

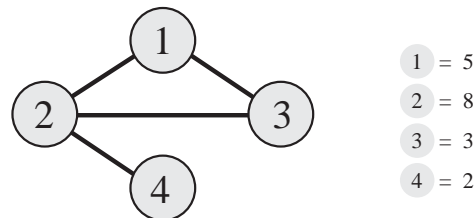
# 6<sup>th</sup> 24 HOURS PUZZLE CHAMPIONSHIP

## PUZZLES BY CIHAN ALTAY

### INSTRUCTIONS

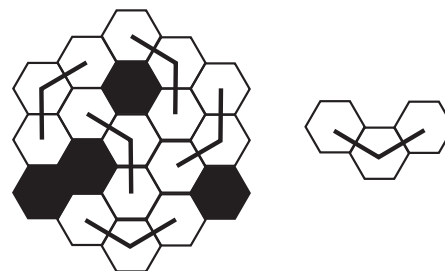
#### 1. Neighbourhood - 25 points (10+15)

Enter numbers from 1 to 6 once each, into the six circles. For each number, the sum of all numbers connected to it is given.



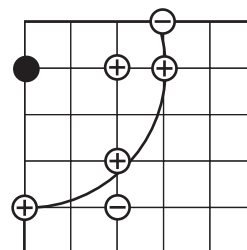
#### 2. V-groups - 35 points (15+20)

Divide the hexagonal grid into groups of three cells. All groups must be same and in V-shape shown below.



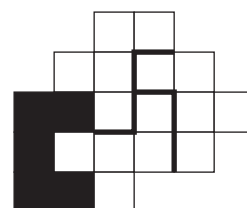
#### 3. Suspects - 40 points

There are ten people in the grid represented by circles. Five of them are police officers and five of them are suspects. Identify the five police officers so that each suspect is watched by **exactly** two police officers. A police officer can watch a circular region with a 3-unit radius. In the example, the police officer, represented by a black circle, can watch the circles with a + sign, but can not watch the circles with a - sign.



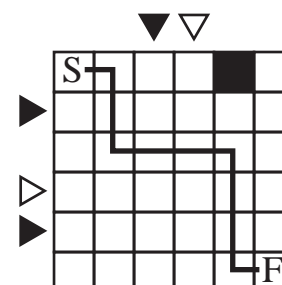
#### 4. Holey Figure - 60 points

Black out five orthogonally connected squares (a pentomino) and divide the remaining figure into three identical regions following the grid lines. The regions must have the same size and shape, but may be rotated and/or reflected.



#### 5. Laser Labyrinth - 60 points

Start from S and finish on F, travelling horizontally and vertically and never stepping on a black cell. The arrows represent laser pointers that laser through the whole row or column that you should avoid. When you are on S, white pointers are active. When you step on the next cell black pointers become active, and on the next cell whites again and so on, alternating.



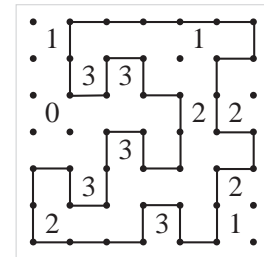
**6. Number Place - 90 points**

Fill in the grid so that every row, column and 3x3 box contains the digits 1 through 9.

4	1	2	5	3	6
6	3	5	1	2	4
2	6	3	4	1	5
1	5	4	3	6	2
3	4	6	2	5	1
5	2	1	6	4	3

**7. Fences - 120 points**

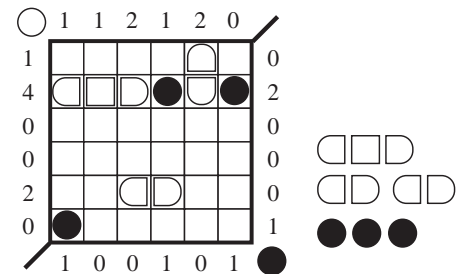
Draw one loop connecting the dots horizontally and vertically, so that each number gives its number of edges used by the loop. The loop doesn't touch or cross itself.



