

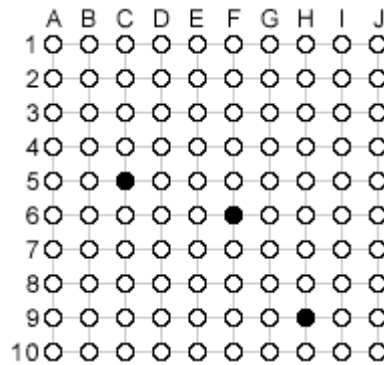
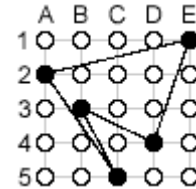
PUZZLE DESIGN TOURNAMENT 2002

PUZZLE 01

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There are 100 points in the grid below. Choose ten of them, one from each row and one from each column, then connect them to make the longest loop you can reach. Any two lines can not cross each other in a loop. Three of them have already been chosen for you, but you don't have to connect them consecutively. Lengths of the lines will be calculated up to two decimal digits.

Example: In the 25 points example on the right the length of the loop is 15.37 units.



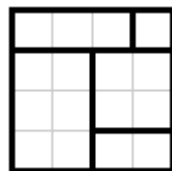
Answer key: Send the coordinates of the ten points in the order you connect them, starting with any one of them.

PUZZLE 02

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Divide a 10x10 grid of 100 unit squares into the maximum number of non-overlapping rectangles with integral sides, such that each rectangle is unique in dimensions from any other. That is, between any two rectangles, the length or width or both must be different. (A square is a legitimate rectangle, but a 2x1 rectangle is identical to a 1x2 rectangle, so only one may be used.) Ties will be broken by comparing the area of the largest rectangles used, with the largest rectangles winning.

Example for a 4x4 square:



5 rectangles:

AAAE
BBCC
BBCC
BBDD

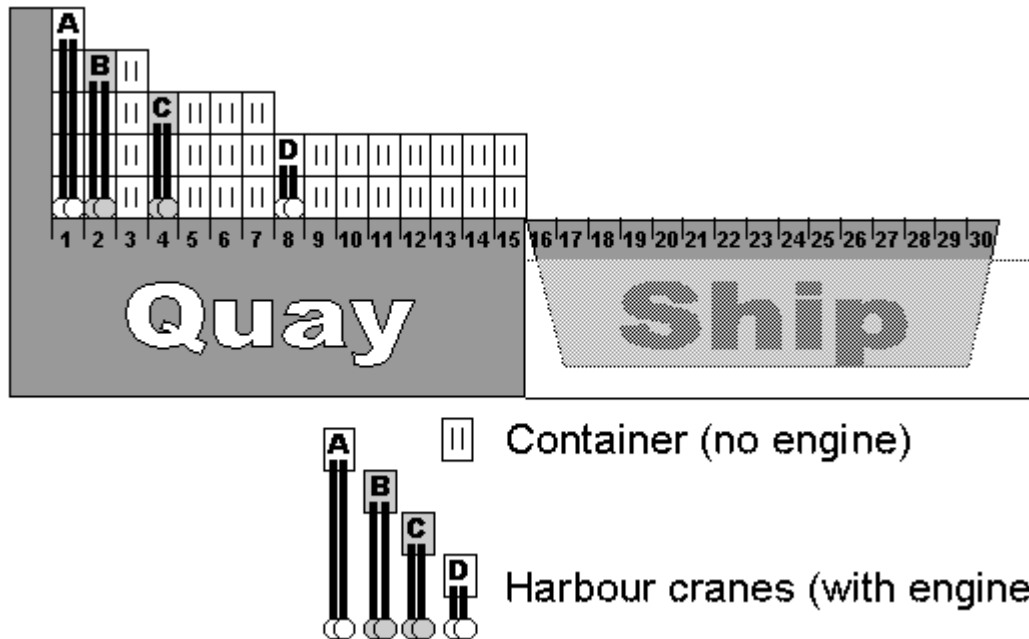
Rectangles used: 1x1, 1x2, 1x3, 2x2, 2x3

Answer key: Send the number of rectangles and a grid with the configuration, a different letter for each rectangle. The answer key for the example is above. Listing the rectangles used is not a requirement.

