

Extra practice problems are for beginning programmers who are finding some aspect of the homework challenging. They will break some of the homework problems into smaller pieces and solutions are provided. Try to answer each question yourself before checking against the (provided) answers. There will often be more than one way to accomplish each task. Again, the goal of the homework is to force you to practice thinking through programming problems yourself. Extra practice practice problems are for your own use, and do not need to be turned in.

Problem 1 -

Use Biopython to transcribe "CCTGAAAGATTTGAATGTACTTGA" from (coding strand) DNA to mRNA.

Problem 2 -

You have a list of lists of numbers:

```
[[1,2,5,4,8,9],[5,6,7,8],[1,3,5,7,9],[1,2,4,6,8,9],[2,4,6,8]]
```

write a script to enumerate all numbers appearing in any of the lists and count how many times each value exists. Print a sorted list of numbers and number of occurrences for each.

Problem 1 -

Use Biopython to transcribe "CCTGAAAGATTTGAATGTACTTGA" from DNA to mRNA.

This is really just a matter of figuring out how to use biopython. Once you know how biopython represents data, this is a pretty trivial task:

<http://biopython.org/DIST/docs/tutorial/Tutorial.html#sec17>

```
from Bio.Seq import Seq
from Bio.Alphabet import IUPAC
my_seq = Seq("CCTGAAAGATTTGAATGTACTTGA", IUPAC.unambiguous_dna)
print my_seq.transcribe()
```

now see if you can take the next step and translate this to a protein sequence.

Problem 2 -

You have a list of lists of numbers:

```
[[1,2,5,4,8,9],[5,6,7,8],[1,3,5,7,9],[1,2,4,6,8,9],[2,4,6,8]]
```

write a script to enumerate all numbers appearing in any of the lists and count how many times each value exists. Print a sorted list of numbers and number of occurrences for each.

There are many approaches you could use for this problem. You could have a nested loop to loop over the outer and inner lists, or you could combine the sublists into one long list, then process that...

Here's an efficient way of doing it:

```
lol= [[1,2,5,4,8,9],[5,6,7,8],[1,3,5,7,9],[1,2,4,6,8,9],[2,4,6,8]]
```

```
combined=[]
for i in lol: combined.extend(i)

vals=set(combined)
for i in sorted(vals): print i,combined.count(i)
```

As it happens, there is a python module called 'collections' designed to do exactly this sort of thing (python 2.7+):

```
from collections import Counter
lol= [[1,2,5,4,8,9],[5,6,7,8],[1,3,5,7,9],[1,2,4,6,8,9],[2,4,6,8]]

ctr=Counter()
for i in lol: ctr.update(i)

print sorted(ctr.items())
```