BMmT Puzzle Round 2015

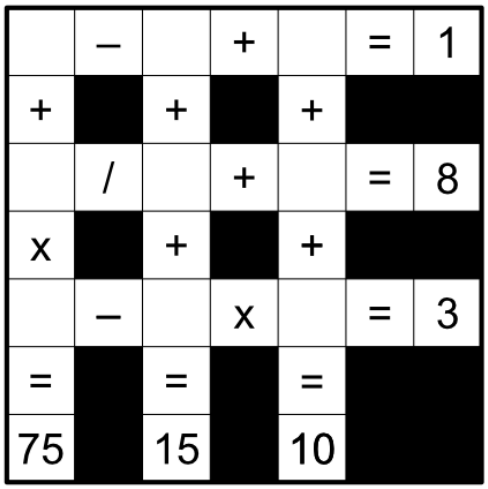
The puzzle round is a team round. You will have one hour to complete the twelve puzzles on the round. Calculators and other electronic devices are not permitted.

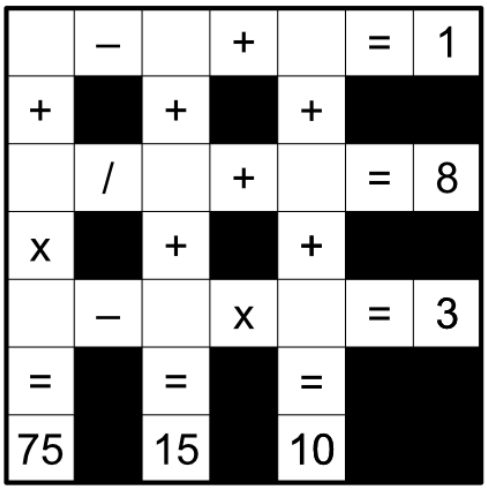
The puzzles are not necessarily in increasing order of difficulty; however, in general, the first puzzle of each type is intended to be slightly easier than the second puzzle of the same type.

1 Number Crosswords

The object of these Number Crosswords is to place the integers 1 to 9 in the cells such that the six equations hold. Each integer from 1 to 9 must be used exactly once. In the first puzzle, the equations are evaulated from left-to-right and from top-to-bottom. In the second puzzle, the equations are evaluated using order of operations. (Order of operations means that if a row/column has both multiplication/division and addition/subtraction, the multiplication/division is evaluated first. Otherwise, evaluate equations from left-to-right and from top-to-bottom.) Examples of order of operations vs. left-to-right are below for your convenience.

With order of operations, $3 + 5 \times 7 = 38$. Evaluated left-to-right, $3 + 5 \times 7 = 56$. Whether you evaluate with order of operations or evaluate left-to-right, $3 - 5 + 7 = 5$.

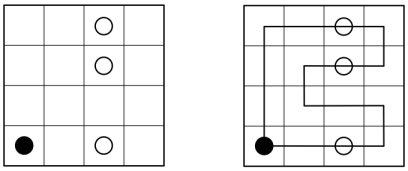




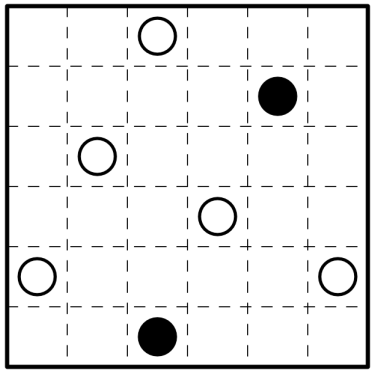
2 Masyu

(Rule explanation by Palmer Mebane)

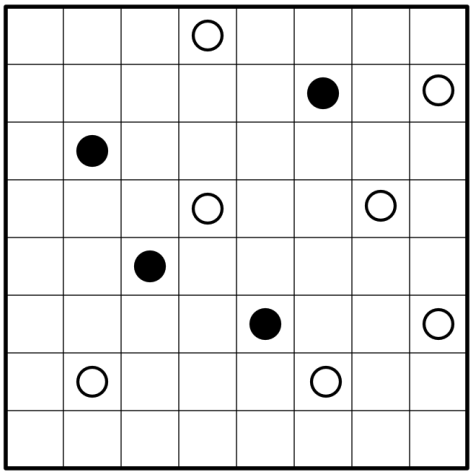
Masyu is a puzzle originally from nikoli. The object is to draw a single closed loop passing through adjacent squares. Some squares are marked with a black or white circle. At a white circle, the loop must go straight through. Additionally, it must turn on the square visited right before or right after the white circle (it may turn on both, but not neither). At a black circle, the loop must turn, and then go straight through both of the two adjacent squares. The solution is unique. Below is an example masyu along with its solution for your convenience.



