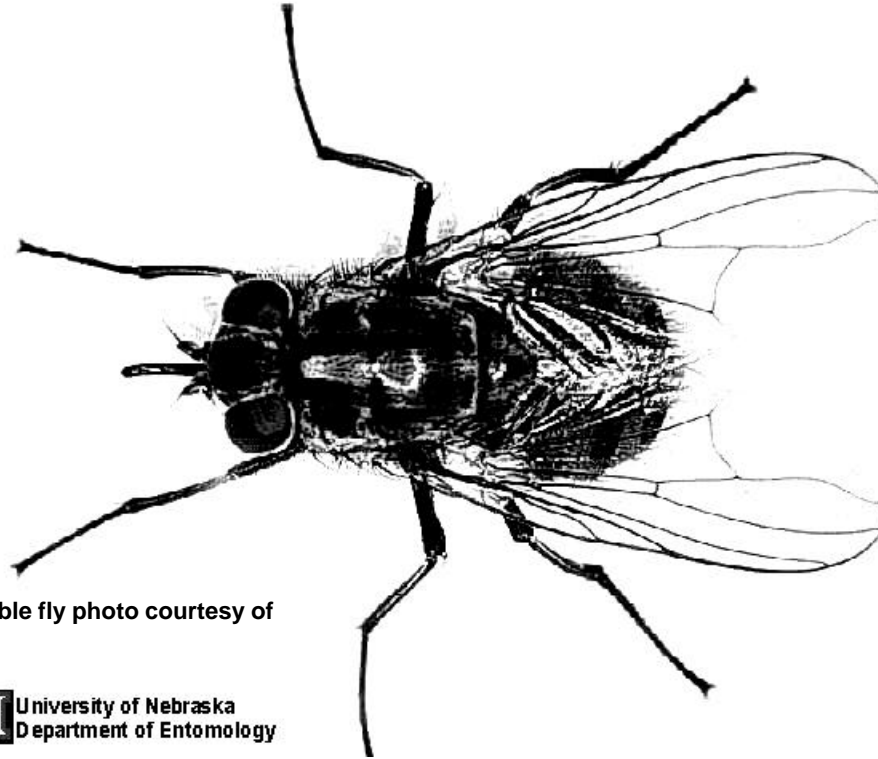



The Fine Art of Writing a Good Bug Report



Stable fly photo courtesy of

 University of Nebraska
Department of Entomology

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What Is a Bug Report and Why Do We Write Them?

- Bug report is a technical document
 - Describes failure mode in system under test (SUT)
 - The only tangible “product” of testing
- Not a management problem escalation tool
 - “Build not delivered on time” is not a bug report summary
 - “Build 781 fails to install” is a bug report summary
- Written to increase product quality
 - Documents a specific quality problem quality of SUT
 - Communicates to developers

Are Bad Bug Reports a Problem?

- Anecdotally, developers return many bug reports as unreproducible, leading to:
 - Wasted time writing the report
 - Frustration for tester and developer alike
 - No increase in product quality
- Bug reports can be unreproducible due to:
 - Intermittence
 - Inconsistent test/development environments
 - Disputes over “correct” behavior
- But many unreproducible bug reports are poorly conceived and poorly written

Ten Tips for a Good Bug Report

- 1 Structure: test carefully
 - 2 Reproduce: test it again
 - 3 Isolate: test it differently
 - 4 Generalize: test it elsewhere
 - 5 Compare: review results of similar tests
 - 6 Summarize: relate test to customers
 - 7 Condense: trim unnecessary information
 - 8 Disambiguate: use clear words
 - 9 Neutralize: express problem impartially
 - 10 Review: be sure
- △ Remember, writing is creative: two good bug reports on one problem can differ in style and content (but not substance)

Case Study: SpeedyWriter

- Let's use a case study to illustrate these techniques
- SpeedyWriter
- A Java-based word processor
- Supports the usual word processing functions
- Differences highlighted in *italics* in case study

Structure

- Structured testing foundational to good bug reports
 - Use deliberate, careful approach to testing
 - Follow written test cases or run automated ones per written or standardized process
 - Take careful notes
- Bug reporting begins when expected and observed results differ
- Sloppy testing results in sloppy bug reports

Structured Testing Paradigms



Ben Franklin standing in a thunderstorm hoping to get hit by lightning

Good software testing should be more like a carefully designed laboratory experiment than a random walk in an electrical storm--or worse. Testers are engineers, after all.



