Data Science Computing Project

Homework 1: The Emacs Text Editor

This homework will give you practice with the emacs text editor. When doing these exercises, please use the commands on the reference sheet at

http://www.stat.wisc.edu/ jgillett/DSCP/emacs/emacs.html

The goal is not just to get the specified tasks done, but rather to do so using the functionality available in emacs, so try to do the tasks elegantly, using the tools provided by the editor.

You may ask your classmates, TA or instructor for help with these exercises. If you collaborate with classmates, please include their names and their primary <code>@wisc.edu</code> email addresses on the line after your name in your submission files.

Editing text in emacs

- 1. Start emacs on your Linux machine.
- 2. Use emacs to make a new directory, 1 (for "homework 1"), in your ~/DSCP directory. That is, make the new directory ~/DSCP/1 (make ~/DSCP first).
- 3. There are about 65 commands listed on the reference sheet (linked above). Try every one of them on tiny files you create.

This is an important step. It doesn't take long. If you do it, you have a good chance of knowing which commands to consider for each of the exercises below. If you skip it, you may find the exercises below unnecessarily difficult and frustrating.

Delete the tiny files you created in this step.

- 4. Download baby_T_Test.R and move it to your 1 directory.
 - (a) Read baby_T_Test.R into emacs.
 - (b) The code has four problems with parentheses. Indent the buffer. The first indenting irregularity indicates a parentheses problem on the previous line. Fix it by adding a parenthesis. Repeat until the whole file is indented correctly.
 - (c) Save the file as baby_t_test.R (note "T_Test" changed to "t_test").
 - (d) Make these replacements in baby_t_test.R.
 - Inside the baby.t.test() function, replace each r (where r indicates the list being set up as a return value) with return.list.
 - Replace each occurrence of three newlines with two newlines. Hint: We can't use Enter to type a newline in the minibuffer, as it ends the minibuffer's input. Use C-q C-j to type a literal newline into the minibuffer. C-q runs quoted-insert, which allows inserting a literal newline in Linux (newline is C-j, the decimal ASCII

code 10), a control character, etc. There are still sequences of three newlines remaining, so jump to the top of the buffer and do it again. (We will see a way to do these two steps in one step after we study regular expressions soon).

- (e) Use the emacs R buffer to:
 - i. Run the chunk of code consisting of the baby.t.test() function definition.
 - ii. Run the "test case" code one line at a time. Note that the p.value test fails. The bug is that I mistakenly used df=n instead of df=n-1 in my call to pt() in baby.t.test(). Fix this bug, run the baby.t.test() chunk again, and run the test code (one line at a time) again.
 - iii. Run the entire buffer. Save the file.
- (f) Kill the R buffer. Start it again.
 - i. Find 3 + 4 (just type it at the R command prompt).
 - ii. Run source("baby_t_test.R") (just type it at the R command prompt).
- (g) Kill the R buffer again and exit emacs.
- 5. Download gettysburg1.txt and gettysburg2.txt to your 1 directory.
 - (a) Use Multiple Windows (in a single emacs session) to split emacs vertically (into halves) and vertically again (now you have one half and two quarters).
 - (b) Resize the windows so they all have the same size.
 - (c) Open gettysburg1.txt in the first window and gettysburg2.txt in the second. Open (the new empty file) gettysburg_emacs.txt in the third window.
 - (d) Use cut, copy, and paste commands to reassemble the Gettysburg Address from its segments in the first two windows into a whole in the third window. Handle each block of lines in the downloaded files separately (e.g. lines 1-2 are a block, as is line 3, as are lines 4-6). Reassemble the Address's paragraphs, by switching among the three windows as needed. Save gettysburg_emacs.txt when you are done. Close its buffer.
 - (e) Return to a single window. Open the Directory Editor on . ("dot"), the current directory.
 - i. Rename gettysburg_emacs.txt to GettysburgAddress_emacs.txt.
 - ii. Find (open) GettysburgAddress_emacs.txt again.
 - (f) Kill the rectangle consisting of the line numbers and spaces preceding each line of the address. Save GettysburgAddress_emacs.txt again.
- 6. Download roster.txt to your 1 directory. Open it in emacs. Save it as password.txt. Convert password.txt so that each line contains the last four digits of a student's ID number and each student's NetID, separated by a space. For example, the first line,

"123456789 Brown, Joe jbrown@wisc.edu should become 6789 jbrown Use the following steps.

(a) Remove the rectangle consisting of the first 5 columns of digits. (Now the first line is "6789 Brown, Joe jbrown@wisc.edu".)

- (b) Use a regular expression to trim the remaining text to the desired result. (The first line becomes "6789 jbrown".)
- (c) Save password.txt again.

Hint: roster.txt is a confusing file because it contains three whitespace characters, each invisible: SPACE, TAB, and NEWLINE. (To understand the file better, you might make a throw-away copy like roster2.txt in which you replace each TAB with a hyphen, -, and each SPACE with an underscore, _.) One way to handle whitespace within a line is to use a character class with square brackets, [], in which you type both a TAB and a SPACE.

Prepare your files for submission

Start emacs and open the (new empty) file hw1.txt.

- 1. Type your name followed by your primary @wisc.edu email address and two blank lines.
- 2. If you discussed this homework with any of your classmates, please list their names and primary <code>@wisc.edu</code> email addresses and two blank lines.
- 3. Insert your baby_t_test.R file followed by two blank lines.
- 4. Insert your GettysburgAddress_emacs.txt file followed by two blank lines.
- 5. Insert your password.txt file followed by two blank lines.
- 6. Search online to find something interesting emacs can do. Summarize it briefly (no more than 100 words) for consideration by the class for a demonstration.
- 7. Save hw1.txt and exit emacs.
- 8. Copy hw1.txt to your laptop. Here are several ways:
 - Run

scp STATuser@public03.stat.wisc.edu:DSCP/1/hw1.txt hw1.txt

(but use your user name instead of STATuser and refer to the location of hw1.txt if it is not DSCP/1/hw1.txt).

Note: Do this on your laptop, from where you can refer to public03. (On public03 there is no way to refer to your laptop.)

- On public03,
 - cp hw1.txt ~/public/html

Now you can use a browser to download hw1.txt from www.stat.wisc.edu/~STATuser/ (but use your user name, not STATuser).

• Open an empty hw1.txt file on your laptop. Copy-and-paste from public03's hw1.txt to your laptop's hw1.txt. (This is a lousy way to do it.)

Hint: Please don't worry about tiny variations in interpretation of these instructions. We will give credit to reasonable interpretations of the instructions.

Upload your hw1.txt file via the Canvas "HW1" grades item.