

# Winter Quarter 2019 – UCSB Physics 129L

## Homework 2

### Due Friday, February 1, 5 pm

Read carefully the instructions on the website on how to prepare your homework for turning it in to the TAs.

If your last name starts with A through L, send the homework to Jenny. Otherwise send it to Francesco.

The emails of the TAs are on the website.

Put the instructor in CC to the email.

- **Exercise 1**

Write a program to prompt the user to enter an integer, then take the integer and print out the integer squared. Write the program such that if the user enters something that is not a number your code will not crash but rather output some kind of complaining message to the user and asks her to try again.

Valid inputs would be for example 458 or +76 or -23.

You can accomplish this in one of two ways. The brute force way is to take the input string and check that it is compliant before casting it to an integer. For this you may want to google around to find nice string methods and/or string operations that you could use.

The more elegant way is to use the python `try...except` statements for handling “exceptions”. See

<https://docs.python.org/3/tutorial/errors.html> for more details. If you have time, you should try both ways (but you do not have to), since there is something to learn in both approaches.

- **Exercise 2**

Write a program to prompt the user to enter a sentence and print out a count of the number of words and the number of characters in the sentence. Note that words can be separated by white spaces but also commas, etc. So your program should deal with that, e.g., “hello world” and “hello, world” and “hello,world” all consists of two words.

- **Exercise 3**

Same as exercise 2 but print out the same sentence with repeat words (if any) removed. For simplicity, you can omit the punctuations in your answer.

- **Exercise 4**

Write a program that outputs all integers between 100 and 400 (included) such that all of their digits are even.

- **Exercise 5**

Write a python program that runs the shell `/bin/ls /etc` command and writes the output to the screen. Something like this could be useful because the output of the shell command would then be available to python for further processing.

Hint:

See [https://www.bogotobogo.com/python/python\\_subprocess\\_module.php](https://www.bogotobogo.com/python/python_subprocess_module.php)  
This could be done either through the `os` or `subprocess` module.

- **Exercise 6**

Write a program that asks for a number and return the prime factors of that number, with their relative powers. For example if the number was 4567956 it should return something like

2 to the power 2

3 to the power 1

191 to the power 1

1993 to the power 1

or the equivalent information.

Hint: you may want to test your code on some sample numbers using web calculators such as

<https://www.calculatorsoup.com/calculators/math/prime-factors.php>