M. Maria Skłodowska-Curie performing a carefully designed experiment

Reproduce

- Always check reproducibility of the failure as part of writing bug report
 - ✓ Three times is a good rule of thumb
 - Document a crisp sequence of actions that will reproduce the failure
 - Report intermittent, hard-to-repeat failures
 - Note failure incidence rate (i.e., 1 in 3 tries)
- ★ Clean steps to reproduce addresses issue of unreproducibility head-on

Good

Steps to Reproduce

1. I started the SpeedyWriter editor, then I created a new file.
2. I then typed in four lines of text, repeating “The quick fox jumps over the lazy brown dog” each time, using different effects each time, bold, italic, strikethrough, and underline.
3. I highlighted the text, then pulled down the font menu, and selected Arial.
4. This nasty bug trashed all the text into meaningless garbage, wasting the user’s time.
5. I was able to reproduce this problem three out of three tries.

Bad

Nasty bug trashed contents of new file that I created by formatting some text in Arial font, wasting my time.

Isolate

- Change variables that may alter symptom
 - Make changes one by one
 - Requires thought and understanding of SUT
 - May not be immediately obvious
 - Can be extensive
 - Match amount of effort to severity of problem
 - Avoid getting into debugging activities
- ★ Good isolation shows due diligence and gives developers head start on debugging

Better

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5. I was able to reproduce this problem three out of three tries.

Isolation

On the vague suspicion that this was just a formatting problem, I saved the file, closed SpeedyWriter and reopened the file. The garbage remained.

If you save the file before Arializing the contents, the bug does not occur.

The bug does not occur with existing files.

This only happens under Windows 98.

Good

Steps to Reproduce

1. I started the SpeedyWriter editor, then I created a new file.
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Isolation

Doesn’t happen on Solaris.

Generalize

- Look for related failures in SUT
 - Does the same failure occur in other modules or locations?
 - Are there more severe occurrences of the same fault?
 - Avoid confusing unrelated problems
 - Same symptom can arise from different bugs
- ★ Generalizing reduces duplicate bug reports and refines understanding of failure

Better

Steps to Reproduce

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Isolation

Also happens with Wingdings and Symbol fonts.

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Steps to Reproduce

1. I started the SpeedyWriter editor, then I created a new file.
2. I then typed in four lines of text, repeating “The quick fox jumps over the lazy brown dog” each time, *using different effects each time, bold, italic, strikethrough, and underline.*
3. I highlighted the text, then pulled down the font menu, and selected Arial.
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Compare

- Examine results for similar tests
 - Same test run against earlier versions
 - Similar conditions, other tests, same version
- Is failure a regression?
 - Change introduces defect not in earlier versions
 - Usually found when previously passed tests fail
- Not always possible
 - Test previous blocked, reinstall impractical
 - Tested feature unavailable in earlier versions

Better

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Isolation

New to build 1.1.018; same test case passed against builds 1.1.007 (System Test entry) through 1.1.017.

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Summarize

- Put a short “tag line” on each report
 - Capture failure and impact on customer
 - ↔ Analogy: Bumper sticker
- Harder than it seems
 - Testers must spend time thinking about this
- ★ Advantages of good summaries
 - Get management attention
 - Name bug report for developers
 - Help set priorities

Better

Summary

Arial, Wingdings, and Symbol fonts corrupt new files.

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1. I started the SpeedyWriter editor, then I created a new file.
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Quality Week 2000

Good

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Condense

- Eliminate extraneous words or steps
 - Reread report carefully
 - Avoid both cryptic commentary and droning on
- Are any details or actions irrelevant?
- Everyone's time is precious, so don't waste any of it on unnecessary verbiage, but don't cut any meat, either

Better

Summary

Arial, Wingdings, and Symbol fonts corrupt new files.

Steps to Reproduce

1. Started SpeedyWriter editor, then created new file.
2. Typed four lines of text, repeating “The quick fox jumps over the lazy brown dog” each time.
3. Highlighted text, then pulled down the font menu, and selected Arial.
4. This nasty bug trashed all text into meaningless garbage, wasting the user’s time.
5. Reproduced three out of three tries.

