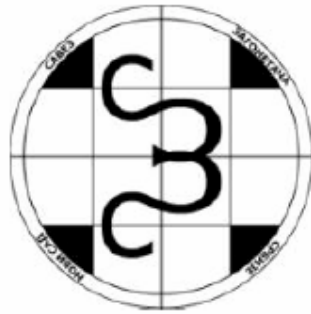


THE SECOND SERBIAN OPEN CHAMPIONSHIP IN SOLVING OPTIMIZING PUZZLES

NOVEMBER 30th - DECEMBER 13th 2009.
<http://puzzleserbia.com/>



SECOND WEEK
(7.12. - 13.12.)

7. KNIGHT MOVES ON PENTOMINOES

8. YEAR OF ASTRONOMY

9. STEP BY STEP

10. ARCHERY

11. HIT THE SCORE

12. MIRROR, MIRROR, ON THE WALL

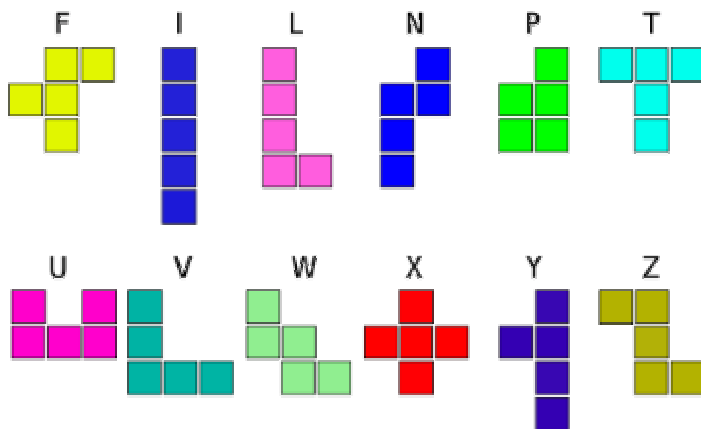
7. KNIGHT MOVES ON PENTOMINOES

Put all 12 given pentominoes in the grid. The pentominoes can be rotated and/or reflected, but they may not overlap. There are 12 gray cells in the grid. Each of them must be a part of a different pentomino. The pentominoes cannot be put over a black cell. Next, choose one of the cells with a pentomino, mark it with number 1 and start moving as a knight in chess. It is not allowed to land on blank or black square, as well as on the same pentomino. Each cell with pentomino can be used at most once (you cannot come back to square 1.) Maximize the number of moves.

	A	B	C	D	E	F	G	H	I	J
1										
2										
3										
4										
5										
6										
7										
8										
9										

Example (on smaller grid with 5 pentominoes):

