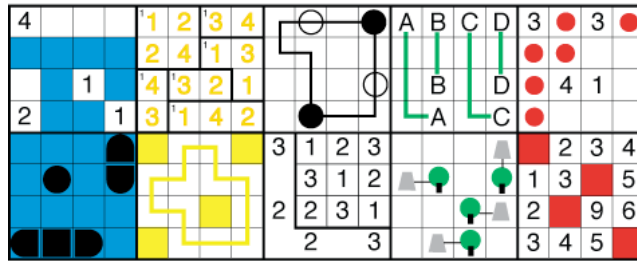


20/10 Puzzle



Decathlon

by Thomas Snyder
(motris.livejournal.com)

The Olympic Decathlon tests a wide range of physical skills, on the track and on the field, to separate the “best athletes” from the rest of the field. In this 20/10 Puzzle Decathlon, I’ve sought to test a range of mental skills to separate the “best puzzle solvers” from the rest of the field.

The 20/10 Puzzle Decathlon consists of ten puzzle types; each type is represented by two “classic” puzzles – an “easy” and a “hard” of the style – as well as one “mutant” puzzle, a variation that will require some unfamiliar thinking. In total there are 20 classic/10 mutant puzzles. All of the “easy” puzzles will be worth 15 points each while the “hard” and “mutant” puzzles will be worth 30 points each, for a total of 750 puzzle points. The test will last for exactly 120 minutes.

To reward solvers with the broadest set of skills, bonuses will be awarded for solving puzzles across all the puzzle types. A total of 450 points of bonus can be earned based on solving 1, 2, or all 3 puzzles across the various styles as follows:

For solving at least 1 puzzle in 9 or 10 of the puzzle types: +150 points
in 8 of the puzzle types: +100 points
in 7 of the puzzle types: +60 points
in 6 of the puzzle types: +30 points
in 5 of the puzzle types: +10 points

For solving at least 2 puzzles in 9 or 10 of the puzzle types: +150 additional points (+300 total bonus)
in 8 of the puzzle types: +100 points
in 7 of the puzzle types: +60 points
in 6 of the puzzle types: +30 points
in 5 of the puzzle types: +10 points

For solving all 3 puzzles in 9 or 10 of the puzzle types: +150 additional points (+450 total bonus)
 in 8 of the puzzle types: +100 points
 in 7 of the puzzle types: +60 points
 in 6 of the puzzle types: +30 points
 in 5 of the puzzle types: +10 points

The 9 or 10 requirement at the top is meant to not overly punish a solver who makes a single answer entry mistake, so it is recommended solvers still try to get all 10 types and not just 9 because of this possibility. Note that the identity (easy/hard/mutant) of the solved puzzles does not matter for the bonus. Someone solving all 10 easy puzzles across the ten types would qualify for the same first 150 point bonus as someone who solved 4 mutant, 3 hard, and 3 easy puzzles, except the second solver will have earned more overall points because of solving more valuable puzzles.

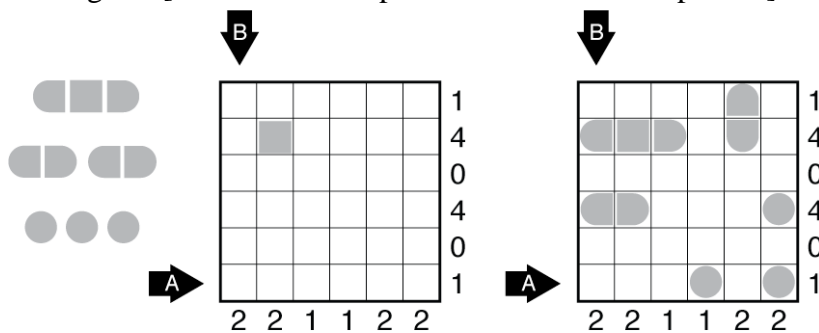
Solvers who finish early will also earn a total of (# of correct puzzles – 20) points per minute saved, up to 10 points per minute.

PUZZLE INSTRUCTIONS:

1. Battleships

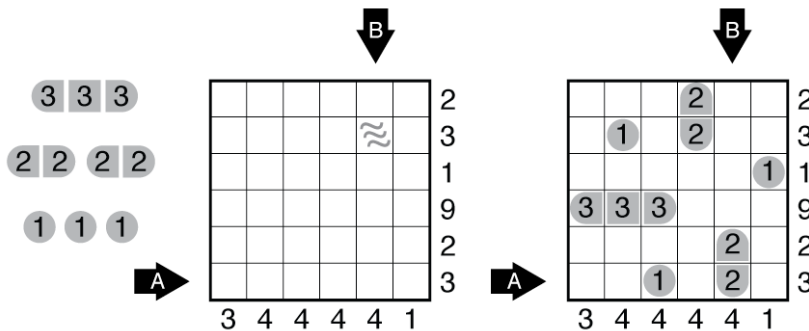
Instructions: Locate the 10-ship fleet (with one 4-unit battleship, two 3-unit cruisers, three 2-unit destroyers, and four 1-unit battleships) in the grid. [Note: The example uses a smaller 6-ship fleet.]

