Introduction to Kakuro

There are black and white fields in a Kakuro game. If a black field does not contain a number, it can be ignored and only serves as a boundary. Otherwise it contains numbers. The white fields are empty in the beginning. It’s our job to enter the digits from 1 to 9 into the white fields. The numbers in the black fields are sums, the white fields contain summands, i.e. digits that add up to the total sum. If the sum is at the bottom left of the black box, the summands are entered in the white boxes below it. If the sum is at the top right, the summands are entered to the right. In some black fields, there is a number in the bottom left as well as the top right corner.

For example, let's assume that there is a 10 in the top right-hand corner of a black field. There are three white fields to the right of it. We now have to enter three numbers in these three fields that add up to 10 (for example: 2, 3 and 5). The following rules apply in Kakuro:

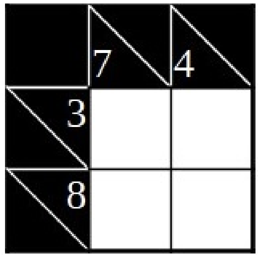
1. Only digits between 1 and 9 may be entered (0 is not allowed)
2. Each number from 1 to 9 may only occur once per sum
3. Only one digit may be entered per field

As only numbers from 1 to 9 may be entered and none of the numbers can occur twice or more, the highest possible sum is 45 (1+2+3+4+5+6+7+8+9). The smallest possible sum is 3 (1+2). Anything less is not possible, as the sum must consist of at least two digits and these must not be repeated. 1 + 1 = 2 is therefore not possible. 0 + 1 = 1 is also not possible.

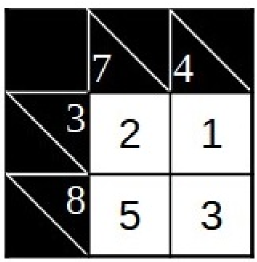
Some kakuro developers add an additional rule: Here, a combination of digits for a sum may only occur once per Kakuro. Let's assume that we have the sum 5 with two digits twice. Then we would have to enter 1 and 4 once and 2 and 3 once, but not one of them twice.

However, this is not an official Kakuro rule. Therefore, I will not use it in this book.

As an example, let's take a look at one of the easiest Kakuro puzzles imaginable, with only four white fields and four sums.



It would make sense to start at the intersection of sum 3 and sum 4. There is only one possibility for each of the two sums. As mentioned above, 3 can only be formed with 1 and 2. For the 4, the only two summands are 1 and 3. If you compare the summands of the two sums, only the 1 occurs in both. The 1 must therefore be at the intersection of the sums 3 and 4. The other digits can then simply be calculated so that we arrive at the following solution:

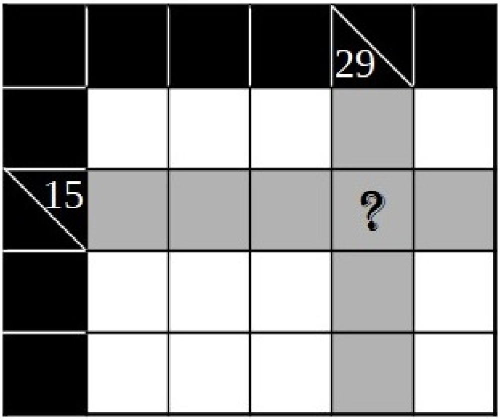


Of course, such a Kakuro is very easy and even the puzzles for beginners (as in this book) are much more difficult. However, we can apply the same tactics as above to more difficult and larger puzzles.

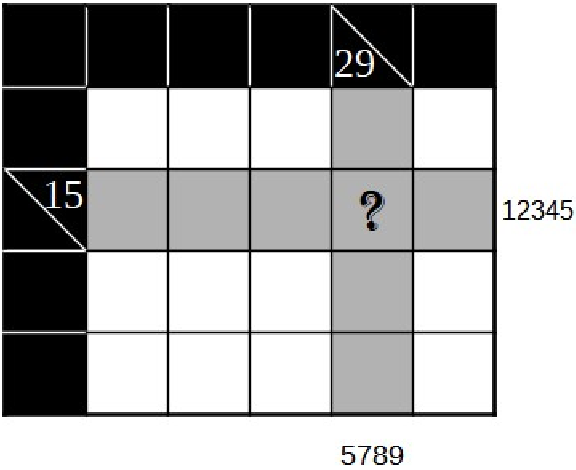
A good place to start is to look at the sums for which there is only one possibility, as we saw above with the 3 and the 4. These are called unique sums. For these sums, you can write the summands at the edge of the paper or with pencil in the fields. Then look at whether there is an intersection between two sums for which only one candidate is possible. This candidate would occur in both sums. You can view a list of all possible Kakuro combinations on my website at

