A Guide to Progress Report Quality Control:

Tips on Writing Nice Progress Reports
and Common Mistakes to Avoid

Matt Roberson

Graduate Teaching Assistant

PHYS 605

Spring 2019, February 25, 2019

The goal of this document is to give you a better idea of how progress reports will be graded in this course, and to provide some tips on how to avoid common mistakes/problems that lower the quality of your progress reports (and hence will impact your grade).

Note that each point in this document has a unique number, so that it can be referenced directly. Your TA will reference these points when grading your progress reports.

Review of Progress Report Guidelines:

Make sure to follow the guidelines in Section II (Progress Report Layout) of the document `How to write a progress report.pdf` which you were provided on the PHYS 605 MyCourses page. For completeness of this guide, these guidelines will be rewritten here:

1. Assume the person reading the report is at least as knowledgeable as you are, so there is no need to be pedantic in your writing.

2. Explain clearly and precisely what you accomplished in the lab, what you learned, and where you are still confused.

3. Report on who helped you and who you helped.

4. Write the progress report using a typesetting program (LaTeX, Word, etc.) and submit the report electronically on MyCourses as a `*.pdf` file.

5. Each progress report needs to have at least the following elements:

    5.1. Your full name, and the name(s) of the lab partner(s) you worked with during this lab.

    5.2. A very brief introduction on what the lab was about, so it is not out of context.

    5.3. A report on what you accomplished this lab.

        5.3.1. If you made measurements, make a table, or graph, or some other way to list the results of the measurement. Be precise and be specific!

        5.3.2. If you made a specific circuit, provide a schematic of this circuit. Schematics need to be professionally done, see the resources section on MyCourses for websites where you can draw schematics.

        5.3.3. Answer all the specific questions that were asked in the lab.

        5.3.4. If you did not quite finish the lab tasks, explain why

        5.3.5. Do the "outside of lab" components and report on them.

    5.4. Clearly tell me what you learned. You can intersperse this with item 3 if you prefer.

        5.4.1. Specific things you learned.

        5.4.2. Any observations you made.

        5.4.3. Who helped you, whom did you help.

    5.5. A brief conclusion.

Progress Report Writing Tips

With the above guidelines in mind, the following collection of tips and guidelines will help you get a better idea of what I look for when reading your reports. Ultimately, what I care about most is that you make sure your report satisfies all the requirements and you need to make sure the report is visually appealing. This collection of tips will also outline some of the

writing-style preferences I tend to favor (to give you a better idea of what I consider elements of a well-formatted, well-structured report), as well as help you answer any questions you might have about how I would like things to be presented and what kind of things should and shouldn't be in your report.

Requirements

The following is a list of requirements which I look for when reading your reports. This list is based on the guidelines you were given in the `How to write a progress report.pdf` document.
Note: Failure to include these requirements will result in harsh grading penalties.

6. Your lab progress reports should be corporate-style engineering progress reports.

    6.1. This means that you should basically pretend you are a professional physicist (or an engineer) working with a team (your lab partner) as part of a large scientific collaboration (or a company) on various projects (the lab activities). For each project (lab) you are asked to work on, you are required to write concise technical progress reports when requested (by the deadline) to keep your boss (the TA) up to date on your progress. (So Professor Holtrop is basically like the TA's boss and/or the Principle Investigator (CEO) in this scenario).

    6.2. Such professional-style progress reports (or engineering-style reports) differ significantly in structure from the scientific lab reports you are probably used to writing in other classes, like chemistry lab reports. They are also not like research-level journal articles you may have read (or contributed to if you do research with some group).

    6.3. The goal of these professional-style progress reports is solely to keep your boss informed about your team's progress on some project your team is working on (or has worked on). This means that they need to be written concisely (i.e., they should be written so that they present a lot of information clearly while maintaining as much brevity as you are able). This brief but comprehensive

approach to report writing is extremely important to keep things running smoothly in a busy scientific (or corporate) environment.

6.4. Assume the person reading the report is at least as knowledgeable as you are, so there is no need to be pedantic in your writing.

7. You are free to format your report as you see fit, but make sure your report contains the following:

   7.1. Title & Author/Partner Information

   7.2. A brief introduction section to give context to the report. This should be the first section.

   7.3. Sections for each thing you did in lab wherein you should tell me what you accomplished in detail (clearly and precisely describe the procedure you followed to perform the lab tasks), present any relevant circuit diagrams, data tables, plots, equations, etc., and you should wrap up these section with a discussion and conclusion.