	A	B	C	D	E	F	G
1			9				
2							
3				8		6	
4				5	2		
5			3	7			
6				4	1		
7							



Possible knight movement

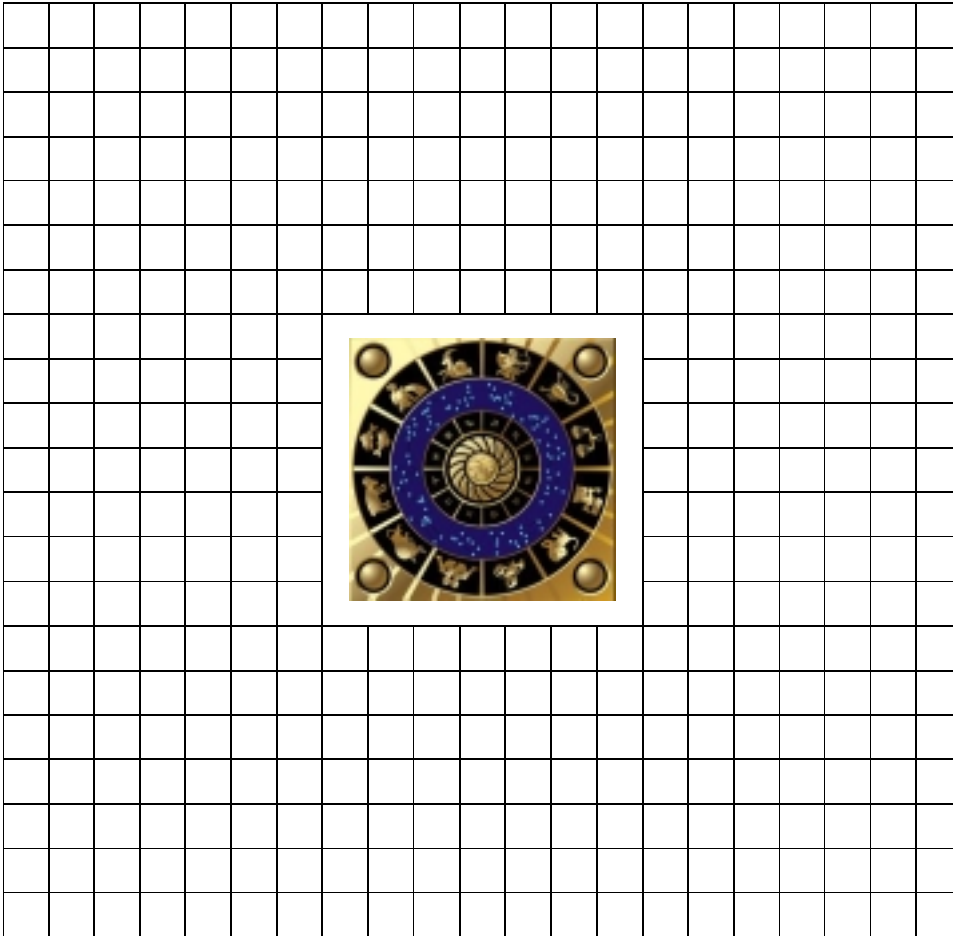
	X		X	
X				X
		♞		
X				X
	X		X	

Answer: First write your score, followed by the content of the grid, left to right, top to bottom, followed by the coordinates of each move. Use the corresponding letter for pentominoes and "x" for blanks. For given example, the answer would be: 9; VVVxxxx, VxxxxW, VxxIxWW, xxZIWWx, ZZZITxx, ZxxITTT, xxxITxx; F6, E4, C5, E6, D4, F3, E5, D3, C1.

8. YEAR OF ASTRONOMY

Put some of the words from the list (the names of constellations) in the grid in standard crisscross style (words appear either across or down and all words formed by consecutive letters must appear in the list). Each cell can contain at most one letter. Each word can be used only once. All words must be interconnected. Ignore spaces in the listed words.

Scoring: Each used word is worth 6 points, each written letter that belongs to only one word is worth 1 point, and each letter that belongs to two words is worth 3 points.



Example:

	V	E	L	A	
			E		P
P	A	V	O		E
			M		G
	L		I		A
C	Y	G	N	U	S
	R		O		U
T	A	U	R	U	S

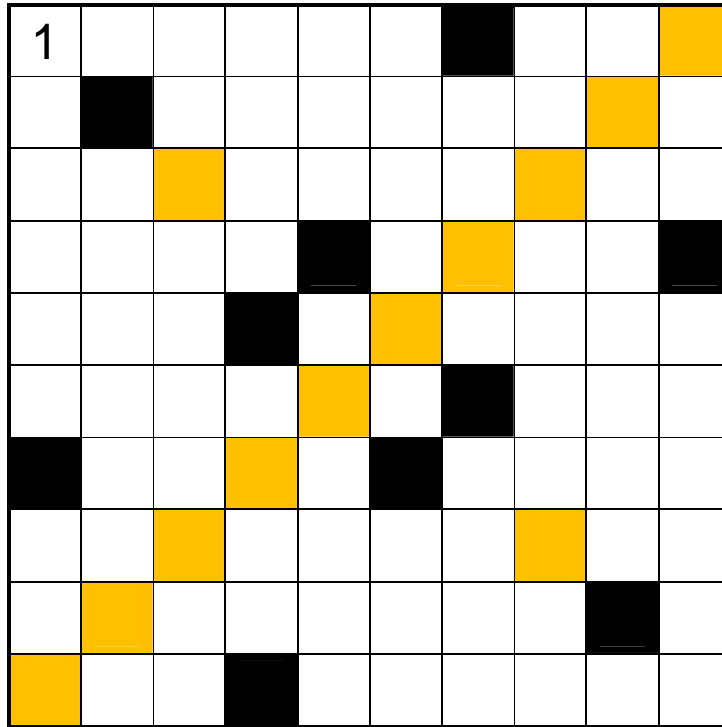
Word list:

ANDROMEDA, ANTLIA, APUS, AQUARIUS, AQUILA, ARA, ARIES, AURIGA, BOOTES, CAELUM, CAMELOPARDALIS, CANCER, CANES VENATICI, CANIS MAJOR, CANIS MINOR, CAPRICORNUS, CARINA, CASSIOPEIA, CENTAURUS, CEPHEUS, CETUS, CHAMAELEON, CIRCINUS, COLUMBA, COMA BERENICES, CORONA AUSTRINA, CORONA BOREALIS, CORVUS, CRATER, CRUX, CYGNUS, DELPHINUS, DORADO, DRACO, EQUULEUS, ERIDANUS, FORNAX, GEMINI, GRUS, HERCULES, HOROLOGIIUM, HYDRA, HYDRUS, INDUS, LACERTA, LEO, LEO MINOR, LEPUS, LIBRA, LUPUS, LYNX, LYRA, MENSA, MICROSCOPIUM, MONOCEROS, MUSCA, NORMA, OCTANS, OPHIUCHUS, ORION, PAVO, PEGASUS, PERSEUS, PHOENIX, PICTOR, PISCES, PISCIS AUSTRINUS, PUPPIS, PYXIS, RETICULUM, SAGITTA, SAGITTARIUS, SCORPIUS, SCULPTOR, SCUTUM, SERPENS, SEXTANS, TAURUS, TELESCOPIUM, TRIANGULUM, TUCANA, URSA MAJOR, URSA MINOR, VELA, VIRGO, VOLANS, VULPECULA.

Answer: First write total number of points, followed by the content of the grid, left to right, top to bottom (use "x" for blanks). For given example, the answer would be: 89; xVELAx, xxxExP, PAVOxE, xxxMxG, xLxIx, CYGNUS, xRxOxU, TAURUS.

9. STEP BY STEP (OAPC puzzle)

Starting from number 1, fill in the grid the numbers from 1 to n, moving within the grid in any of four directions (up, down, left, right). If you are on an odd number, you must move to a neighbouring cell in any of the four directions. If you are in an even number you must jump over the neighbouring square and land on the next one, in any of the four directions. The numbers are written in the increasing order, i.e. 1, 2, 3, ..., n. It is not allowed to land on a black cell, but is allowed to jump over it. You cannot come back to a cell already visited. Maximize the sum in orange cells.



Example:

1	2	13	14	12
		10		11
4	3	9	15	16
	20	19		18
5	6	8	7	17

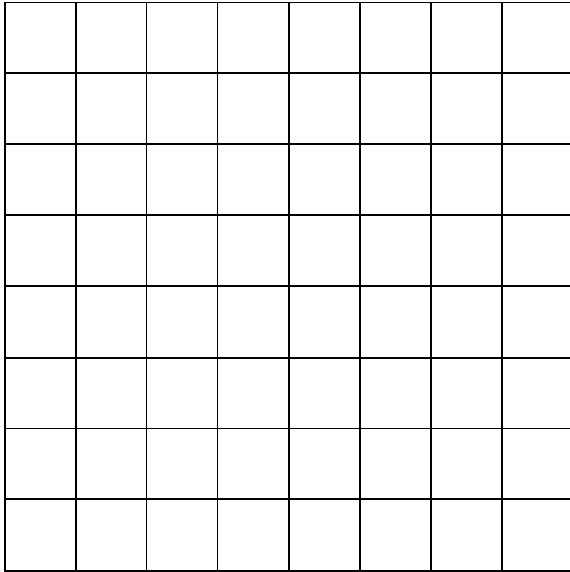
$5+20+9+0+12=46$

Answer: First write your result, followed by the directions of all the steps. Use U for up, D for down, L for left and R for right. For given example, the answer would be: 46; RDLDRRLUURULRDRDULL.

10. ARCHERY

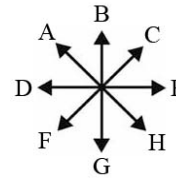
Fill in the grid single digit numbers (from 0 to 9) and some arrows in such a way that each number shows how many arrows point at that number. Each arrow must point to at least one number. No number **except zero** can appear more than once in a row, a column or in two diagonally neighbouring cells.