PUZZLE 03 M. Oskar van Deventer m.o.vandeventer@planet.nl

Move all containers and cranes from the quay onto the ship, with minimum moves. A crane can only move itself and things below or on top of it. For stability, there can never be empty space below a crane. All movements with a single crane count as one move. The next move starts when you start moving another crane.

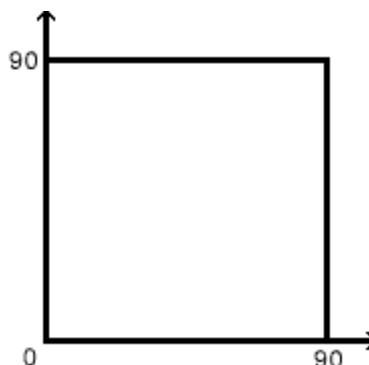
See example moves in the errata page: <http://www.otuzoyun.com/puzzledesign/errata2002.html>



Answer key: Describe each move by the letter written on the crane and the number of the place where it finishes its move on. Enter the number of moves at the beginning.

PUZZLE 04 Guillermo I. Verger ingverger@yahoo.com.ar

Divide the square, 90 units side, with the fewest number of straight line cuts, in a way that with all of the resulting pieces you can construct three identical squares separately. You can rotate and/or reflect the pieces.



Answer key: Enter the total number of cuts and the coordinates of the straight line cuts. One decimal digit will be enough. Your answer will look something like this:
 10 cuts: (42.2, 0.0)-(42.2, 90.0); (42.2, 42.2)-(90.0, 42.2); ...

PUZZLE 05

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We have a set of ten numbers: 101, 143, 187, 233, 281, 337, 409, 517, 683, 983. We will call these numbers "target numbers".

Pick five integers, different than the target numbers, of your choice. Using your five integers each as many as you want, and using the operations addition and subtraction try to obtain each target number.

Example: If your five integers are: 1, 10, 50, 100, 200; then you can obtain 101 by $100+1$, 143 by $100+50-10+1+1+1$ and so on.)

Your score for each target number is how many times you have used your five integers to obtain that target number. (For the example above, your score for 101 is 2, score for 143 is 6.) Your overall score is the addition of the scores of the ten target numbers. Minimize your overall score.

Answer key: A. List your five integers. B. For each target number, write the operations to obtain that target number. C. Write your overall score.

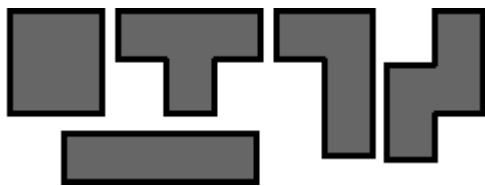
For the example above the answer key would be:

A. 1, 10, 50, 100, 200 B. $101=100+1$; $143=100+50-10+1+1+1$; ... C. 50

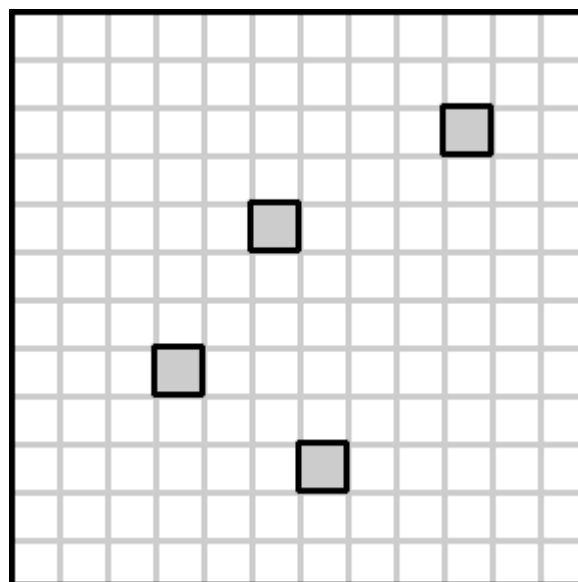
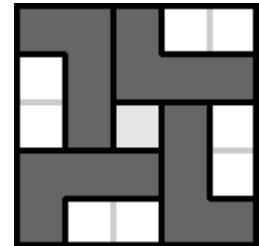
PUZZLE 06