Isolation

New to build 1.1.018; same test case passed against builds 1.1.007 (System Test entry) through 1.1.017.

Also happens with Wingdings and Symbol fonts.

On vague suspicion this was a formatting problem, saved file, closed SpeedyWriter and reopened file.

Garbage remained.

Saving file before changing font prevents bug.

Bug does not occur with existing files.

Only happens under Windows 98.

Good

Summary

Arial, Wingdings, and Symbol fonts corrupt new files.

Steps to Reproduce

1. *I* started the SpeedyWriter editor, then *I* created *a* new file.
2. *I* then typed *in* four lines of text, repeating “The quick fox jumps over the lazy brown dog” each time.
3. *I* highlighted *the* text, then pulled down the font menu, and selected Arial.
4. This nasty bug trashed all *the* text into meaningless garbage, wasting the user’s time.
5. *I was able to reproduce this problem* three out of three tries.

Isolation

New to build 1.1.018; same test case passed against builds 1.1.007 (System Test entry) through 1.1.017.

Also happens with Wingdings and Symbol fonts.

On *the* vague suspicion *that* this was *just* a formatting problem, *I* saved *the* file, closed SpeedyWriter and reopened *the* file. *The* garbage remained.

If you save the file before changing the font of the contents, the bug does not occur.

The bug does not occur with existing files.

This only happens under Windows 98.

Disambiguate

- Remove, rephrase, or expand vague, misleading, or subjective words and statements
 - Make sure report is not subject to misinterpretation
- ★Goal: Clear, indisputable statements of fact
∴Lead developer by the hand to bug

Better

Summary

Arial, Wingdings, and Symbol fonts corrupt new files.

Steps to Reproduce

1. Started SpeedyWriter editor, then created new file.
2. Typed four lines of text, repeating “The quick fox jumps over the lazy brown dog” each time.
3. Highlighted *all four lines of* text, then pulled down the font menu, and selected Arial.
4. This nasty bug trashed all text into meaningless garbage, *including control characters, numbers, and other binary junk*, wasting the user’s time.
5. Reproduced three out of three tries.

Isolation

New to build 1.1.018; same test case passed against builds 1.1.007 (System Test entry) through 1.1.017.

Reproduced with same steps using Wingdings and Symbol fonts.

On vague suspicion this was a formatting problem, saved file, closed SpeedyWriter and reopened file.

Garbage remained.

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Only happens under Windows 98, *not Solaris, Mac, or other Windows flavors.*

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Neutralize

- Deliver bad news gently
 - Be fair-minded in wording and implications
 - Avoid:
 - Attacking developers
 - Criticizing the underlying error
 - Attempting humor or using sarcasm
 - Confine bug reports to statements of fact
- △ You never know who'll read the reports

Better

Summary

Arial, Wingdings, and Symbol fonts corrupt new files.

Steps to Reproduce

1. Started SpeedyWriter editor, then created new file.
2. Typed four lines of text, repeating “The quick fox jumps over the lazy brown dog” each time.
3. Highlighted all four lines of text, then pulled down the font menu, and selected Arial.
4. *All text converted to control characters, numbers, and other apparently random binary data.*
5. Reproduced three out of three tries.

Isolation

New to build 1.1.018; same test case passed against builds 1.1.007 (System Test entry) through 1.1.017.

Reproduced with same steps using Wingdings and Symbol fonts.

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Review

- Each tester should submit each bug report to one or more test peers for a review
- Reviewing peers should:
 - Make suggestions to improve report
 - Ask clarifying questions
 - Even challenge “bugginess” if appropriate

△ Test team should only submit best possible bug reports, given time constraints appropriate to priority of bug

Conclusions

- A bug report is a technical document
 - Accurate
 - Concise
 - Well-conceived
 - High-quality
- Instill tester focus on writing good reports
- Quality indicators for good bug reports
 - Clear to management (especially the summary)
 - Actionable by development
 - Move quickly from opened to closed

ROI for Good Bug Reporting

- Improved Test team communication to senior and peer management
 - Can enhance credibility, standing, and resources
 - Better tester/developer relationships
 - Helps developers be effective, reduces arguments
 - Faster, more efficient bug lifecycles
 - Quicker fixes and fewer reopens
- Support increased product quality