memo also can be sent to people or firms that have close or long-standing relationships, such as vendors or consultants. Like a business letter, a memo is a permanent record of your communication. It is used in both paper and electronic formats. Since you may know the people you are writing, a memo may appear less formal than a business letter, but it isn't. It is not a text message or blog posting, and it should not include emoticons, cartoons, or anything "cute." Be professional and polite.

### **When to Write a Business Memo**

Businesses and organizations may ask their employees or members to follow certain protocols for when to send a memo and even how to send it. These guidelines may explain when a paper version is required or when email is appropriate. These are some common workplace purposes for a memo:

- Announce or confirm a meeting or event
- Provide instructions
- Provide a status report on a project
- Request feedback or recommendations
- Summarize action required after a meeting
- Clarify or change a policy or procedure
- Distribute minutes or handouts from a meeting or event
- Notify others of a problem or that a problem was resolved
- Provide a short report of an event or decision

### **If You Use a Memo Template**

Be selective if you use a template to create your memo. Some templates display the word "Memo" in very large type, and the words in the memo are in a very small font size. The word "Memo" should not be the most noticeable part of the document, which is why that memo template may make a poor impression on others. Instead, select one that looks professional and is easy to read. The message—your words—are most important.

### **How to Format a Business Memo**

In the workplace, you may be required to use company letterhead or memo stationery or follow a specific electronic format. Type the memo single-spaced using a readable font and font size. Begin with a heading similar to those used in email transmissions (See Capital Industries sample below). The memo itself follows an A-B-C format. Even if a memo is one paragraph, it needs all three elements.

A = Abstract, which is the main point of the memo and sets the tone. Don't be mysterious; explain why you are writing in the first sentence.

B = Body, which provides relevant details. One or two body paragraphs are most frequently used, which is why you must choose only the most important details to share. You may use numbered lists (for items in a sequence or to indicate importance) or bullet points. If you are writing a long memo, use a few brief headings to divide the memo into logical sections.

C = Closing, which confirms the purpose and/or request, provides contact information, or states the follow-up.

If you send a paper version, the memo should be initialed next to your name as the sender. A memo also can be sent as an attachment to an email or as the email itself. Email memos usually do not require an electronic signature.

**CAPITAL INDUSTRIES**  
**1492 Washington Street ☙ St. Paul, Minnesota**

---

To: Jane Addison  
From: Mike Fitzgerald  
Re: New Application Forms  
Date: January 4, 2010

- Use full names; also use titles if you are writing to someone at a higher level.
- Re or Subject: Be specific, but brief; begin each word with a capital letter.

Two new application forms will be ready for your use next week. The Executive Committee approved them late yesterday. I thought you would appreciate a follow-up report.

The Committee was grateful for the changes that you made to improve both forms. We are printing 500 of each form and should have them by Friday. Someone from shipping will deliver 250 of them to the plant so that you have them Monday morning. We will keep the other half here for our use and as reserve.

Carrie Olson is updating the electronic versions. She will contact you yet this week so that you can test them online before they are uploaded on Monday.

Thanks again, Jane, for your suggestions. Contact me if you have any questions.

cc: Carrie Olson

**Name of the individual who was sent a copy.**  
Be aware that any communication may be shared with others in the company.

© 2010 by Mary McLaughlin

# Memo Format

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Letters and memos are two common formats for business communications. The general rule is to use letter format when your audience is outside of your organization, and use memo format when your audience is within your organization. However, often memos are used when communicating with clients and other external parties that you work with frequently.

**Memos are formatted differently from letters:**

- **Omit the complimentary opening** (Dear Dr. Bartlet:) and **complimentary close** (Sincerely, Mary Walker) that are included in a letter.
- **Omit the mailing and return address** (because memos are typically internal—sent between employees of the same company—no addresses are needed).
- **If sending a hard copy, initial or sign the memo** next to your name on the “From” line.
- **Label the memo “Memo,” “Memorandum,” etc.** at the top of the page, as in the examples below.

The examples below show possible ways to set up your memo. When you begin to work for a particular company, you will likely format your memos in a company-specific way. Many companies have memo templates pre-formatted with the company and/or department logo. However, any memo you write will include the date, recipient's name, sender's name, and a subject line.

