BIOL199 BDB
Fall 2022

Lab 1: Getting Started

(Learning) Objectives:

- Create and start an electronic notebook
- Check access to UR's cluster Spydur and create a folder for personal use
- Aid the Biology Department in examining how students are learning (two surveys!)

Pre-lab Readings:

1. None this week, though you are welcome to look through the protocol. Note that I will provide a printed copy of the protocol at the beginning of that day's lab.

Post-lab Assignment (Must be Completed for Lab Participation Credit)

Due by end of lab or deadline discussed with instructor (if there are technical problems):

1. From Pt A: E-notebook link posted in the Perusall Group called 'Links'.
2. From Pt B: Folder made on Spydur cluster in appropriate location
3. From Pt B: Short paragraph reflecting on this week's lab in your lab notebook

A. Keeping an Electronic Notebook

Instructions	Comments
1. As a student at UR, you have unlimited storage in Google Drive, and instructions for accessing your Google Drive are at http://tiny.cc/URgoogledrive.	UR provides unlimited storage to students – I don't even have this resource!
2. In Google Drive, make a directory for the BIOL199 Lab, labeled 'B199_BDB_Lab', by clicking New → Folder.	You may want to put the lab folder into a larger folder for the class as a whole, if you would like to organize additional documents associated with the class in Google.
3. Use the link http://tiny.cc/b199notebook to find the starting template, and then click File → Make a copy to make your own personal copy of the lab notebook. Make sure to place it into your new B199_BDB_Lab/ directory.	
4. Place your name in the filename and under the title.	I've added underscores in the filename, because spaces can be annoying in filenames when you want to do some coding.

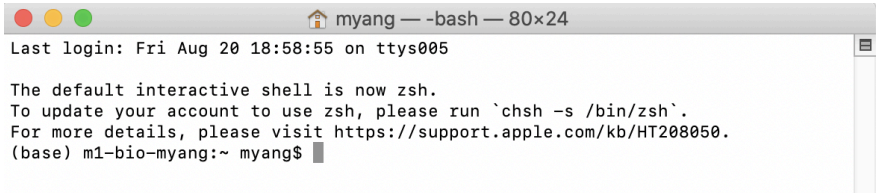
5. Click the 'Share' button, then click 'Change to anyone with the link', and then change 'Viewer' to 'Commenter'. Then click 'Copy link'. With this link, people can access the notebook, but cannot remove anything you wrote without permission. **NOTE: Make sure it is anyone with link, and not just those at UR - faculty, including me, don't have UR accounts associated with google**	Lab notebooks are meant to be shareable, and I will occasionally do lab notebook checks as a Close Reading assignment. You might want to share your lab notes with a group mate as well.
6. Share the lab notebook with me. Go to Perusall, find the group msg titled 'Links', and find the post titled 'Lab Notebook Links'. Reply back to that post following the instructions I posted on Perusall to link your lab notebook.	**Completes Post-lab assignment #1**
7. Edit the first entry in your notebook under 'Week 1'. a. At minimum, mention you made the lab (and class) directory and link the directory. b. If you never used Google Drive before, jot a few notes for yourself about any steps you found useful.	
8. When you're done, read the article "How to keep a lab notebook" at the following link. https://doi.org/10.1126/science.caredit.aaz3678. In your lab notebook, jot some thoughts down for why a lab notebook is useful and what are important things to do to maintain a lab notebook.	You do not have to finish the entire article if you don't have much time, but I encourage reading a few different quotes to reflect on with your lab group in discussion later.

CHECK-IN: After everyone in class has started reading the article, we will discuss the article as a class to see what some of you liked (and disliked!) about the suggestions given. Let me know when you have finished reading the article, and then if we are not yet starting class discussion, take the time to start on your Perusall homework for tomorrow - the Big Data in Bio article.

B. A little bit on computing

Next week, we will learn how to access the UR cluster (Spydur) and run text-based commands to perform genetic analyses. This will be done through a program on your computer known as the Terminal, Command Prompt, or Command Line, or more generally the *shell*. Today in the lab, we are checking to make sure you can access the cluster, so I can resolve any technical issues prior to the start of next week's lab.

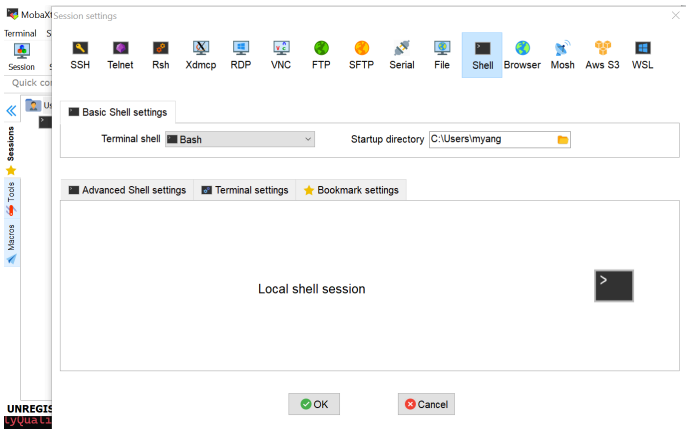
Instructions	**Comments**
1A. **For personal computers using a Mac Operating System:** Let's access a shell through which we can use the Linux language. If this step does not work, let your instructor know. A. Click on the search button at the top right. B. Type 'Terminal' and select that software. C. A new window should pop up that has some text and a cursor, that might look something like the image below.	



