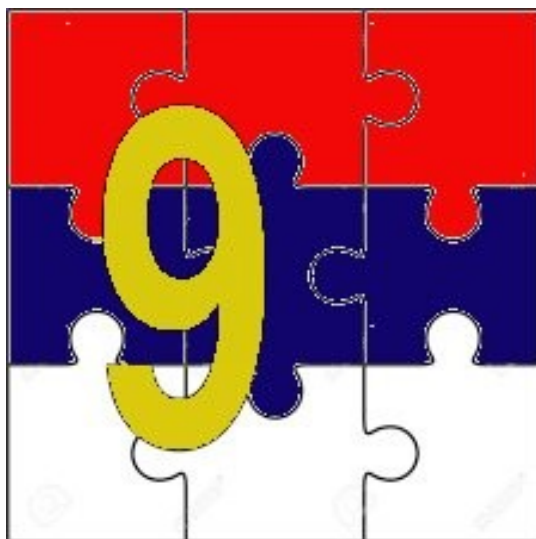
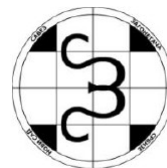


THE NINTH SERBIAN OPEN CHAMPIONSHIP IN SOLVING OPTIMIZING PUZZLES



December 2nd - 18th 2016

<http://puzzleserbia.rs/>



- 1. ABCD IN PENTOMINOES**
- 2. DOMINOES – SKYSCRAPERS – SCRABBLE**
- 3. LITS DIVISION**
- 4. WORD SEARCH WITH PENTOMINOES**

BASIC RULES

There are four puzzles. For each puzzle the scoring will be the following:

The best competitor gets 25 points, the second best 20 points, the third best 17, the fourth best 15, then 14, 13, 12, 11, ..., 2, 1. Each subsequent competitor with a correct solution will get 1 point. Incorrect solutions will score 0 points. In case of tie where two or more competitors have the same score they will get the same amount of points according to their place on the standings, however the competitors behind them will have their scores as if no tie happened. For example, if the third, fourth and fifth best competitor have the same score, they will all get 17 points, while the sixth best will still get 13 points.

The best three scores of each contestant will be added together, the lowest score will not be counted. The maximal possible total score is 75 points. The authors of the puzzles may participate, but may not send the solutions of their own puzzles.

While sending your answers you can, for some or all the puzzles, instead of the plain text formats suggested in the puzzles, send clear and legible images of your solutions (scanned or otherwise obtained). You may use the following formats - .doc, .xls, .pdf, .jpg. Make sure to indicate your total score.

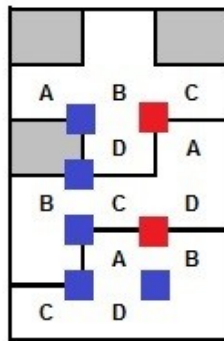
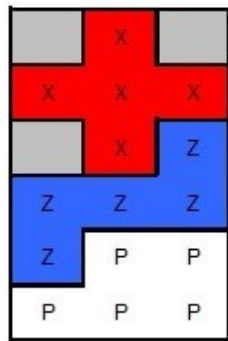
Send your solutions together with your info (name, city, country) to answers@puzzleserbia.rs and, just in case, also to puzzleserbia@gmail.com since some servers experienced problems with the first e-mail address. You may send them as many times as you want, however, only your last solution counts. We wish you good luck!

1. ABCD IN PENTOMINOES (author M. Kovačević)

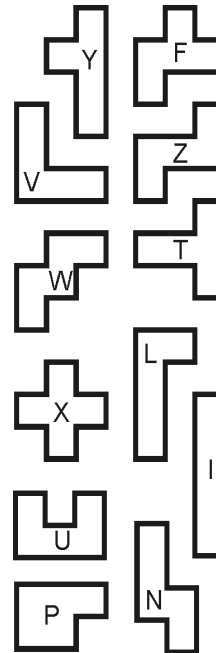
Place the full set of pentominoes (right image) in the grid of size 9x8. Pentominoes must not overlap. Empty cells must not share an edge. Then place letters A B C and D into four segments of each pentomino (one segment remains empty). The pentominoes may be rotated and reflected.