Scoring: The result is equal to the sum of all the numbers in the grid. Maximize your result.



Example (on smaller grid):

0	↘	↓	↙
→	1	6	↙
→	3	4	↘
↗	↗	2	←



Answer: First write your result, followed by the content of the grid, left to right, top to bottom. For arrows use the corresponding letters from the picture: A – up left, B - up, C – up right, D - left, E - right, F – down left, G - down, H – down right. For given example, the answer would be: 16; 0HGF,E16F,E34A,CC2D.

11. HIT THE SCORE

1) Replace the letters from the expression below with digits from 0 to 9 so that different digits replace different letters. The sign “*” stands for multiplication. Numbers may start with 0.

$$\text{hit} * \text{min} \approx \text{score}$$

Make the left and right hand side of the expression as close as you can, and also as small as you can.

Scoring: Let r1 be the (positive) difference between the left and right hand side in the expression 1), and r2 the same difference in the expression 2). The result will then be:

$$(\text{SCORE} - \text{score}) / (1 + r1 + r2)$$

Maximize your result.

2) Replace the letters from the expression below with digits from 0 to 9 so that different digits replace different letters. Numbers may start with 0.

$$\text{GET} * \text{MAX} \approx \text{SCORE}$$

Make the left and right hand side of the expression as close as you can, and also as big as you can.

Example:

$$275 * 170 \approx 46839; \quad 286 * 340 \approx 97158.$$

$$(97158 - 46839) / (1 + 89 + 82) = 292.55$$

Answer: First write your score (with two decimal places if not an integer), followed by the numbers as they appear in the expressions. For given example, the answer would be: 292.55; 275, 170, 46839, 286, 340, 97158.

12. MIRROR, MIRROR, ON THE WALL

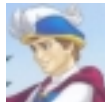
Put seven dwarfs in the grid so that each row and column contains exactly one dwarf. In some of the remaining squares put mirrors (square diagonals). Each mirror has two sides. Both Snow White and the Queen want to see their own reflection in as many mirrors as possible. Besides, Snow White wants to see her Prince, too (the beam that starts at Snow White must end at Prince). The beam always reflects at the right angle. If the beam comes across a dwarf, it ends there.

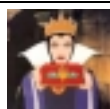
Scoring: Let S be the number of mirrors with the reflection of Snow White, and Q the number of mirrors with Queen's reflection. Maximize the product $S \times Q$.

Snow White



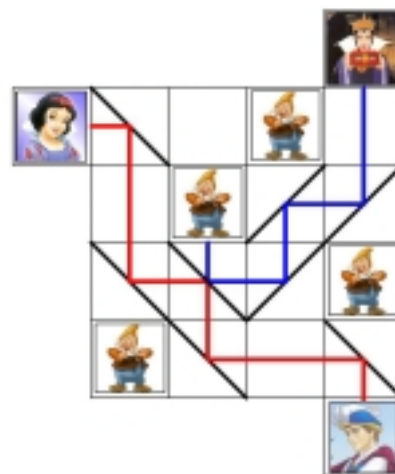
Prince





Queen

Example on smaller grid with 4 dwarfs:



Answer: First write your score, followed by the content of the grid, left to right, top to bottom. Use slashes for mirrors (/ \), D for dwarfs, and x for blank squares. For given example, the answer would be: 20; xDx, xD//, \D, Dx\.

Send your answers to answers@puzzleserbia.com in simple text:

Name:

City, country:

7. 9; *VVVxxxx, VxxxxxW, VxxIxWW, xxZIWWx, ZZZITxx, ZxxITTT, xxxITxx; F6, E4, C5, E6, D4, F3, E5, D3, C1.*

8. 89; *xVELAx, xxxExP, PAVOxE, xxxMxG, xLxIxA, CYGNUS, xRxOxU, TAURUS.*

9. 46; *RDLDRRLUURULRDRDULL.*

10. 16; *0HGF,E16F,E34A,CC2D.*

11. 292.55; *275, 170, 46839, 286, 340, 97158.*

12. 20; *\xDx, xD//, \\D, D\x.*