1. 6x6



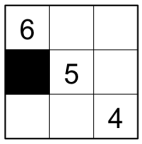
2. 8x8

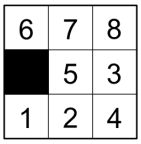


3 Hidato

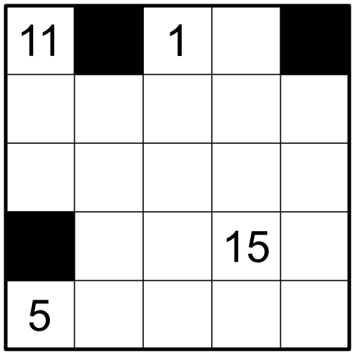
(Rule explanation by Palmer Mebane)

In Hidato, you are to fill in the white squares with numbers from 1 to N, each number used once, where N is the number of squares not shaded black. You must do so in a way so that any two consecutive numbers are placed in touching squares. It is permitted for these squares to touch only at a single point. Some numbers will be given to you. One can think of a Hidato puzzle as placing a chess king, which can move in any of the eight directions, on a square and having it move until each square has been visited exactly once. The number k in a square means that is the kth square that the king visits. Below is an example hidato along with its solution for your convenience.

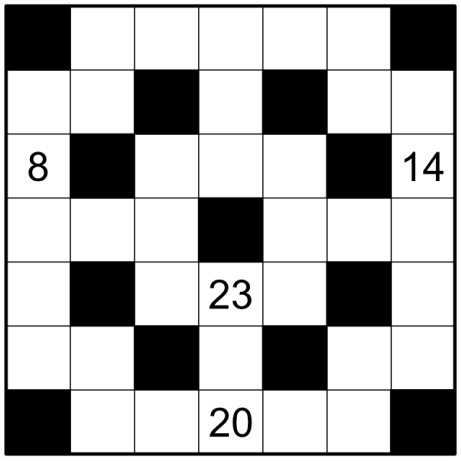




1. 5x5 (use 1-22)

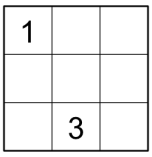


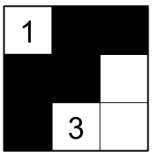
2. 7x7 (use 1-36)



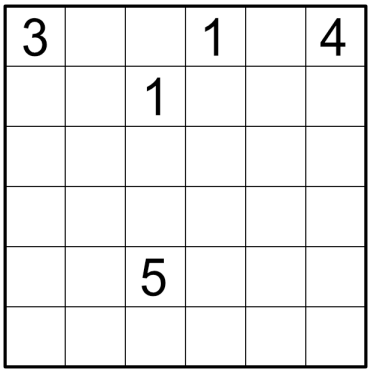
4 Nurikabe

(Adapted from a rule explanation by Palmer Mebane) Nurikabe is a puzzle originally from nikoli. The object is to determine whether each grid cell is filled in or not. Grid cells must be filled in so that all the filled-in squares form one connected region, not counting squares touching at a corner to be adjacent, but it is not allowed to have a two by two square of black cells. Grid cells with numbers are not filled in. Finally, each connected region of unfilled cells must contain exactly one number, which tells how many unfilled cells there are in that region. When solving, you may find it useful to also place a dot inside squares which must be part of an island. Below is an example nurikabe along with its solution for your convenience.