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Call a configuration "stable" if no piece or group of pieces in that configuration can be moved either horizontally or vertically without moving outside the grid. Add the fewest number of tetrominoes to the grid below to make the entire configuration stable - you must stabilize the four monominoes as well as all of the tetrominoes you add. There are five types of tetrominoes as seen in the figure on the left. You may use all of them in any numbers.



Example: Configuration of four tetrominoes and one monomino on the right is stable.



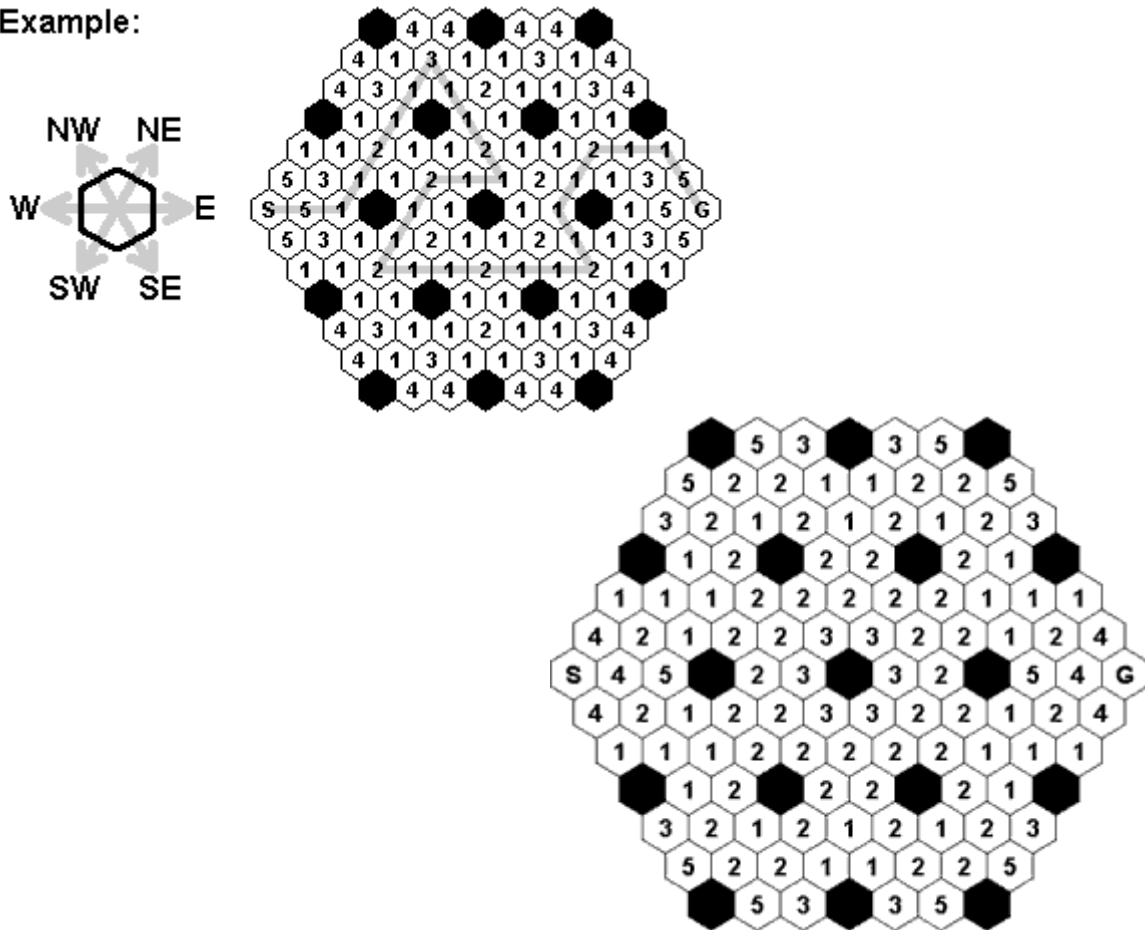
Answer key: Assign a distinct lowercase letter to every tetromino. For each square in the grid (left to right; then top to bottom) enter one of the following: B (Blank space), M (Monomino), a or b or c or ... (letter of the tetromino that lies on that square. Enter a slash at the end of each line. For the example the answer key is: aabBB/Babbb/BaMcB/dddcB/dBBcc

