

You should write up this exam using latex (doing the editing in emacs). In each question, you will be asked to write some code either in perl or latex. You should copy the code to the latex source file (after the appropriate question), adding formatting as necessary. Note, some characters (for example, '\$') will need to be handled specially.

When you are finished with the assignment, attach the latex source file (which should be compilable using the command 'pdflatex') to an email and send to *mcorliss@cis.upenn.edu*. The subject of the email should be "cse399 - final" (without the quotes). The exam is due on Monday, February 27th, at 1pm. Total points: 60.

1. Preliminary.

- (a) Change your location to the 'cse399' directory you created in homework 1 (or create it again if you deleted it). Copy the directory /home1/m/mcorliss/teaching/cse399/final and all its subcontents to your current location. Change your location to this new directory (final). In this directory, you will find files 'final.tex' and 'misc.tex'. Use these files to write up your exam in latex. Use the command 'pdflatex' to test your source file and to generate a pdf.

2. [6 Points] Shell.

- (a) Describe what the command 'which' does? Show one use of it.
- (b) Describe what the command 'finger' does? Use 'finger' to find the last time you logged in and from what machine.
- (c) The command 'diff' can be used to determine the differences between two files (unlike 'cmp', which can only determine the first difference). Describe, in detail, the format 'diff' uses to indicate any differences between two files.

3. [15 Points] Emacs.

- (a) Find the command (only one command) in emacs to highlight the entire buffer.
- (b) Open the file 'data.txt'. Notice that the lines in this file are split into columns using ":". Use regular expression replacement in emacs to reverse the order of the columns. The first column in 'data.txt' should become the last column, the second column should become the second-to-last column, ...
- (c) Use macros to select the second and fourth columns and copy them to a new file 'data-2.txt'. Use ":" in 'data-2.txt' to separate the two columns. The macro should copy one line at a time. The selection of the second and fourth column should occur within the macro. When you finish defining the macro, use the repeat command to run the macro on the remaining lines.
- (d) There is a makefile in the current directory. Use the emacs compile mode to run make (not in the shell mode). In the compile command, set the compiler flags to "-O1 -g".
- (e) Set the keyword color in emacs to yellow. Do this first using a command in the current session, then add a command to your .emacs file so that the change will persist.

4. [24 Points] Scripting.

- (a) In 'convert-iphoto.sh' from homework 4, exercise 4(b), (use the script in the solutions, if yours had mistakes) add an optional test flag. './convert-iphoto.sh hpca05 test' should print out the move and sed commands that will be executed rather than actually executing them. Your output, when testing should look like the following.

```

mv hpca05/hpca05.html hpca05/index.html

cat hpca05/hpca05-Pages/Image0.html |
  sed -e "s/hpca05\.html/index.html/" > tempfile
mv tempfile hpca05/hpca05-Pages/Image0.html
cat hpca05/hpca05-Pages/Image1.html |
  sed -e "s/hpca05\.html/index.html/" > tempfile
mv tempfile hpca05/hpca05-Pages/Image1.html
cat hpca05/hpca05-Pages/Image10.html |
  sed -e "s/hpca05\.html/index.html/" > tempfile
...

```

- (b) Write a script 'add.sh' that takes two arguments. Each argument can be either a number or a script. If both arguments are numbers then 'add.sh' outputs the sum of the two numbers. If one or both arguments is a string then 'add.sh' concatenates the two numbers and outputs the resulting string. For the numeric addition, your script should use the 'expr' command ('man expr' for more information). Below are some examples of using 'add.sh'.

```

bash$ ./add.sh 1 2
3
bash$ ./add.sh 1 foo
1foo
bash$ ./add.sh foo goo
foogoo

```

- (c) Write the script from the previous exercise using perl.

5. [15 Points] Important Applications.

- Write up the exam in latex, using the files 'final.tex' and 'misc.tex'.
- Create a new CVS repository that contains the files 'final.tex' and 'misc.tex'. Check out a new copy and work from these copies.
- Commit some new changes to 'final.tex'.
- CVS (like the shell) contains a diff command. Use CVS diff to compare the new version and the previous version of the file 'final.tex'.
- CVS logs all operations. Print out the log for the file 'final.tex'.

6. About this assignment.

- Approximately, how long did it take you to complete this homework?
- Would you classify this assignment as easy, straight-forward, or difficult?