kakuro-online.de/Tabelle_Kombinationen_Kakuro.pdf

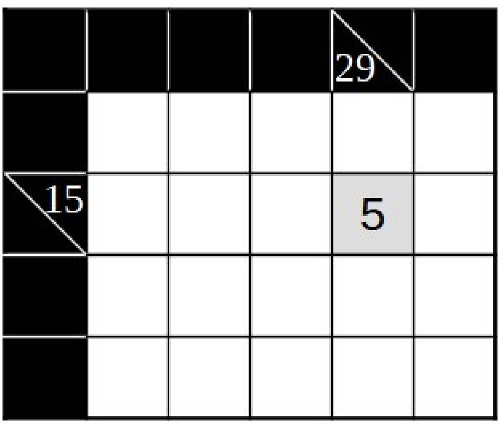
We can take a look at the following excerpt. This is a little more complicated than the simple example above, but we follow the same logic.



There is only one possibility for each of these two sums. The 15 with five fields can only be formed as 1+2+3+4+5, the 29 with four fields only as 5+7+8+9.

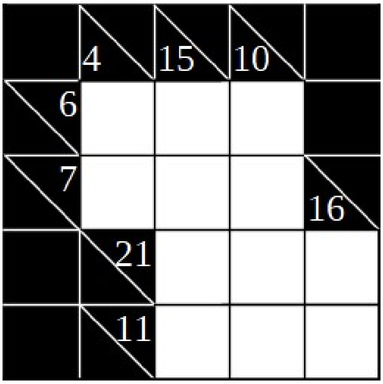


The only number that appears in both variants is 5, so the intersection, the field with the question mark, can only contain 5 to fulfill the rules of a Kakuro.



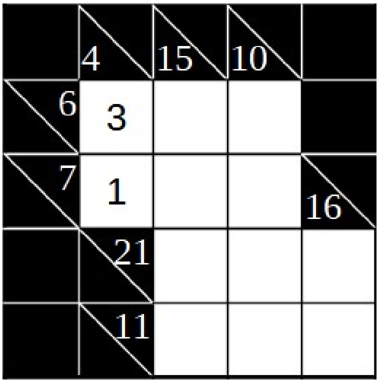
However, there is often only one possibility even for non-unique sums. Let's assume that we have the sum 15 with two digits and the 9 with three digits. These two sums intersect at one point. For the 15 with two digits, there are two possibilities: 6 and 9 or 7 and 8. For the 9 with three digits, three variants are possible: 1 + 2 + 6, 1 + 3 + 5 or 2 + 3 + 4. If we now compare the two possibilities for the 15 and the three possibilities for the 9, we notice that only the 6 can occur in both sums. Therefore, only 6 and 9 remain for the 15 and 1, 2 and 6 for the 9. The 6 must then be at the intersection of the two sums.

Let's take a look at a complete and small example to illustrate the strategies. This Kakuro has 5 rows and 5 columns, a size that we will also start with here in the puzzles in this book. This example will hopefully illustrate how to proceed when solving a (simple) Kakuro. At the beginning we have the following situation:

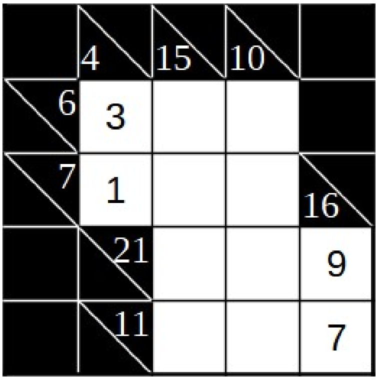


A good place to start would be in the top left-hand corner, as we are dealing with small sums there. There is only one possibility each for 4, 6 and 7. We have to remember that no digit may occur twice within a sum, which is why 2 + 2 = 4 is not allowed in Kakuro. The 4 can therefore only be formed from 1 and 3, the 6 (with three summands) only from 1, 2 and 3 and the 7 (also three summands) from 1, 2 and 4.

