

Lab TA manual

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This document is something of an instruction manual. Within are all the things I wish I had known when starting my duties as a lab TA that would have made the job much easier on myself. Hopefully it will be of use to those with these duties in the future.

The Lab Room

The lab itself is an awkwardly shaped room. The back row is hard to walk through when people are sitting at their computers, and the room itself has a couple awkward corners and pillars that block line of sight to the “front” of the room. The two most important features of the room itself are the printer and the smartboard. Each will be discussed in turn.

First, the printer. Right away, you should be aware that not all computers can necessarily see the printer. During the first lab, you should have them all open a text editor, and make sure they can see the printer when they try to print a document. They don't have to actually print anything at this stage; just ensure that they can actually send things to the printer and not just the document writer.

Along the same lines, always come to the lab with a package of paper. The first thing you should do when walking into the lab is to check the printer tray to make sure it has paper. If it does, then great! Carry on with the rest of the lab. If not, load it up! If you add paper, make sure to take any remaining paper out of the printer at the end of the lab. If you do not, this paper will get used up by students using the lab during non-lab hours. As a lab TA, paper is available to you; ask where you can pick up a package.

The printer likes to display a variety of error messages. Pressing the “ok” button seems to get rid of most of them. Just press “ok”, and wait a couple seconds. If nothing happens, you may have to get in touch with the lab IT personnel. The one exception to this rule is if the “toner low” warning shows up. In this instance, notify IT personnel immediately. It will likely take a few days from time of notification until the cartridge is actually replaced. This is not laziness on the part of IT staff; they have to order the new cartridge and wait for it to arrive before they can install it. In the meantime, you may notice that students lab printouts become *very* faint.

Now that you know about the printer, it's time to talk about the smartboard. The room has three projectors and a smartboard. The smartboard

is connected to the computer at the front of the room. You'll need to be able to log into the computer to actually work the board, so make sure you can do this before your first lab. The three projectors are all linked together, and are placed to try to conquer the line of sight problem in this lab room. Everybody should be able to see at least one projector screen from where they are sitting. Come in early before the first lab and play around with this for a while; get a feel for it. If you're not sure how to work the smartboard, don't be afraid to ask the students. Some of them have seen it before and know how it works, and actually have fun showing you how to work it. The smartboard is a toy that everybody likes to play with. Knowing how to work the board can make your presentations that much more effective.

Finally, it is impossible to anticipate all the technical problems that may creep up during the term. First and foremost, don't panic. Make sure you know how to contact the IT staff: know the phone number, email address, physical location of the IT office. Do not assume that you have a working computer available to you so that you can check for this information when a crisis arises. Always keep the students informed of what is going on if a crisis occurs, otherwise each student will remind you that a crisis is occurring individually. It is much quicker to announce "The printer isn't working! We're fixing it", than to reply "Yes, I am aware that the printer isn't working", to each student after they try to print something from the lab. Again, don't panic, and remember that you are the authority figure and must act accordingly. Try to improvise a solution that will keep the lab running, and use your judgement.

The Labs

Always remember that these students are fairly new to MATLAB. With this understanding, there are a number of things you can show them right away that will save you a lot of time later on.

The first such item you can show them is the MATLAB debugger tools. Show them how to step through an m-file line by line. Show them what MATLAB errors look like, and what some of the basic ones mean, like multiplying vectors of different lengths, improper number of input arguments to a function, etc. Also show them the workspace window, showing them the variables in scope of the current m-file. Let them watch as variables are created, and as they change value during the course of a program. Once the students get to the lab on defining MATLAB functions, you can show them how the "step into" debug methods. This will also give you an opportunity to demonstrate to the class how variables have scope associated with them, and how variables are passed into functions. If this is not done right, you are

guaranteed to get many questions when students find errors in their code directly related to this topic.

Another very useful thing to show the students right away is how to manipulate plot properties using the interface instead of the command window. It is definitely useful for the students to be aware of both methods. However, for these labs the interface method of plot preparation will save you and the students plenty of time during the lab.

When the students learn about loops, it is educational to show them what an infinite loop looks like. Show them an example of this. Also, tell them how to break out of a program using Ctrl-C. Otherwise, students do things that waste a lot of time to try to stop their code, such as restarting their computer. They only have two hours to work with, and restarting their computer eats up about 5 minutes.

Constantly remind the class that m-files cannot have a space in their name. This is a very popular error, and a lot of students will spend time trying to debug perfect code before they realize what the actual error is.

Of course, each class will be different, and the particular batch of students you work with may be prone to certain errors more than others. Take note of the recurring problems that your class is having, and react accordingly.

Working With Students

The last topic is how to interact with the students themselves. Of course, some advice is applicable anywhere; be approachable, be pleasant, don't berate students, etc. However, lab work is a bit of a special case compared to other TA duties, and there are some tips and tricks that can help relations with students.

It should be noted that students are typically allowed to work in groups of at most two and at least one during the lab. Verify this with the course instructor before the first lab.

First and foremost, do not get tied down with the weaker students at the beginning of the lab. There will always be a few students that are just lost in the material, and require a solid 20 minutes of attention to set them on the right course. Resist the temptation to do this right away. Instead, for the first hour of the lab, try not to spend more than 5 consecutive minutes with any one group. If you approach this 5-minute limit, try to escape the

situation by saying things like “keep working, I’ll come back to check up on you in a couple minutes”, or “your error is somewhere in this block of code. Try stepping through your code line-by-line”, etc.

The reason for this 5-minute soft time limit is that students who finish the lab early tend to stick around and help their friends out with the lab. So it is in fact beneficial to help out these stronger students right away. Once they finish, you have a mini-army of amateur TAs to help you out. You are still the authority figure in the classroom, and students will get help from their friends before asking for you, if possible. This means that the number of students who want your direct attention decreases sharply at some point during the lab. At this point, it is much easier to dedicate 15 minutes of time to that weaker group of students.

Sometimes just standing behind a group of students long enough will prompt them to ask a question. Try not to answer questions such as “is this the right answer?” Counter that question with “Does your answer make sense in the context of the question?” If you see a group committing a large logical error in their code, just wait behind them. When they see their code failing, they will ask for assistance and you can point out their error. Avoid pointing out logical errors before the students try their code and find erroneous results. It is more instructive for them to see their error and understand why it is an error, than to have their mistake corrected before they see it. In contrast, it usually speeds things along to point out typos, syntax errors, redundant code, etc. as you notice them while walking by.

This leads into another important point: Always be travelling around the lab when not working with a group. It makes you seem available to the students. They will be hesitant to ask for your attention if they believe your attention is being given to someone or something else.

Write down every question you are asked during the lab. The lab is one of those rare occasions to collect great feedback from the students about the course itself. You are an authority figure, but you are more accessible than the course instructor, and the lab environment makes communication easier for the students. The questions asked during the lab are a great indication of the concepts that the students are understanding well, and those that they are struggling with. The course instructor will thank you for the feedback.

Finally, always remember that you are an authority figure and must act as such. Labs are loud places; you need to be louder if you want to be heard by everyone. Make sure students pay attention to you when you have something to say. Never panic in a crisis.

Conclusions

That's all the advice I can offer. Individual experiences may vary. Your own judgement and improvisation skills will be important, since each class will have its own unique quirks. Best of luck!