      7.3.1. It's probably easiest to organize your report sections by following the structure of the relevant lab manual. Usually the sections which the lab manual is split into correspond well to a good way to structure sections in your report. Just include your discussion of the tasks outlined in that manual section in the same section in your report. You can usually even keep the section names the same between the manual and your report.

      7.3.2. You might instead find it more useful to organize your report sections by the circuit you're studying. In this case, report on all tasks relevant to a particular circuit in the same report section.

   7.4. A section detailing specific things you learned and any interesting observations you made.

   7.5. In addition to the above sections, students in previous semesters have found it useful to add the following additional kinds of sections (though, not all of these are always appropriate for every lab):

      7.5.1. A "Lab Questions" section wherein the specific questions asked in the lab manual are collected and answered.

7.5.2. An "Unfinished Tasks" section, wherein discussion of required tasks that were not completed has a more natural home.

7.5.3. An "Equipment" subsection of the Introduction, wherein the make/model of the measuring equipment used in lab is detailed clearly.

7.5.4. Appendix sections at the end of the report wherein relevant code or calculations (like error propagation) are presented in full detail. (Such appendices would be for your own benefit/reference, but depending on what extra effort is taken might also result in bonus points.)

8. **Make sure you write about every task you were expected to do, whether you finished the task or not.**

8.1. Unless a task is specifically marked "Extra", "Optional", etc., I will be expecting to read about it in your report. Thus, you should make sure to comment on every task (not labeled "Extra","Optional", etc.) in your report, as those were the tasks you were expected to have performed in lab.

8.2. **It is okay if you did not get to or complete all the tasks you were asked to perform in lab, however, you need to always report on them!** If you did not get far enough during lab time to perform the task, just say so. If you started a task but did not finish enough of it to give that task a full section in your report, at least tell me that you started it, tell me what progress you made on it (no matter how big or small), tell me if and why you might have got stuck, tell me if you just didn't finish because you ran out of time, etc..

8.3. You were given a set of tasks to do in the lab, and you have to be clear about what you did and did not do. Only reporting a few successful accomplishments without truthfully addressing the status of other incomplete tasks you were asked to perform makes you appear incompetent and leaves your boss/team in the dark. Acknowledging that you did not perform a specified requested task and reporting on why it was not performed is important information to report, as it helps to keep your boss/team properly informed.

9. **Make sure you answer all specific questions and do any calculations that were explicitly asked in the lab manual.**

    9.1. Throughout the lab manuals for each lab activity, you are often asked specific detailed questions (and/or asked to perform calculations) relevant to the tasks you are asked to perform. Since you were directly asked these questions, you need to answer them in your progress report. You can do so by incorporating your answers into the relevant section content discussion, or by making a seperate section in which to provide your responses to these questions.

    9.2. Do not just treat the questions as rhetorical questions. If you do not answer them, you will have points deducted from your report!

10. **Make sure to always provide circuit diagrams for any circuit you build in lab.**

    10.1. Always do this for every circuit, whether or not the circuit you were asked to build was given in the lab manual, whether it's an analog or digital circuit... Always provide a circuit diagram! It helps keep everyone properly informed.

    10.2. I would suggest drawing them in your lab notebook in lab at the time you build the circuit and then re-drawing them electronically for a nice lab report image. Draw the circuit you built and don't just draw the circuit as it's given in the lab manual. This will help you make sure you have constructed your circuit correctly. If you are having difficulty drawing complicated circuits electronically, ask for help.

    10.3. Often you will find that the diagram-drawing software you are using to draw your circuit diagrams doesn't have a pre-made symbol for the chip or component you need to draw. (This almost always happens when drawing digital circuits in this class). If you find yourself in this situation, these programs always have some sort of empty rectangular "black-box"-style component symbol that you can use. This is often the best way to draw complicated electronics devices, integrated circuit chips, etc.. When using this approach, you need to make sure you label the box appropriately and you

only need to draw and label the pins on the device that you needed in your circuit.