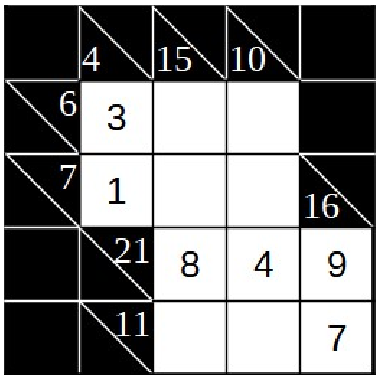
The 3 can not appear in the sum 7. Therefore, only the 1 can be at the intersection of 4 and 7, with the 3 in the cell above it.



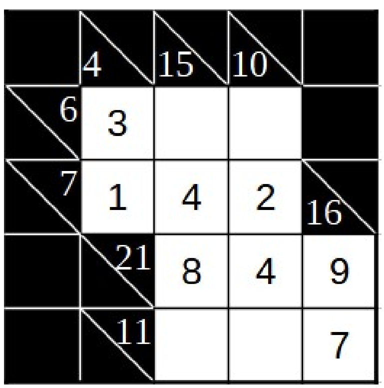
In the next step, we can take a closer look at the bottom right corner. Due to the rules, the 16 with two digits can only be formed from 7 and 9. We can now examine what influence these two digits have. Among other things, the sum intersects with the sum 11 made up of three digits. What would happen if we were to write the 9 in the field at the bottom right? Then we would have a remainder of 2 for the sum 11 and two fields left. However, this is only possible as 0 + 2 or 1 + 1, neither of which is allowed. From this we can conclude that the 7 must be at the bottom right and not the 9.



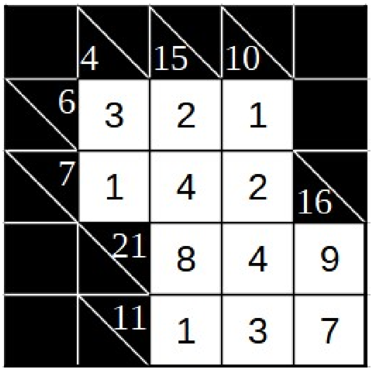
In the sum 21, one field is now already occupied by the 9. This leaves two fields with a remainder of 12. There are basically three possibilities for this: 3 + 9, 4 + 8 and 5 + 7. However, we can immediately rule out the first of these possibilities, as the 9 already appears in the sum. This leaves us with 4/8 or 5/7. We have an intersection with the sum 10 (four summands). This is also a unique sum that can only be formed from 1, 2, 3 and 4. From our options above (4/8 or 5/7), only the 4 also occurs in the sum with 10. Therefore, the 4 must be at the intersection and the 8 remains to the left of it.



Now we can take another look at the sum 7. The 1 is already entered here and only 2 and 4 remain. However, we have already entered one 4, so there cannot be another one in the same column. The 4 is therefore directly next to the 1, the 2 to the right of the 4.



Now we can also solve the row with the sum 6. Only 1 and 2 remain here, but 2 is already in the same column within the sum 10. So the 1 must be entered there and the 2 in the middle. We can then enter the remaining digits without any problems and arrive at the following solution:



This was a rather simple example and most puzzles in the book will be more difficult. But I hope that the basic approach has become clear.

As a general rule (but not always), a Kakuro has 10 rows and 10 columns. This makes sense, as a sum can consist of a maximum of 9 summands. With 10 rows or columns, we would have a maximum of 9 white fields without interruption. However, there are also smaller Kakuro games, as we have seen above. Puzzles with more than 10 rows and/or columns are also possible. The only thing to note here is that there must not be more than 9 white cells in a row, i.e. without being interrupted by a black cell. Furthermore, the shape of the entire grid does not necessarily have to be square. The number of rows and the number of columns could be different.

In this book, which is aimed at beginners, we start with smaller Kakuro and then gradually work our way up to 10x10 grids.

But now have fun and good luck with the puzzles!