## Memorandum

Date: October 9, 2006  
To: Bob Manager, Team Coordinator  
From: Sam Steinberg, CPA  
Subject: Treatment of the restructuring issues for NetWorth Corporation

---

## Internal Memorandum

October 9, 2006

To: Bob Manager, Team Coordinator  
Cc: Debbie Partner  
From: Sam Steinberg, CPA  
Re: Treatment of the restructuring issues for NetWorth Corporation

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**The subject line should be very specific** to the topic or purpose of the memo. Subject lines are important to memos (as well as emails) because they have a large impact on whether or not the recipient actually reads the message. A vague subject line could cause the recipient to discard the memo (or delete the email) without reading it.

**Begin the memo with an introductory paragraph.** This paragraph should set the tone for the memo. The length of this paragraph depends on the readers' need for introduction and orientation. The introduction is also the place to build goodwill with the reader and **forecast** the contents of the rest of the memo by overviewsing the contents of the memo (that is, provide an **abstract** of the memo). When writing a memo to someone who has requested information, refer to that person's request in the introductory paragraph.

In the **body** of the memo, use clear topic sentences and smooth transitions (e.g., In addition..., Next..., Secondly..., In conclusion...) to guide the reader through the document.

"Talking" headings can be very effective, even in short memos. Headings help readers know how you have organized your memo and also enable readers quickly skim the memo to know what key topics are addressed.

The body of memos should be single-spaced, with blank space between paragraphs and around headings. As with all business communications, apply visual design principles.

Don't end the memo too abruptly. If further action is required of the reader, include a brief closing paragraph. This paragraph is the place to bring a **conclusion** to the memo by reinforcing the main points of the memo, using "you-attitude" to end on a positive note, and letting the reader know what action should be taken in response to the memo.

You can easily create memo formats on your own. Microsoft Word has memo templates that you can also use, but you will need to modify and adapt them to suit your needs and those of your readers. Realize also, that the templates are set up using Styles in Word (Normal, Heading 1, Heading 2, etc.), so often the easiest way to modify the template is to modify the styles.

Memos can be sent in hard copy or electronically. Today, memos are often sent as attachments to emails or are posted on company intranets.

Memos can be formal or informal, lengthy or short – it depends on the audience and purpose!

## NEGATIVE MESSAGES

Sometimes, a letter, memo, or e-mail contains "bad news" of some type--a rejection of a request for funding, a report that a project won't be completed on time, a notice that an order hasn't been shipped yet. In that case, you may need to adopt an indirect approach, one that strategically delays the bad news until your reader has been prepared to accept or deal with it in a positive way.

In this instance, organizing the message can be a bit more complicated and call for a bit more strategy. In situations where bad news is communicated orally—someone has broken his or her arm at work, for instance. You generally don't go to that person's family and simply blurt out that their loved one has been hurt. You usually begin with something to soften the bad news a bit.

For example, you might begin by assuring them that their loved one is safe/fine, or is being taken care of. Then you might go on to explain the injury and what has been done and so forth. That bit of reassurance in this case is called the buffer--material designed to postpone the bad news and to win trust.

### *Parts of Negative news messages*

Parts of the Negative News Message	Example
Buffer or Cushion	Thank you for your order. We appreciate your interest in our product.
Explanation	We are writing to let you know that this product has been unexpectedly popular, with over 10,000 requests on the day you placed your order.
Negative News	This unexpected increase in demand has resulted in a temporary out-of-stock/backorder situation. We will fulfill your order, received at 11:59 p.m. on 09/09/2009, in the order it was received.
Redirect	We anticipate that your product will ship next Monday. While you wait, we encourage you to consider using the enclosed \$5 off coupon toward the purchase of any product in our catalog. We appreciate your business and want you to know that our highest priority is your satisfaction.

Be careful with buffers. What you don't want to do is create the impression that you're delaying, or attempting to hide the negative message, or just offering a line of down. If there is bad news to communicate, you have to be honest in communicating it, and you need to get to it in a way that doesn't waste your reader's time. However, a well-placed paragraph, sentence, or just a