Each segment of a ship occupies a single cell. Ships are oriented either horizontally or vertically, and do not touch each other, not even diagonally. The numbers on the right and bottom edges of the grid reveal the total number of ship segments that appear in that row or column.



Answer:
000101,030200

Answer Entry: Enter the contents of the marked row from left to right and then the marked column from top to bottom, using 0 for seas and N for any ship segment where N is the size of that ship in cells.



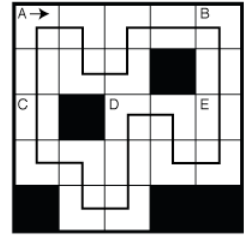
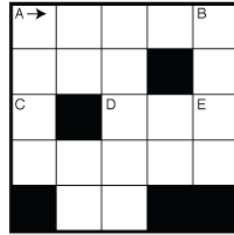
Answer:
001020,000022

Mutant: “Digit Battleships” – Same rules as above, except each ship segment is now labeled with a number as shown in the fleet. The outside clues indicate the sum of the numbers on all ship segments in that row or column.

2. Simple Loop

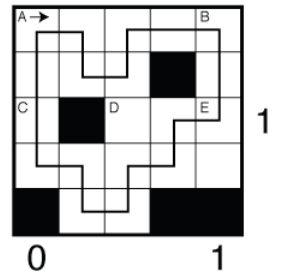
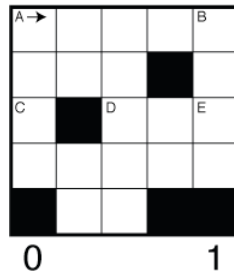
Instructions: Draw a single closed loop that visits all white cells of the grid exactly once. The loop is made of horizontal and vertical line segments and cannot intersect/overlap itself.

Answer Entry: Starting from the A and traveling to the right (as indicated) around the loop, enter the letters encountered in order.



Answer:
ABEDC

Mutant: “Almost Simple Loop” – Same rules as above except that not all white cells must be visited by the loop. The numbers outside the grid indicate how many white cells are left unused by the loop in that row/column. Unused white cells cannot touch, either horizontally or vertically.

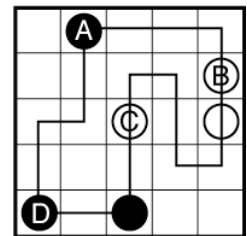
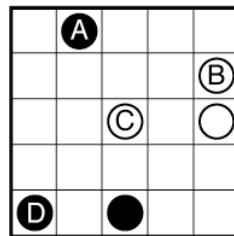


Answer:
ABEC

3. Masyu

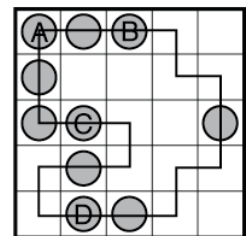
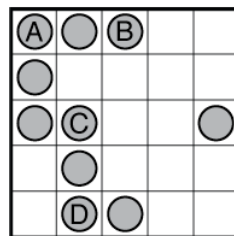
Instructions: Find a single closed loop passing through each of the black and white circles. The path passes through the centers of adjacent squares. When passing through a black circle, the path must make a 90 degree turn and extend at least two squares in both directions. When passing through a white circle, the path must go straight and must make a 90 degree turn in at least one of the adjacent squares.

Answer Entry: Starting at A and traveling clockwise around the loop, enter the order the letters are passed.



Answer:
ABCD

Mutant: “Total Masyu” – Find a single closed loop as above, passing through all of the gray circles, such that each of the gray circles in the loop satisfies the rules for either a black or white circle as in a standard Masyu, and such that every cell in the loop that could be labeled with a black or white circle is covered by one of the given circles.



