An alphabet ring is formed if the 26 letters of the alphabet are written down (in any order) on the circumference of a circle, so that each letter has a predecessor and a successor. This article describes several logological studies based on such rings.

There are many different ways in which the letters can be arranged in an alphabet ring so that every bigram in the ring (every pair of adjacent letters) can be imbedded in a word. In this context, the term "imbedded" means without interruptions caused by spaces, hyphens, apostrophes or any intervening letters. However, this task becomes considerably more difficult if the more stringent requirement is imposed that every trigram in the ring must be imbedded in a word. If one restricts the vocabulary of words to boldface entries in the Merriam-Webster Pocket Dictionary, the following arrangement of letters satisfies the requirement:

\[\text{QURGHFICKJAWNTZVOMSPLYBDEX}.\]

Note that only 19 different words (instead of the theoretical maximum of 26) were needed, a measure of the quality of the solution. It may well be possible to find even shorter word lists.
Suppose that one requires that every tetragram on the ring be imbedded in a word. It is quickly evident that this is a far more difficult task. If the word stockpile is enlarged to allow boldface entries from Webster's Second or Third, the best solution to date is given below. Not only is it impossible to close the ring, but apparently one cannot use more than 24 different letters:

\[
\text{G \ H \ P \ O \ L \ V \ S \ B \ E \ C \ K \ W \ A \ N \ D \ U \ R \ M \ I \ X \ T \ Y \ F \ Z } \text{ (no J or Q)}
\]

bou G H P o t
cate H P O L e
POL V erine
s O L V S B E r gite
mi S B E C om ing
B E C K on
n E C K W a rd
h a i K W A N
W A N d e r
G A N D U l
e N D U r e
D U R M a s t
t U R M i t
o v e R M I X T u r e
s I X T Y F o ld
s T Y F Z i e k t e

If the Random House Unabridged Dictionary is also allowed, this solution can be improved to 25 letters. Note that UR has been removed from the interior of the sequence, and RJU has been placed at the beginning:

\[
\text{R J U G H P O L V S B E C K W A N D M I X T Y F Z } \text{ (no Q)}
\]

inte R J U G a l (Random House)
J U G H e a d
b o U G H P o t
............
W A N d e r
I A N D M I l
a D M I X
o v e r M I X T u r e
........ ...

s T Y F Z i e k t e

Although the tetragram sequences were basically constructed by trial and error, the work was materially aided by the existence of a list previously mentioned in Word Ways: R. B. Thomas, M. Kas l e r, and G. Wooley, Advanced Character Recognition Techniques Study, Report Number 4, Appendix D. Tetragrams Legal With Respect to Webster's International Dictionary (Unabridged Second Edition), U.S. Army Electronics Research and Development Laboratory,
The construction of alphabet rings (or incomplete sequences) is hampered by a general shortage of vowels relative to consonants; on the average, vowels (including Y) must be separated by three or four consonants apiece. This is especially troublesome when the letter Q is to be included, for nearly all Q-words are followed by two vowels. A few exceptions are QOPH, QINTAR, SQUADGY and MIQRA, but usually one cannot locate words having lead-in tetrgrams (such as -QOP, -QRA, -QIN). Similarly, V is a letter which nearly always is followed by a vowel; consonant chains beginning with V are rather rare (pervSKite, soVKHoz, soLVSbergite).

Let us turn now to the inverse problem -- that of arranging letters in an alphabet ring so that no trigram in the ring can be imbedded in a word. This turns out to be a fairly easy task, even if one allows boldface words from Webster's Second or Third Editions:

\[ \text{VGIQAOJYULCDRHPMNZSBTXEFK} \]

Again, the above-mentioned list of legal tetrgrams was of considerable value in finding this solution. Undoubtedly there are many other equally valid arrangements.

One can rather quickly show that it is impossible to construct an analogous alphabet ring for bigrams, even when one is restricted to the Merriam-Webster Pocket Dictionary, because several letters (A, E, I, N, O, R) form legal bigrams with all possible successors, and others (I, U) with all possible predecessors. The longest possible sequence of impossible bigrams appears to be only 16 letters:

\[ \text{UWJCFMKVBQPZDXR} \]