11. Make sure to mention who helped you and who you helped in performing lab tasks.

Style

Everyone has their own style of writing. I don't want to give you a cookie-cutter lab report template to fill out. Instead I want you to develop your own writing/formatting style. However, I just want to give you a few stylistic suggestions that I think help to improve your report quality.
Note that I usually don't take off points for your stylistic choices unless I think they lessen the quality of your report (and even then I'm usually quite lenient).

12. Don't write as though you are following a lab manual. Simply tell me what you did. This helps keep your progress report concise.

    12.1. For example, don't say "In this part of the lab, we [description of what you did]" when you can just say "We [description of what you did]".

13. In my stylistic opinion, Figures (circuit diagrams, plots, etc.) and Tables are a little more useful by being named/numbered and having a concise, descriptive caption (this caption can even read like a title if you prefer). I would prefer you to do this for all figures and tables. For example, names/numbers/captions like "Figure 1: Circuit Used to Create I-V Curves." or "Table 2: Calibration Results" should appear centered immediately below the relevant figure/table.

14. Don't include an "Abstract" at the beginning of your progress report. Abstracts are appropriate for journal quality research articles, not for corporate-style engineering progress reports.

Writing/Language

Proper and professional use of language is important. However, this isn't a writing class, so I am fairly lenient and won't be grading you in-depth on

expert use of grammar. Below are a few suggestions to improve your writing. Ultimately, if you make sure your sentences are comprehensible and screen for typos before submitting your report, your writing is probably going to be just fine.

15. Be clear and concise in your writing.

16. Make sure to use professional language:

    16.1. Avoid typos, spelling errors, grammatical errors, and punctuation errors. You can make sure such errors don't appear in your report by re-reading the report before submission!

    16.2. Avoid using language that is too conversational than professional. Here are a few examples:

        16.2.1. Avoid the use of words like "a lot" and "really." Words like these are unprofessional sounding in a professional report and don't add anything useful to what you are saying.

        16.2.2. Instead of "The first thing we did was..." you should can write "First we calibrated...". This helps keep your report clear and concise.

    16.3. Avoid the use of profanity. No matter how you feel about it, it has no place in a professional report.

Technical Details

You need to be able to write technical reports so that they are concise without losing any of the important scientific details. But the details are important! Make sure you get them right and ask questions if you are unsure.
Note that I am usually fairly lenient in grading when it comes to in-depth technical details since we are all still learning here. However, you should know and be able to talk about the basic physics of what is going on most of the time without issue.

17. Make sure you are using technical language correctly to properly convey what you're trying to say. If you have questions - or even just any doubt - about your use of terminology/jargon, ask the professor or TA.

18. Always make sure you report units along with measured numerical values of physical quantities.

19. Make sure you are very clear about what steps you followed to do the tasks you performed.

20. The first time you refer to a device in your report, you should be specific and state the manufacturer/brand name and model number of the device.

    20.1. For example, "I calibrated the Analog Discovery 2 (AD) oscilloscope, Rigol DS1102E oscilloscope, and Mastech MS8268 voltmeter against one of the high end BK Precision 2831E benchtop voltmeters (BK) available in the lab."

    20.2. It might be a little tedious, but reminding the reader (e.g., the person you are reporting to at the company you work for) of the specific devices you are using without any ambiguity is probably a good idea.

    20.3. Knowing the make/model details of the measuring device lets the reader know how to find the appropriate technical manual if it is needed to look up details like how to determine the device's measurement error.

    20.4. After initially stating the make/model specifics, you can refer to the device more generally (e.g., you can refer to the Rigol DS1102E as simply "the oscilloscope").

Formatting/Presentation

I'm looking for your reports to be well-formatted and visually appealing. Well-formatted reports are much easier to read/navigate and reference. This is especially important in a busy, corporate setting; so it's an important skill to be able to write well-formatted, easily-readable progress reports. Here are some rough guidelines for what I consider nice formatting and presentation of various elements of your report.
Note that I am quite open to however you want to format things in your report as long as it maintains clarity and visual appeal. If your formatting detracts from the report and makes it more difficult to read than it should, I will take off points.

Text:

21. 1-inch margins, and a professional-looking 12-ish-point font is probably most appropriate for your progress reports.

22. Avoid having too much (or too little) white-space between segments of text.
    Use your own judgment, but here are a few helpful guidelines:

    22.1. Single spacing between lines usually looks the best for technical reports.

    22.2. Double the line spacing between sections.

    22.3. Any more than two lines between text is probably too much vertical white-space. Use your own judgment to decide.

Circuit Diagrams:

23. Make sure your circuit diagrams look nice. They should appear high-quality, clear and crisp, not low-quality and grainy-looking.