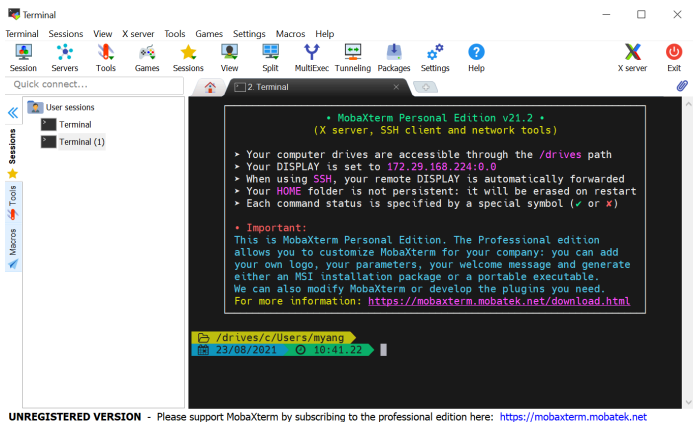
D. Continue on to step #2.

1B. **For personal computers using a Windows Operating System:** Let's access a shell through which we can use the Linux language. If this step does not work, let your instructor know.

A. There are many different software you could install to access a Terminal and use the same language we are using on Macs and Linux (BASH). If you aren't familiar with any, I recommend downloading the free version of MobaXterm using http://tiny.cc/mobaxterm.
B. Click MobaXterm Home Edition v22.1 (Portable Edition) – the blue box in the link.
C. After it downloads, extract the folder from the zipped file.
D. Open the folder and click MobaXterm_Personal_22.1.exe
E. A new window should pop up (see below), click Session → Shell. Then, click the folder icon in the 'Startup directory' and set it to your User folder. Make sure the 'Terminal shell' says "Bash".



F. Click 'OK', a Terminal window should pop up like the one below.



G. Continue on to step #2.

2. Make sure you are logged into urwin internet. If you cannot login to urwin, let your instructor know.

The following instructions will not work if you are not on urwin.

3. To log into the Spydur cluster, use `ssh <username>@spydur`. ssh means 'secure shell', and it is a secure way of accessing a remote network. It is typically the simplest way of accessing another computer connected to the internet.

<username> should be whatever is your five letter/digit web ID (e.g. mine is myang). I typed '**ssh myang@spydur**' Note that extra spaces have been added in the command to emphasize where spaces are required.

4. It will prompt for your password, which is your >16 digit UR password.

You won't see the password being typed in, and you have three attempts before you have to re-start the process.

5. If successfully logged in, your Terminal should now show something like the following image. If you cannot login, let your instructor know.

```
(base) [myang@spydur]:
```

The image indicates that the user, myang, is now writing in the Terminal from Spydur.

6. Type `pwd`, which means '**p**rint **w**orking **d**irectory'. It should return the PATH to the directory you are currently in.

Mine is /home/myang/. Yours should have a similar structure.

7. Type `cd /scratch/myang_shared/classes/BDB_F22/` → the cd command means 'change directory'. We are changing into the communal folder to which the entire class has access.

This folder is where we can all write and read files, and we have a lot of storage space for larger data files.

8. Type `ls -lrth` → ls means 'list files/directories'. Since we are in the folder BDB_F22/, this command should list all the files and directories in the directory BDB_F22/.

The image in this step shows what I saw the week before classes started, which was a single folder I made called 'Mel'. You may see multiple folders, but

```
(base) [myang@spydur]: ls -lrth
total 0
drwxrwsr-x 2 myang myang$ 10 Jan  3 16:53 Mel
(base) [myang@spydur]:
```

presumably not one with your name on it since you haven't made one yet.

9. It's your turn to make a directory for your work. Type mkdir <your first name>. You will use this directory next week for our first lab.

Remember that the <...> means I want you to insert something customized to your computer. Do not include the '<' and '>' in your command.

Completes Post-lab assignment #2

10. Take a moment now to complete the last part of the post-lab - spend some time reflecting on what you did in the lab today and write a few sentences into your lab notebook.

Completes Post-lab assignment #3

11. If you haven't been taking notes on the commands above in your lab notebook, take the time to do so now, see the question below under 'Discuss'.

Adding a link to the original source of anything you reference or paste is helpful as well, in case you need the original documentation.

DISCUSS: What can you write that will help you quickly log into Spydur and access our communal BDB_F22/ directory? Discuss with your group what you might want to put in your lab notebook as a reference to use in later weeks. Then, based on that conversation and what you want to note, take some time to add these notes and any useful images to your lab notebook.

C. Take the BioMAPS baseline assessment

On BB under '1: Intro' → Wednesday Lab, you should find the link to the BioMAPS survey. Take this survey–note that your performance will NOT be graded and I will not see your results. The goal is to provide data for the Biology Department on how students learn fundamentals of biology, and to do that, we need to have baselines for entering students. We will do one additional baseline assessment before finishing the lab today. If you finish early, feel free to take a break or immediately start on Part D.

D. Take the BioSquare baseline assessment

On BB under '1: Intro' → Wednesday Lab, you should find the link to the BioSquare survey. Take this survey–note that your performance will NOT be graded and I will not see your results. The goal is to provide data for the Biology Department on how students learn quantitative and computational skills in biology, and to do that, we need to have baselines for entering students.

Congrats on finishing your first biology lab at UR! **If you finished early, make sure you've completed all parts of the post-lab (directions shared at top of protocol).** If you have, feel free to leave early or get a headstart on homework assignments. Remember to read the Big Data in Bio article on Perusall, due by the start of class tomorrow.