How to Write Short Reports for 6.033

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Writing Weekly Reports

- Why write them
- How to write them
- How to make them better
Why write short technical reports?

- Professional “real world” communication
  - Efficient
  - Persuasive
- Not knowing how to write directly and concisely can have deleterious consequences
How do you write short reports?

Steps in Writing

1. Read and Understand the Assignment
2. Brainstorm
3. Construct a coherent thesis
4. Develop ideas with evidence
5. Organize logically
6. Revise
7. Edit—lean, readable prose
Read and Understand the Assignment

- What does it want you to do?
- Identify topic and scope
- Identify key words
  - Summarize
  - Analyze
  - Compare
Lessons learned from the Therac-25 accidents serve as a dire warning of the severity of human casualty due to machine failures. The inventors of the Therac-25 made several decisions on both the level of hardware and software. Can you identify a decision that is critical to the malfunctioning of the machine? What would you do differently to prevent the same kinds of errors from happening?
Lessons learned from the Therac-25 accidents serve as a dire warning of the severity of human casualty due to machine failures. **The inventors** of the Therac-25 **made several decisions** on both the level of hardware and software.

Can you **identify a decision** that is **critical to the malfunctioning of the machine**?

What would you **do differently to prevent the same kinds of errors** from happening?
- a (=one) decision
  - What is the key decision?
  - Why is that important to the malfunctioning of the machine? What kind of errors did that decision cause?

- What would you do differently to prevent the same kinds of errors from happening?
  - An tangible action or design change
  - Related to the decision
Construct a coherent thesis

- State your argument in one sentence.
  - **Example:** The Therac-25 programmer’s decision to reuse code in the development of the system meant that Therac-25 did not undergo rigorous testing.
Develop Evidence

- Make the points obvious
  - Simple language
  - Concrete, compelling evidence
  - “So what?”
- Start with the most important points
- Chunk information into manageable bits
- Move between generalizations and examples
Develop Evidence

**Example:** The software developers assumed that using off-the-shelf software would increase safety because that software would have been thoroughly tested. For example, Therac-25 used modified software from Therac-20 to handle the dual mode of X-rays and electrons. . .
Organize logically

- Readers expect the following organization:
  1. **Introduction** = State your point
  2. **Body** = Prove it
  3. **Conclusion** = Summarize argument + recommendations
Organize this Week’s Assignment

- Introduction
  - Thesis that identifies the key decision and why that decision was significant

- Body
  - Evidence to support that thesis
  - What kind of errors did that decision lead to?

- Conclusion
  - Recommendations on how to prevent the same kinds of errors from happening
Revise for Clarity

- Do you answer the question?
- Do you have a thesis?
- Do you have appropriate examples?
- Is each example sufficient evidence?
- Are counter-arguments considered?
Revise for Clarity

- Delete “empty” introductions
  - Example: Very important lessons may be learned from the Therac-25 accidents.

- Avoid argument via restatement:
  - Example: The primary reason that Therac-20 killed far fewer people than Therac-25 was that Therac-20 had hardware interlocks. These hardware interlocks were not on Therac-25. Hardware interlocks made Therac-20 safer.
Edit for lean, readable prose

Avoid:

- stock phrases
  - “In today’s society . . .”
- clunky constructions
  - “The reason is because . . .”
- vague phrases
  - “This shows . . .”
- slang
  - “They fried people.”
Avoid clunky constructions

- **WEAK**
  Significant are the Therac accidents.
  The reason that the Therac-25 failed is because it did not have hardware interlocks.

- **BETTER**
  The Therac accidents are significant.
  The Therac-25 failed because it did not have hardware interlocks.
Avoid the “naked this”

- **WEAK**
  Programmers often view code reuse as an excuse to avoid testing and documenting particular parts of a system. *This can allow minor bugs to go undetected.*

- **BETTER**
  Programmers often view code reuse as an excuse to avoid testing and documenting particular parts of a system. *This improper reuse can allow minor bugs to go undetected.*
Active vs. Passive Voice

**WEAK**
The errors were not documented. *(Passive)*

I think that this design is problematic. I think they could have improved the system by . . . *(Active—overuse of personal pronouns)*

**BETTER**
The engineers failed to document the errors. *(Active)*

The engineers could have improved the design by . . . *(Active)*
### Verbs vs. nominalizations

<table>
<thead>
<tr>
<th>Verb</th>
<th>Noun</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discover</td>
<td>Discovery</td>
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<tr>
<td>Investigate</td>
<td>Investigation</td>
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<tr>
<td>React</td>
<td>Reaction</td>
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<tr>
<td>Fail</td>
<td>Failure</td>
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</tbody>
</table>

Verbs forms are stronger

**WEAK:** Expectation of system failure

**BETTER:** Expecting when systems will fail
One-Page Format

- Word processed
- Your name, the name of your recitation instructor, & your section meeting time at the top of the page.
- 11 or 12 point font
- Enough leading (vertical space between lines) so that graders can make comments.
- The entire assignment should fit on one side of one sheet of paper.
Writing Help

- Model papers on 6.033 website
- Writing Center
  web.mit.edu/writing
- Writing practica
- *Mayfield Handbook of Technical and Scientific Writing*