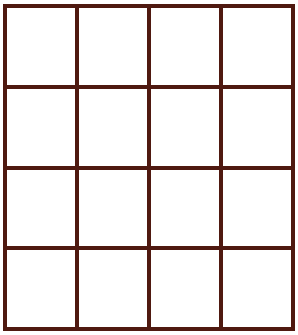
# September 2017 Puzzle

Place the letters *A, B,* and *C* in the 4x4 grid below so that each of the following "words" can be found in a row (read left to right) or column (read top to bottom).

*ACAA BACA BACC BBAB BBAC CBBA CBCA CBBC*



# September 2017 Solution

The two possible solutions to the puzzle are shown below.

| | | | |
|---|---|---|---|
| C | B | B | A |
| B | B | A | C |
| B | A | C | A |
| C | B | C | A |

| | | | |
|---|---|---|---|
| C | B | B | C |
| B | B | A | B |
| B | A | C | C |
| A | C | A | A |

As one can easily see, each of these solutions can be obtained from the other by simply interchanging each row with the corresponding column (change row 1 to column 1, row 2 to column 2, etc…).

A strategic method for coming up with the solutions will now be provided.

We start by determining where the word *ACAA* must go. Since we can easy convert a solution where *ACAA* is in a row, to one where it is in a column (as described above), we will focus on a solution where *ACAA* is in a column. This is the only word which has *A* as its first letter and therefore, it cannot be placed in column 1 for otherwise, column 1 and row 1 would both have words starting with *A*. Similarly, *ACAA* is the only word that has *C* as its second letter, and therefore it cannot be placed in column 2. If *ACAA* where in column 3, then there would be three rows containing words where *A* was the third letter. However,

that isn't possible since there are only three words with $A$ as the third letter and $ACAA$ is one of them, which would have already been placed in column 3. We conclude that $ACAA$ must be located in column 4.

Since no other words start with $A$, we see that no other $A$'s can be placed in column 1 or row 1.

We now look to determine which word must be placed in column 1. The only word that starts with $B$ and ends with $A$, is $BACA$ which can't be in row 1, since no other $A$'s can be placed in row 1. Therefore, row 1 cannot begin with a $B$. The only word starting with $C$ that doesn't contain the letter $A$ is $CBBC$, and thus $CBBC$ must be in the first column.

We immediately determine that $BACA$ must be in row 3 as it is the only word starting with $B$ and ending with $A$.

Of the words remaining, only $BBAB$ and $BBAC$ have $A$ as the third letter and therefore these are the only two words to consider for column 2. But if we put $BBAC$ in column 2, then row 4 would start with $CC$ and there are no words that start $CC$. Thus, we must have $BBAB$ in column 2.

At this point, all that remains is to complete column 3. The only words remaining with $C$ as the third letter are $BACC$ and $CBCA$. But if we put $CBCA$ in column 3, then $CBCA$ would also appear as row 1. Therefore, we conclude that column 3 must be $BACC$ and the puzzle is complete.

| | | | |
|---|---|---|---|
| | | | A |
| | | | C |
| | | | A |
| | | | A |

| | | | |
|---|---|---|---|
| C | | | A |
| B | | | C |
| B | | | A |
| C | | | A |

| | | | |
|---|---|---|---|
| C | | | A |
| B | | | C |
| B | A | C | A |
| C | | | A |

| | | | |
|---|---|---|---|
| C | B | | A |
| B | B | | C |
| B | A | C | A |
| C | B | | A |

| | | | |
|---|---|---|---|
| C | B | B | A |
| B | B | A | C |
| B | A | C | A |
| C | B | C | A |