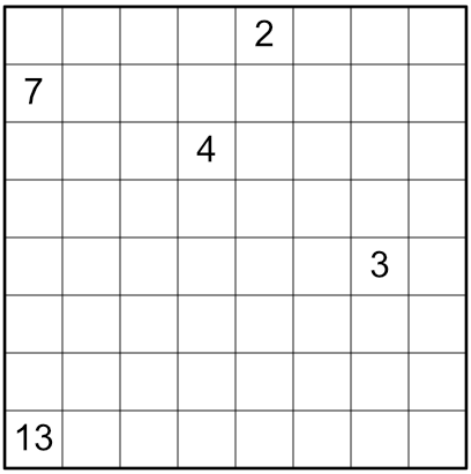




1. 6x6

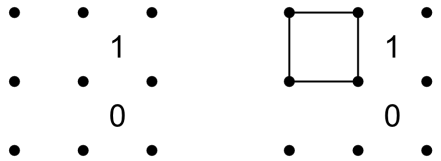


2. 8x8

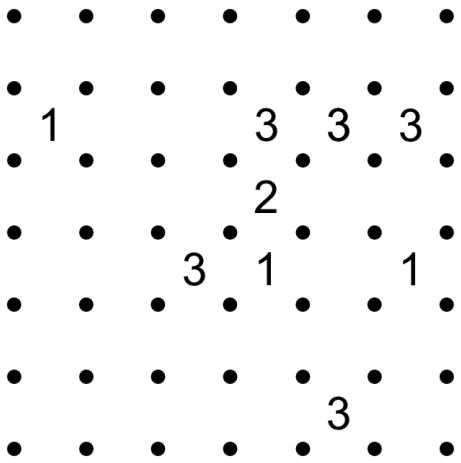


5 Slitherlink

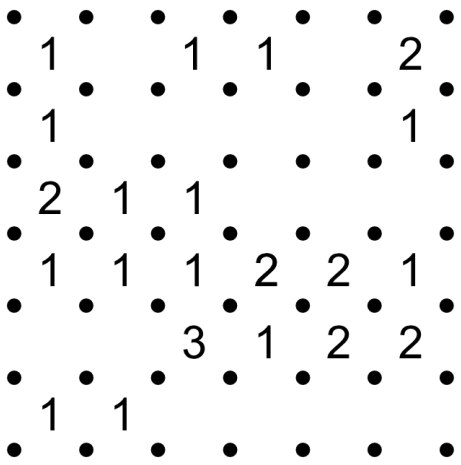
(Rule explanation by Palmer Mebane.) Slitherlink is a puzzle originally from nikoli. The object is to draw horizontal and vertical segments of unit length that connect the dots so that a single closed loop is formed. The loop cannot intersect itself. Numbers in the grid indicate how many of the four potential segments surrounding that square are contained in the loop. The solution is unique. When solving, you may find it useful to draw a small "x" in places where there cannot be a loop segment. Below is an example slitherlink along with its solution for your convenience.



1. 6x6



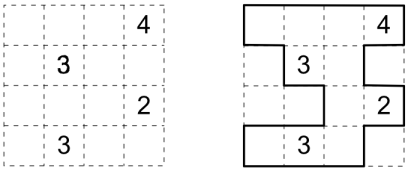
2. 6x6



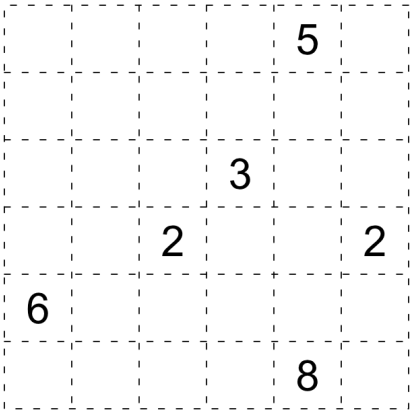
6 Corral

(Rule explanation by Palmer Mebane)

Corral is a puzzle originally from nikoli. The object is to draw a single closed loop along the gridlines that does not intersect itself. The loop should enclose every number in the grid. Furthermore, if we treat the loop as a wall, the number tells how many grid squares in the loop can be seen from the number's square when looking vertically or horizontally, where the number's own square is counted. The solution is unique. When solving, you may find it useful to shade squares known to be outside the loop and mark squares known to be inside the loop with a dot. Below is an example corral along with its solution for your convenience.



1. 6x6



2. 6x6