24. *(expires 5/13)* The string below was encrypted using an affine cipher on the 27
letter alphabet “abcdefghijklmnopqrstuvwxyz” (there is a space in the 0th position.)
Decrypt it.

`fmw segjaweouanerj a ceyqrype aswaheaqbrqaabeafrua eeaojerf afmjeayperjpu`

Hint: this phrase follows the the typical pattern in English where there are (almost)
as many spaces as words (and so spaces are very common), and the letter “e” is also
very common. You can use the technique described in chapter 4 of the notes, section
7.3.

25. *(expires 5/13)* Recall that a Vignere cipher can be interpreted as a Caesar-like cipher
on n-vectors, where n is the length of the key phrase. Can every affine encipherment
on digraphs (two-character codes) be interpreted as an affine matrix encipherment
on 2-vectors? That is, suppose I encode a message by affine enciphering on di-
graphs. Can I always get the same crypttext from the same plaintext using an affine
matrix enciphering (using a $2 \times 2$ matrix) on 2-vectors? If your answer is yes, prove
it. If no, give a counter-example that cannot be so interpreted.

26. *(expires 5/13)* Modify the `AffineMatEncode` routine from the notes so that you
can use a text string as a key instead of a matrix and a vector. For example, if the
phrase is k characters long, the key should be an $n \times n$ matrix and an $n$-vector, where
$n^2 + n \approx k$. The elements of the key matrix and vector should be the numerical
equivalents of the characters in the key phrase. Do something sensible with any
extra letters (that is, if $k \neq n^2 + n$). Be sure to check that the resulting matrix is
nonsingular.