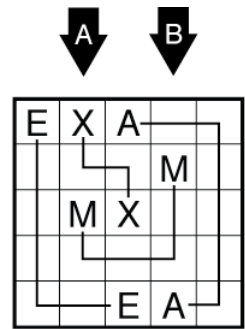
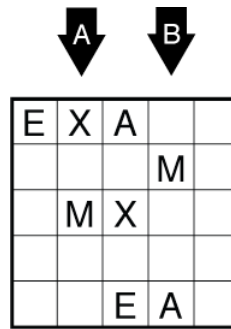
Answer:
ABDC

4. ABC Connect

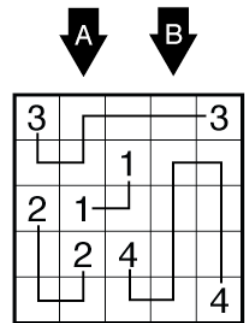
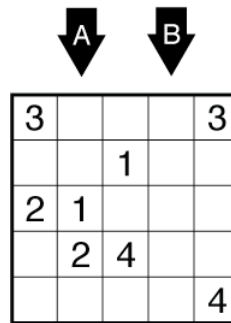
Instructions: Draw paths that connect each pair of letters. The paths will pass vertically/horizontally between cells and no two paths can go through the same square.

Answer Entry: Enter the letters/numbers corresponding to all path segments in the indicated columns from top to bottom.

Mutant: "Turning Points" – Draw paths that connect each pair of numbers, using every cell in the grid. (Note: this is not normally a requirement of ABC Connect puzzles but is a requirement here). The path connecting each number N must contain exactly N turns.



Answer:
XXMME,AMMMA



Answer:
33122,34444

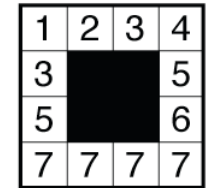
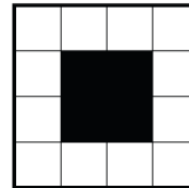
5. Number Skeleton

Instructions: Enter all but two of the numbers listed to the left of the puzzle into the grid criss-cross style, either reading left-to-right or top-to-bottom.

Answer Entry: Give the two unused numbers, starting with the smallest.

Mutant: "Extra! Extra!" – Same rules as above, except that each number has an extra digit that must be removed before the number can be entered into the grid.

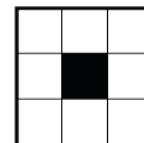
- 1234
- 1357
- 4567
- 4680
- 7531
- 7777



(or reflection)

Answer:
4680,7531

- 1234
- 1357
- 1999
- 5656
- 8778
- 9887



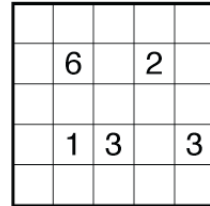
(or reflection)

Answer:
5656,8778

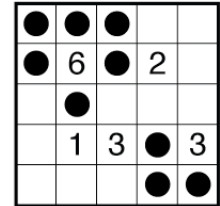
6. Minesweeper

Instructions: Place the indicated number of mines into the grid. The numbers in the grid indicate how many of the adjacent cells (including diagonally adjacent cells) contain a mine. Mines cannot sit on the given numbers.

Answer Entry: Enter the number of cells containing mines in each row, starting at the top row and continuing to the bottom row.

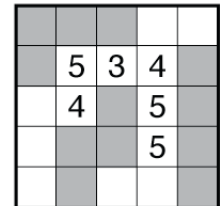
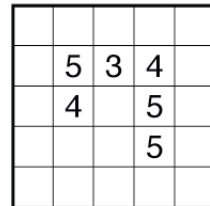
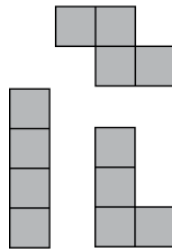


9 mines



Answer:
32112

Mutant: “Tetromino Minesweeper” – Place the seven indicated tetrominoes into the grid (three in the example). Tetrominos may be rotated but cannot be reflected. The numbers in the grid indicate how many of the adjacent cells (including diagonally adjacent cells) contain pieces of the tetrominoes. The tetrominoes cannot sit on the given numbers, and cannot touch each other, not even diagonally.

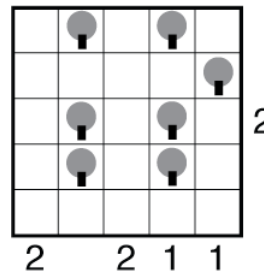


Answer:
32232

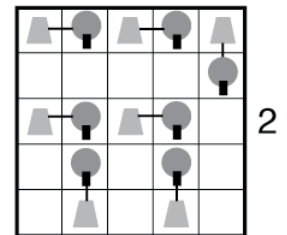
7. Tents

Instructions: Place a tent horizontally or vertically next to each tree. Tents do not touch, not even diagonally. The numbers outside the grid indicate the number of tents in that row or column.

Answer Entry: Enter the number of cells covered by tents in each row, starting at the top row and continuing to the bottom row.