Scoring: Each 2x2 region which has 4 different letters is worth 10 points. Each 2x2 region which has 3 different letters is worth 2 points. A 2x2 region which has 2 or more same letters is worth no points. The sum of all points gives the final score. **Maximize your final score.**

Example: (with 3 pentominoes on 6x3 grid)



■ 2 x 10 = 20
■ 5 x 2 = 10
 Total = 30



Answer format: First line - your score, next 9 lines – pentomino grid content row by row, from top to bottom. For pentominoes use the standard labels (F, I, L, N, P, T, U, V, W, X, Y, Z), and for the empty cells use minus sign "-". Next 9 lines – ABCD grid content row by row, from top to bottom. For the empty cells use minus sign "-". For the given example, the solution should look like this:

```

30
-X-
XXX
-XZ
ZZZ
ZPP
PPP
---
ABC
-DA
BCD
-AB
CD-
  
```

2. DOMINOES – SKYSCRAPERS - SCRABBLE (author Z. Tanasić)

1. Place some or all dominoes from the set 1-1 to 9-9 in the grid of size 15x15.
2. The dominoes must not form a 2x2 region. All dominoes in the grid must be connected (by sides) in a group. Two dominoes that touch each other by side must have the same number in touching segments.
3. Choose one row/column from each side of the grid and consider dominoes' numbers as skyscrapers. The number of visible skyscrapers is multiplied with the sum of all numbers in that row/column.
4. Place the words from the list below according to scrabble rules (all words must be connected, every word must cross at least one other word).
5. There must not be word which is not on list, not even of 2 letters. Every word can be used only once.
6. The value of every word is the sum of all letters' values.
7. The letter value is equal to number of its occurrences in the grid.
8. Every crossing is worth additional 5 points.
9. Every 10 used words are worth additional 30 points.
10. Every empty cell is worth -7 points.
11. Every unused domino is worth the negative sum of its segment numbers.

Scoring:

- a) Dominoes: Add all domino numbers in the grid.
- b) Calculate 4 products of visible skyscrapers from the chosen rows/columns with the sum of all numbers in that row/column.
- c) Determine the letter values and then the value of each word from the grid. Calculate the sum of words' values.
- d) Multiply the number of crossings by 5.
- e) For every 10 used words add 30 points.
NEGATIVE POINTS
- f) Add all the numbers from unused dominoes and multiply the sum by 2.
- g) Multiply the number of empty cells by 7.

YOUR SCORE is $(a+b+c+d+e) - (f+g)$

Maximize your score.

Domino set:

1-1
1-2, 2-2
1-3, 2-3, 3-3
1-4, 2-4, 3-4, 4-4
1-5, 2-5, 3-5, 4-5, 5-5
1-6, 2-6, 3-6, 4-6, 5-6, 6-6
1-7, 2-7, 3-7, 4-7, 5-7, 6-7, 7-7
1-8, 2-8, 3-8, 4-8, 5-8, 6-8, 7-8, 8-8
1-9, 2-9, 3-9, 4-9, 5-9, 6-9, 7-9, 8-9, 9-9

Word list:

13 letters

RADISAVLJEVIC

10 letters

GAVRANOVIC
VANROOIJEN
STOJANOVIC
STRACENSKI

9 letters

KOVACEVIC
MILANOVIC
MILOSEVIC
NOVAKOVIC
OBRADOVIC
ZIVANOVIC

8 letters

ARIMATSU
GOLJOVIC
KRESIMIR
MACHERLA
PETPAR55
ROBINSON
SENIOR41
TOKUNAGA

7 letters

ANURAAG
CEDOMIR
CERANIC
DANIJEL
DEMIGER
DZUDZAR
GERHARD
HARMEET
HUSEYIN
MILOVAN
MIHAJLO
PARNITS
RICHTER
TOMOAKI
TANASIC

6 letters

BRANKO
DRAGAN
NIKOLA
PARLIC
RAKESH
SPASIC
VICTOR

5 letters

BJORN
BOIKO
DAVOR
DEJAN
ERGAN
JOVAN
KUMAR
MARKO
MATUS
PETAR
RAUDE
RAUNO
ROSEL
SAHAY
SINGH
URMAS
ZAFER
ZORAN

4 letters

BANE
GAJA
GANE
HUGO
LIAN
RADE
RAVI
TARO
URRA
ZOKI

3 letters

RAI

Example:

		3					
	T	1	1	1	4		
2	E		1		4	4	K
	R		2			S	O
	A		2	3	3	E	N
	Z	4	2		1	N	T
	I	4		S	L	I	K
	J	3	3	3		O	K
	E	L	A	B	O	R	A
				3			

RESULT

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

a)	Dominoes (per row)	7+9+2+8+7+4+9	46
	Skyscrapers	3 * 11 = 33	
		3 * 7 = 21	
		3 * 12 = 36	
		2 * 9 = 18	
b)	Sums of skyscrapers		108
	Terazije	19	
	Elaborat	22	
	Senior	14	
	Kontakt	21	
	Slika	13	
c)	Sums of words		89
d)	Number of crossings 5 x 5		25
e)	Bonus for each 10 words		0
f)	Sums of unused dominoes x 2		8
g)	Blank fields (17x 7)		119
	TOTAL		141

set of dominoes for this example are

1-1; 1-2; 1-3; 1-4

2-2; 2-3; 2-4

3-3; 3-4

4-4;

unused dominoes are

2-2

Answer format: First line - your score, next 15 lines –grid content row by row, from top to bottom, use capital letters for words and minus sign "-" for empty cells. For the horizontal dominoes use the sign „:“ between segment numbers. Next 4 rows – the positions of the chosen rows/columns: left row, top column, right row and bottom column. For the given example the solution should look like this:

