

Name: _____

Problem	Points	Score
1	40	
2	40	
3	20	
Total	100	

Notes:

- (1) For this exam you are allowed to open a terminal window on your computer, you are allowed to web surf with Google, but you cannot use online chat or other interactive services.

Problem No. 1: The directory tree:

```
/data/courses/ece_1111/2018_fall/exams/exam_01/data
```

contains over 10,000 files. One of these files contains the words “ece_1111 is a fun class” spelled using mixed case (e.g., EcE_1111 or fUN or CLaSS). Find the full pathname of the file (e.g. /data/courses/.../<filename>.txt) containing these words.

Submit the Linux command you used or any code you wrote to do this, and show your results. Note that your code must run from any directory. In other words, I should be able to execute your command from my home directory and obtain the same result that you do. Be careful how you specify paths and locations of things.

Note also that you cannot generate any intermediate files. Use a single command line, though you can use multiple commands on that line.

Problem 2: Random number generation is one of the more interesting and difficult things to do on a computer. We will write a simple piece of code that uses roundoff errors to generate random numbers.

Just as you did in HW #3, declare a float variable called val, and set it to the math constant M_PI. Write a loop to add val to another float, sum, 10,000 times. Be sure to initialize sum to zero. Then write another loop to subtract val 10,000 times from sum. Compute the error.

Extract the four least significant bits from sum and print them to stdout using this format:

```
b0 = 1 -or- 0 (depending on its value)
b1 = 1 -or- 0 (depending on its value)
b2 = 1 -or- 0 (depending on its value)
b3 = 1 -or- 0 (depending on its value)
```

Problem No. 3: We learned that binary coded decimals are used to represent numbers as integers. We also discussed the relationship between ASCII characters and decimal values. Write a C program that adds the decimal values of ASCII characters using command line arguments. Your program should accept four values from the command line:

```
my_prog.exe a b c d
```

and produce the following output:

```
the sum of the command line values is 394
```

For example, the character abcd sum to $97+98+99+100 = 394$. Your output should be an integer value – no decimal point. Your program should work for any values entered on the command line – don’t hardcode the example above.

Submit your solutions to these three problems in a single pdf file named lastname_firstname_ex01.pdf, as we have done throughout the semester. Draft the document in Word and convert it to pdf. Send the pdf document as an email attachment. Use “ECE 1111: Exam No. 1” in the subject line. Points will be deducted if you get these things wrong.

Provide your code in your pdf document in a textbox. I must be able to cut and paste your code into a terminal window (so do not include code as images). Provide a convincing demonstration that your code works.