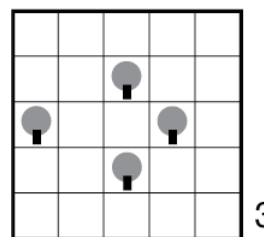
2 2 1 1



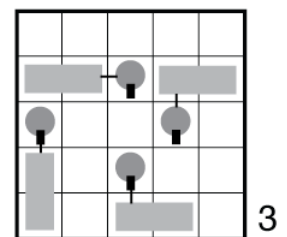
2 2 1 1

Answer:
30202

Mutant: “Big Tent Party” – Same rules as above, except each tent occupies two adjacent squares instead of just one square.



3 2 3



3 2 3

Answer:
04013

8. Skyscrapers

Instructions: Place the digits 1 to N into each N by N grid so that no digit repeats in any row/column. Digits indicate the height of a building on that cell, and the clue numbers are the number of buildings that can be “seen” (not blocked by a taller building) when viewed from the corresponding direction.

2			
4			

2	2	1	4	3
4	1	2	3	4
	4	3	1	2
	3	4	2	1

Answer:
4312,3421

Answer Entry: Enter the numbers in the indicated row “A” from left to right, and then the numbers in the indicated column “B” from top to bottom.

Mutant: “Wacky City” – Same rules as above, except the cells are not of uniform size and some cells extend into several rows/columns. Each digit from 1 to 7 will appear in exactly one building (regardless of size) in each row or column.

3			
2			

3	1	2	3	4
4		3	2	1
2	3	4	1	2
	2	1	4	3

Answer:
4321,2341

9. TomTom Puzzles

Instructions: For each N by N grid, enter a number from 1 to N into each cell so that no number repeats in any row/column. The value in the upper-left of each bold region indicates the value after some mathematical operation (addition, subtraction, multiplication, or division) is applied to the numbers in that region. For division and subtraction, start from the largest number.

1	5		1
8	4		
	4		4
7			

[1-4]

1	2	3	4
8	4	1	3
4	4	3	4
7	3	4	2

Answer:
4312,3412

Answer Entry: Enter the numbers in the indicated row “A” from left to right, and then the numbers in the indicated column “B” from top to bottom.

Mutant: “Mystery Number Set” - Same rules as above, except that the set of numbers is not given and must be determined. 6 different integers from 1 to 9 inclusive are used in the puzzle.

19			13
17	8		
	2		32
36			

[?, ?, ?, ?]
4 integers
from 1 to 9

19	2	8	9	13
17	8	2	4	9
	9	4	8	2
36	4	9	2	8

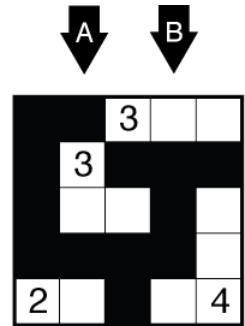
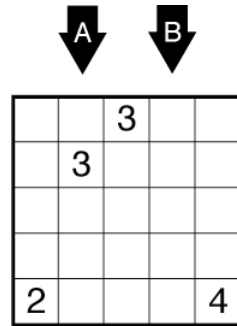
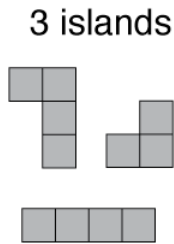
Answer:
9482,8249

10. Nurikabe

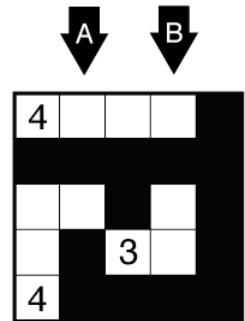
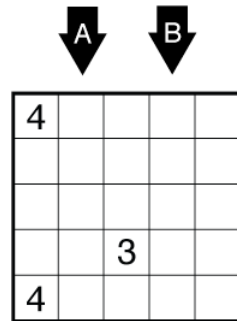
Instructions: Shade some empty cells black so that the grid is divided into white areas, each containing exactly one number and with the same area as that number. White areas may only touch diagonally. All shaded squares must be connected orthogonally with each other (by an edge), but no 2x2 square of cells can be entirely shaded black.

Answer Entry: Enter the contents of the marked columns from top to bottom, using 0 for black areas and 1 for white areas.

Mutant: "Shape Nurikabe" – Same rules as above, except that a set of shapes is now given alongside the puzzle. Each shape represents exactly one white area in the grid, and each white area is represented by exactly one shape outside the grid; shapes can be rotated and reflected in the grid.



Answer:
01101,10001



Answer:
10100,10110

Thanks to Wei-Hwa Huang and Palmer Mebane for test-solving, and to Deb Mohanty and Logic Masters India for help in organizing and hosting the test.