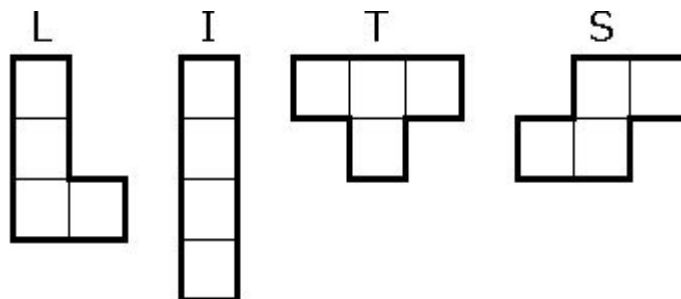
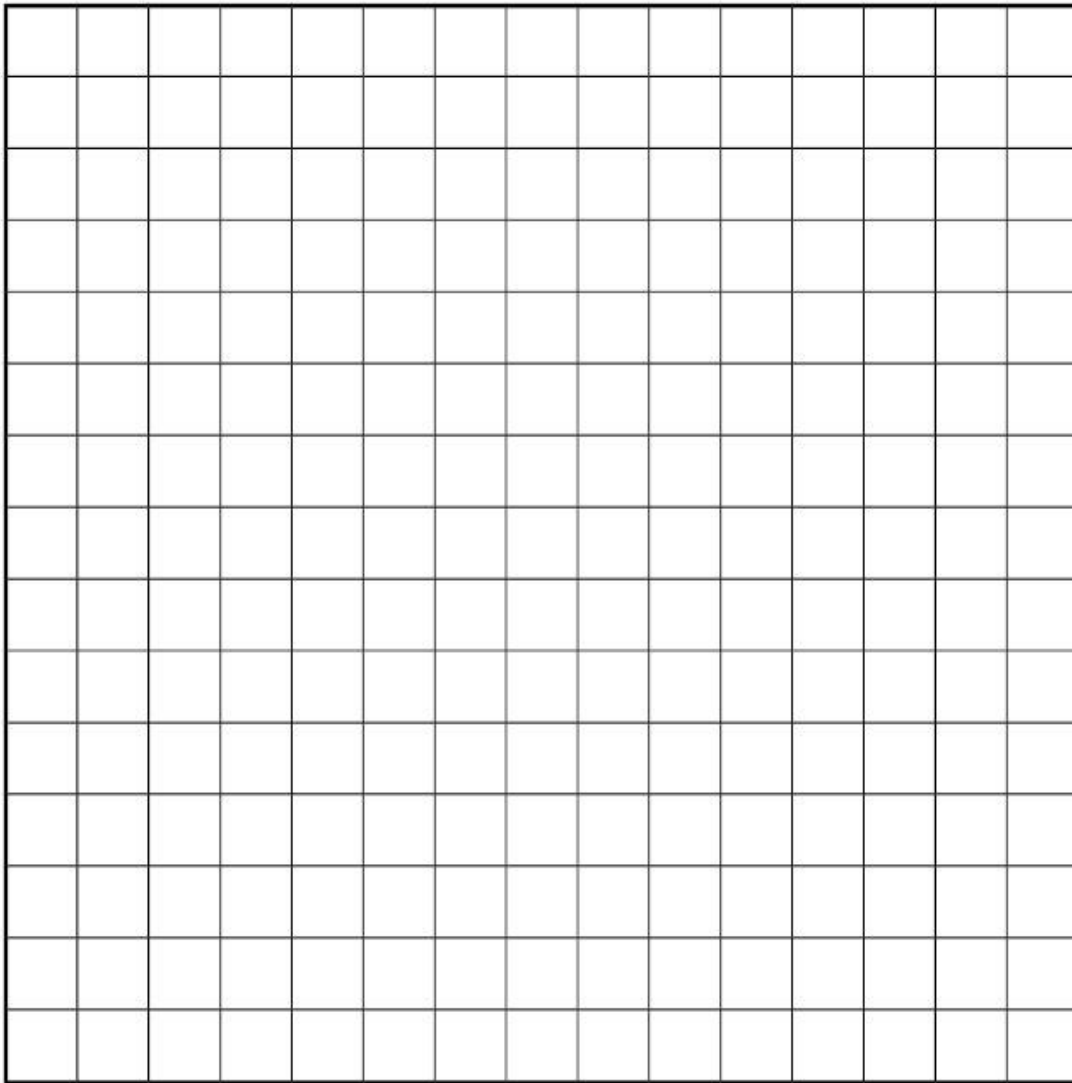
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141
T111:4---
E-1-4:4-K
R-2--S-O
A-2:33E-N
Z4:2-1N-T
I4-SLIKA
J33:3-O-K
ELABORAT
2
3
5
5

```

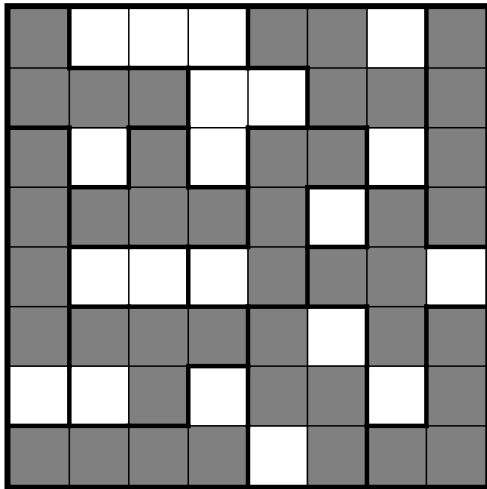
3. LITS DIVISION (author M. Obradović)

Divide the given grid (15x15) into some regions such that no two regions are of identical shape (rotations and reflections are considered identical shapes). Then, shade some cells according to LITS rules. Inside a region the shaded cells must form a tetromino – L, I, T or S (given on the picture below). It is not necessary for every region to contain a tetromino – some may remain empty. Tetrominos of identical shape cannot touch each other by side. All shaded cells must be orthogonally connected, and nowhere in grid a completely shaded 2x2 square may appear.



Scoring: Let A be the number of regions, B the total number of tetrominoes, and C the minimum of the numbers of L's, I's, T's and S's in the grid. The score is $A \times (B+C)$. **Maximize your score.**