PUZZLE 08

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Beginning at the cell labeled ' S ' , find a path to the cell labeled ' G ' , attempting to score as high as possible. On each move you may go straight in any direction, proceeding as far as you like, but must always move at least 2 cells further, like the first move in the example. You can not stop on or pass through any black cells, and you can not stop on or pass through any cells you have previously stopped on or passed through. Your score is the total value of all cells that your path passes through.

Example:



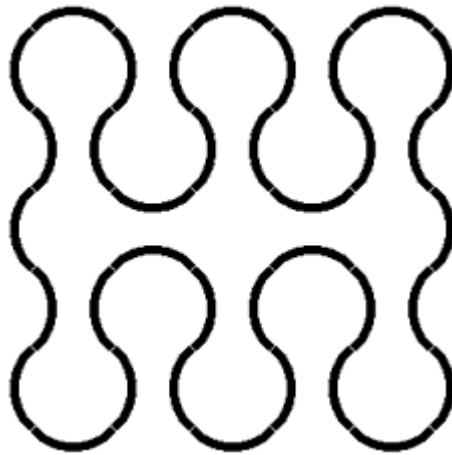
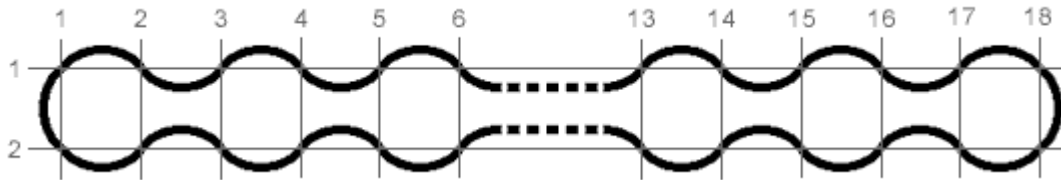
Answer key: Enter each move as the direction moved and the number of cells moved. Separate moves by commas. Enter your total before your moves. For the example above, the answer key would be; 46: E2, NE5, SE4, W2, SW3, E6, NW2, NE2, E2, SE2.

PUZZLE 09

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The figure on the top consists of 36 quarter circles. Convert it to the one below in the fewest moves. One move is to flip two S shapes (consisting of two quarter circles, not being a half circle) simultaneously so that the full figure remains flat and doesn't cross itself. The other pieces must keep their shapes so that the full figure is not ambiguous. That means the resulting figure can not make sharp turns.

See example moves in the errata page: <http://www.otuzoyun.com/puzzledesign/errata2002.html>



Answer key: Enter your number of moves followed by the move descriptions. Describe each move by writing the coordinates of the middle points of both S bends with a (x,y)-(x,y) notation. For first column of the figure, x is 1; and for first row of the figure, y is 1 after each move. Your answer will look something like: 20 moves; (4,1)-(5,2), (2,3)-(3,2), ...

END
