

6.189 Homework 2, Optional Problems

<http://web.mit.edu/6.189/www/materials.html>

Exercise OPT.1 – Pig Latin Sentences

This optional problem builds on the work you did in Exercise 4.2. Save your work for this problem in a new file, `pig_latin.py`; you may wish to reuse the code you wrote before to help with this exercise.

Converting one word to Pig Latin is okay, but it would be more useful to be able to convert whole sentences; so for this exercise, we'll use `raw_input` to ask the user for a full sentence and translate it, word by word. It's tricky for us to deal with punctuation and numbers with what we know so far, so instead, ask the user to enter only words and spaces. You can convert their input from a string to a list of strings by calling `split` on the string; also, you can use `lower` to make a string all lowercase:

```
>>> phrase = 'My namE is JohN SmIth'
>>> word_list = phrase.split()
>>> print word_list
['My', 'namE', 'is', 'JohN', 'SmIth']
>>> lowercase_phrase = phrase.lower()
>>> print lowercase_phrase
'my name is john smith'
```

Using a list of words, you can go through each word and convert it to Pig Latin.

Hint: It will make your life much easier - and your code much better - if you separate tasks into functions, e.g. have a function that converts one word to Pig Latin rather than putting it into your main program code.

More extensions: Once you have your program working, make it interactive such that it keeps translating phrases into pig latin until the user enters in the phrase `QUIT`. Or, you can add in some more complex Pig Latin rules - for example, words that start with “th”, “st”, “qu”, “pl”, or “tr” should move both of those letters to the end.

Eg, “stop” → “opstay”, and “there” → “erethay”

There are many other Pig Latin rules that you can find online if you want a true converter. Finally, you could try and deal with punctuation by looking for it within a string and moving it to the end of the word (the solutions I wrote only handle commas, periods, `!`, `?`, `:` and `;` that appear at the ends of words, as they are pretty simple to handle).

Feel free to show your modified pig latin code to a staff member (although if it's close to a checkoff due date, or the lab is really busy, we may ask you to come back later), and we'll look it over with you! It's fine to show this extended version in order to get your checkoff 4.

Exercise OPT.2 – List Comprehension Challenges (tricky!)

You'll want to do this problem after you've completed the more basic list comprehension problems available on the online tutor.

1. Write a function that takes in a list of elements of different types and uses a list comprehension to return all the elements of the list of type `int`. **Note:** The function `isinstance` will be of help here. Google “Python isinstance” and see if you can figure out what it does, or type `help(isinstance)` at the Python shell.
2. Write a list comprehension which solves the equation $y = x^2 + 1$. Your solution should print out a list of $[x, y]$ pairs; use the domain $x \in [-5, 5]$ and the range $y \in [0, 10]$.
3. Similarly, write a list comprehension that finds the integer solutions $[x, y]$ for a circle of radius 5.
4. Make your own list comprehension challenge! Write a comment of what you're trying to do in your code, then put the list comprehension below the comment. If you think of a good tricky one, send it to sarina@mit.edu