Example: (on smaller grid 8x8)



Score: $195 = 15 \times (11 + 2)$

$A = 15$ (number of regions)

$B = 11$ (number of tetrominoes)

$C = 2$ (minimum of the numbers of L's (3), I's (3), T's (3) and S's (2))

Answer format :

First, write your score with the formula. Then, write the content of the grid (region division), row by row. Used the same marks (small letters, capital letters, digits) within the region and different for different regions. Finally, write the content of the grid (shaded cells), row by row. Use "X" for shaded and "." for unshaded cells. For the given example, the answer may look like this:

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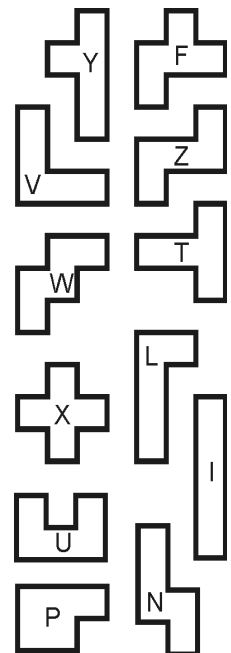
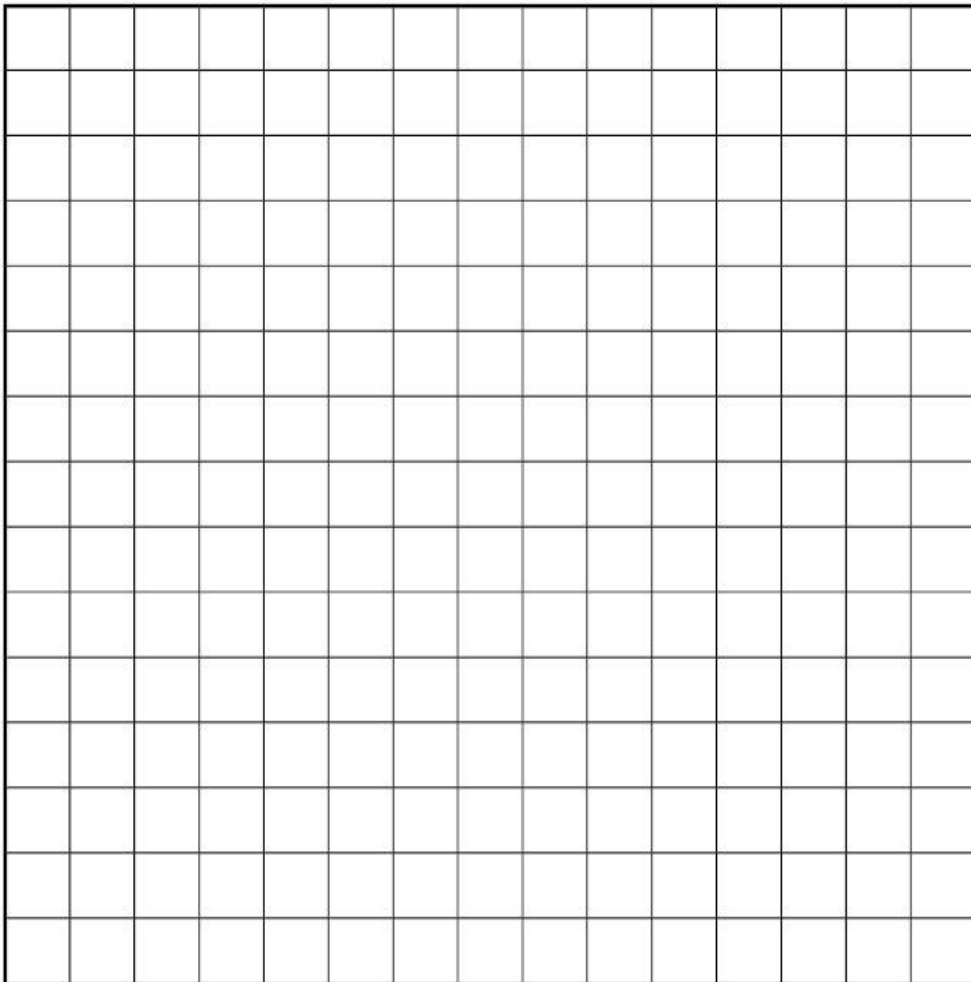
195=15x(11+2);
abbbcccd
aaaeeccd
fagehhcd
fggghijd
fkkhhjjj
flllmmjn
fllommjn
ooooommn;
X...XX.X
XXX..XXX
X.X.XX.X
XXXXX.XX
X...XXX.
XXXXX.XX
..X.XX.X
XXXX.XXX