**8. Level Battleships - 80 points**

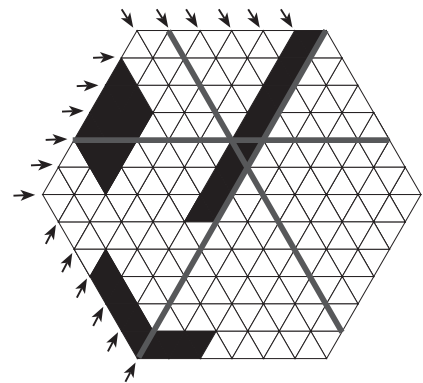
There are two levels on the grid: 1-cell submarines are under the sea, and the other ships are on the sea level. In each level, ships don't touch each other, not even diagonally. A submarine may be in a neighbouring cell of another ship from the top level, but can not be under a ship, that is they can't be on the same cell. Locate the ships into the grid.

Numbers on the left and top of the grid reveal the number of ship segments occupied by the ships on the sea level. Numbers on the right and bottom of the grid reveal the number of submarines.



**9. Hex Pie - 80 points**

Below is the diagram of a hexagonal pie with some parts, represented by black areas, taken out. Make three cuts, one from each side with arrows, so that there occur two groups of pieces, each having the same number of pieces, and all pieces of a group having the same area in triangular units.



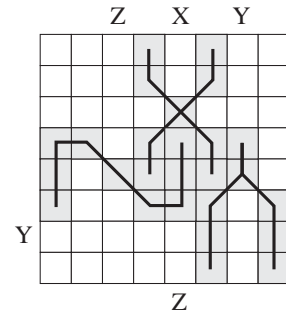
**10. Liar Neighbours - 60 points**

There are cards with numbers on the cells of the grid. Some cards are true, others are false. Each card tells the number of true cards in the neighbouring cells, including diagonals. Identify the false cards.

2	4	3	2
3	6	6	4
5	5	5	3
2	3	3	2

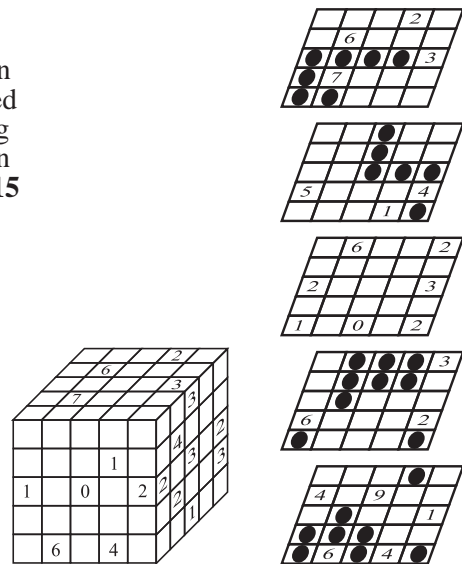
**11. Hard as XYZ - 80 points**

Locate two sets of figures X, Y, Z into the grid so that letters outside the grid indicate the first letter that appears from the corresponding direction. Figures can be rotated, but can not be reflected. Lines forming the letter-shapes can not overlap.



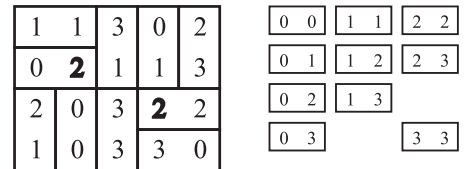
**12. Mined Cube - 70 points**

Below is a cube made of 64 small cubes. Some small cubes contain numbers, some contain mines and others are empty. Each numbered cube tells the number of mines on the surrounding cubes, including the cubes it shares an edge or a point with. Layers on the right is an open configuration of the 4 cube levels. Find the locations of the 15 mines.



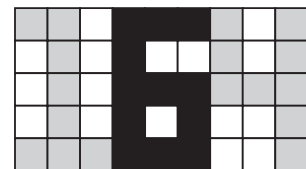
**13. Domino Spaces - 130 points**

A complete set of 28 dominoes (0-0, 0-1, 0-2, ..., 6-6) have been placed in the diagram. However, the sides of the dominoes have been removed and the spots have been replaced by numbers. Additionally, there are blank spaces to be filled in. Fill the spaces and reconstruct the missing edges.



**14. Touching Numbers - "Total-[Number to be revealed]" points**

There are six digit-figures to be placed into an 18x5 box side by side. Figures cannot be rotated or reflected and they cannot overlap each other. After the placement, each figure will touch some number of squares from other figures, edge-to-edge. For each figure, multiply the digit by the number of squares it touches. Maximize the total of these six products. Write your sequence of digits.



1x1=1  
 6x3=18  
 4x2=8  
 Total: 27

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