

### Task 1

In a file called `transcriptic_test_1.py` define two functions, `robotize(well)` and `humanize(well)`. These functions should convert well references declared in robot form (each well is represented by an integer, indexed from zero row-wise) to human form (ex: "A1") and vice-versa. Assume a 96-well plate containing 8 rows labeled A-H and 12 columns labeled 1-12. You may also write other helper functions or import packages if you feel the need to. Add assertions and/or tests to make sure all wells are represented.

### Task 2

In a file called `transcriptic_test_2.py` write a Python script that takes a cDNA sequence of any given length and optionally prints out either its RNA translation or all of the possible in frame sequences that result in a (theoretically) valid protein (including start and stop codon). Your script should take an operation and filename from the command line, and print its output to standard out. For example:

```
$ cat dna.txt
```

```
GCGCTTGGTTTAATGACGGCTTGTTCCTTTCTGTGGCTGCGTGAAAGCCTTGAGGGGCTCCGGGAGGGCCCTTT  
GTGCGGGGGGAGCGGCTCGGGGGTGCGTGCGTGTGTGTGTGCGTGCGGGGAGCG
```

```
$ python transcriptic_test_2.py --rna dna.txt
```

```
GCGCUUGGUUUAAUGACGGCUUGUUUCUUUUCUGUGGCUGCGUGAAAGCCUUGAGGGGCUCCGGGAGGGCCCUUU  
GUGCGGGGGGAGCGGCUCGGGGGUGCGUGCGUGUGUGUGUGCGUGGGGAGCG
```

```
$ python transcriptic_test_2.py --genes dna.txt
```

```
1 valid protein(s) can be produced from this sequence:
```

```
DNA: ATGACGGCTTGTTCCTTTCTGTGGCTGCGTGA
```

```
RNA: AUGACGGCUUGUUUCUUUUCUGUGGCUGCGUGA
```

```
amino acid sequence: MTACFFSVAA.
```

Use the following codon table (next page):

RNA codon table

1st position	2nd position				3rd position
	U	C	A	G	
U	Phe Phe Leu Leu	Ser Ser Ser Ser	Tyr Tyr stop stop	Cys Cys stop Trp	U C A G
C	Leu Leu Leu Leu	Pro Pro Pro Pro	His His Gln Gln	Arg Arg Arg Arg	U C A G
A	Ile Ile Ile Met	Thr Thr Thr Thr	Asn Asn Lys Lys	Ser Ser Arg Arg	U C A G
G	Val Val Val Val	Ala Ala Ala Ala	Asp Asp Glu Glu	Gly Gly Gly Gly	U C A G

Amino Acids

Ala: Alanine  
Arg: Arginine  
Asn: Asparagine  
Asp: Aspartic acid  
Cys: Cysteine

Gln: Glutamine  
Glu: Glutamic acid  
Gly: Glycine  
His: Histidine  
Ile: Isoleucine

Leu: Leucine  
Lys: Lysine  
Met: Methionine  
Phe: Phenylalanine  
Pro: Proline

Ser: Serine  
Thr: Threonine  
Trp: Tryptophane  
Tyr: Tyrosine  
Val: Valine