```

4. WORD SEARCH WITH PENTOMINOES (author Č. Milanović)

Put each of the 12 different pentominoes in the given grid (15x15) at least once, without overlapping. They must not share an edge and diagonal touching is allowed. Rotating and mirroring is allowed, too. In each field belonging to the pentominoes enter the corresponding letters (5 letters "F" in the F-pentomino, for example). After that, put some words from the given list in the grid, each at most once, in all eight possible directions. Their crossing and partial overlapping is allowed, as well as using the letters already written in the pentominoes. Every letter written outside the pentominoes must belong to some word, and letters inside the pentominoes don't need to be a part of the words. It is allowed to have completely isolated pentominoes – neither of the five letters from the single pentomino is a part of any word. It is allowed to have completely isolated words - without crossing with any other word and/or using any pentomino-letter.

Scoring: Every written word from the list is worth 10 points. Using the letters already written in the pentominoes brings bonus points - the first such letter in a word is worth 2 bonus points, the second one is worth 4 bonus points more, the third one is worth 6 points more, and so on. For example, if a word goes through two pentomino-letters (no matter if they belong to the same or different pentominoes), it is worth $10+2+4=16$ points. Every empty field in the grid is worth -1 point. Pentomino-letters not used in the written words are not worth any points (positive or negative). **Maximize your result.**



Word list:

ALLIGATOR	GAZELLE	MONKEY	SWALLOW
ALPACA	GIRAFFE	MOUFLON	TARANTULA
ANACONDA	GNU	NARWHAL	TORTOISE
ANTELOPE	GOAT	NEWT	TOUCAN
AVOCET	GRIZZLY	ORYX	URIAL
BUFFALO	HAWK	PELICAN	VICUGNA
BUTTERFLY	HIPPOPOTAMUS	PENGUIN	VIPER
CAPUCHIN	HYRAX	PLATYPUS	VULTURE
CHIMPANZEE	IBEX	PLOVER	WALLABY
CHITAL	IMPALA	PORCUPINE	WAPITI
CHUCKWALLA	LAPWING	PUFFIN	WAXBILL
COYOTE	LEMMING	PYTHON	WEAVER
DOLPHIN	LION	QUETZAL	WHALE
ELEPHANT	LIZARD	RAVEN	WOLF
FALCON	LLAMA	RINGTAIL	WOYLIE
FLAMINGO	LYNX	SERVAL	YAK
FOX	MALLEEFOWL	SQUIRREL	ZEBRA

Example: In the smaller grid, using pentominoes I, L, N, U and Y

U	N	A	U	R	U		L	L
S	N	A	U	U	U	A	A	L
A	N	N	T	S	O	T	I	L
I	O	N	A	S	V		J	L
I	R	E	I	I	I	I	I	U
I	W	M	A	A	D	K	F	R
I	A	E	Y		P	N	A	E
I	Y	Y	Y	Y	Y	S	I	P

- FIJI 10+2=12
- INDIA 10+2=12
- LAOS 10+2=12
- LATVIA 10+2+4=16
- NAURU 10+2+4+6=22
- NORWAY 10+2=12
- PAKISTAN 10+2+4=16
- PERU 10
- RUSSIA 10+2+4=16
- SPAIN 10+2+4=16
- USA 10
- YEMEN 10+2+4=16
- 3 empty fields
- Total score: 167**

Answer format: First write your total score, followed by the content of the grid, top to bottom. For the letters inside the pentominoes use capitals, for the ones outside use small letters. Mark empty fields with “-”. For the given example, the answer should look like this:

```

167
uNaUrU-LL
sNaUUUaaL
aNNtsotiL
IoNasv-jL
IreIIIIu
Iwmaadkfr
IaeY-pnae
IyYYYYsip

```