24. Center your circuit diagrams, or, if you would rather not center them for stylistic reasons, wrap text around them (in a way that looks good).

25. Present your diagrams as numbered, captioned figures. For example. name them Figure 1, Figure 2, ... etc. and give them concise, descriptive captions.

    25.1. Figure numbering helps you refer to specific diagrams more easily. It's easier to say "see Figure 1" than it is to try to describe where your reader should look for the figure you are referring to.

    25.2. Descriptive captions are useful to the reader because they give the reader context as soon as they look at the figure and allow the reader to know what they are looking at without having to read all the details of the report (if they choose not to). In addition to a short description, captions for circuit diagrams can/should include things like the specific resistor, capacitor, inductor, etc. values you used to build the circuit (if relevant).

    25.3. Center the caption immediately beneath the diagram image it describes.

26. Make sure your circuit diagrams are professionally drawn such that the reader could easily build the circuit themselves without any ambiguity.

    26.1. Make sure that all components are clearly labeled.

    26.2. If your circuit diagram contains more than one of any given component, make sure the reader can clearly distinguish which component is which.

Tables:

27. Make sure all your tables print properly onto the same page.

    27.1. Split tables look terrible and are hard to read.

    27.2. If your table splits between pages, move the table elsewhere or reformat the surrounding text until it doesn't split any longer.

    27.3. Before you submit your report, double-check to make sure there are no split tables in the file you're submitting.

28. Label your tables. Here are two good ways to do that:

    28.1. Give the table a title (by adding a title cell at the top of the table) and refer to it by that title.

    28.2. Number and caption tables in a similar manner to numbering and captioning figures. Name them Table 1, Table 2, ... etc. and give them concise, descriptive captions.

        28.2.1. Table naming/numbering helps you refer to specific tables more easily. It's easier to say, e.g., "see Table 1" or "Table of Calibration Results" than it is to try to describe where your reader should look for the table you are referring to.

        28.2.2. Descriptive captions are useful to the reader because they give the reader context as soon as they look at the table and allow the reader to know what they are looking at without having to read all the details of the report (if they choose not to).

        28.2.3. Center the caption immediately beneath the table it describes.

29. Make sure that numerical entries in your tables which represent measured values of physical quantities have proper units associated with them. Make sure this unit association is clear.

Equations/Math:

30. Important equations (like those that you use directly in any calculations you perform) should be put on their own line (rather than being typeset in-line with surrounding text). This helps important equations stand out more in your report. If there are several such equations, you should also number them if you find yourself referring to them in your text.

31. When typesetting equations involving multiplication I would suggest denoting the multiplication operation using juxtaposition (ab) or a vertically-centered dot ($a \cdot b$) instead of an asterisk ($a * b$). This is because the asterisk symbol $*$ is often used in electronics systems engineering to denote the convolution operation. Obviously, I can tell from context when you're using the asterisk to mean multiplication, but it's important to use notation such that as much ambiguity as possible is eliminated.

Plots:

32. Make sure your plots look nice. They should appear high-quality, clear and crisp, not low-quality and grainy-looking. Make sure they are clearly readable.

33. Center your plots, or, if you would rather not center them for stylistic reasons, wrap text around them (in a way that looks good).

34. Present your plots as numbered, captioned figures. For example. name them Figure 1, Figure 2, ... etc. and give them concise, descriptive captions. Plots and circuit diagrams (and other kinds of figures like images, if necessary) should probably share the same naming numbering convention.

    34.1. Figure numbering helps you refer to specific plots more easily. It's easier to say "see Figure 1" than it is to try to describe where your reader should look for the figure you are referring to.

    34.2. Descriptive captions are useful to the reader because they give the reader context as soon as they look at the figure and allow the reader to know what they are looking at without having to read all the details of the report (if they choose not to).

34.3. Center the caption immediately beneath the figure image it describes.

Bonus Points:

Some degree of extra work might lead to being awarded bonus points. Examples of this are:

35. I will give bonus points if you take the extra time to do error/uncertainty analysis. This includes things like reporting uncertainties with your measurements, working out uncertainty propagation rules for equations you use in calculations, proving mathematically that measured values agree, etc.