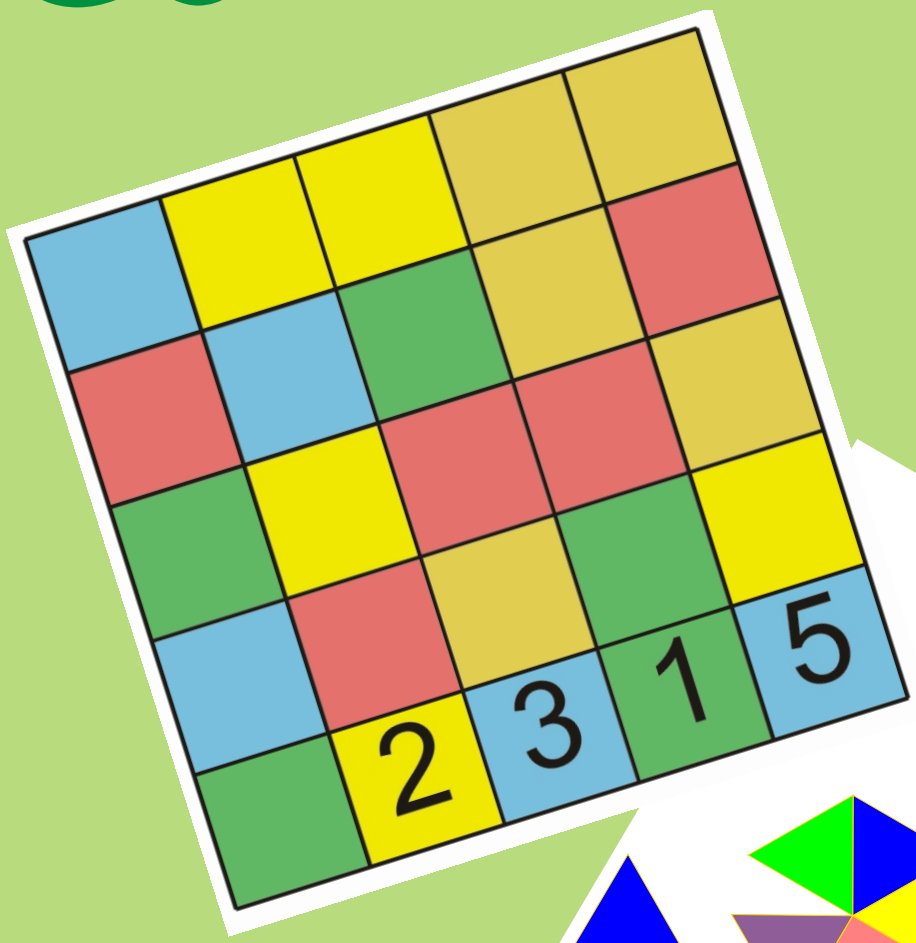
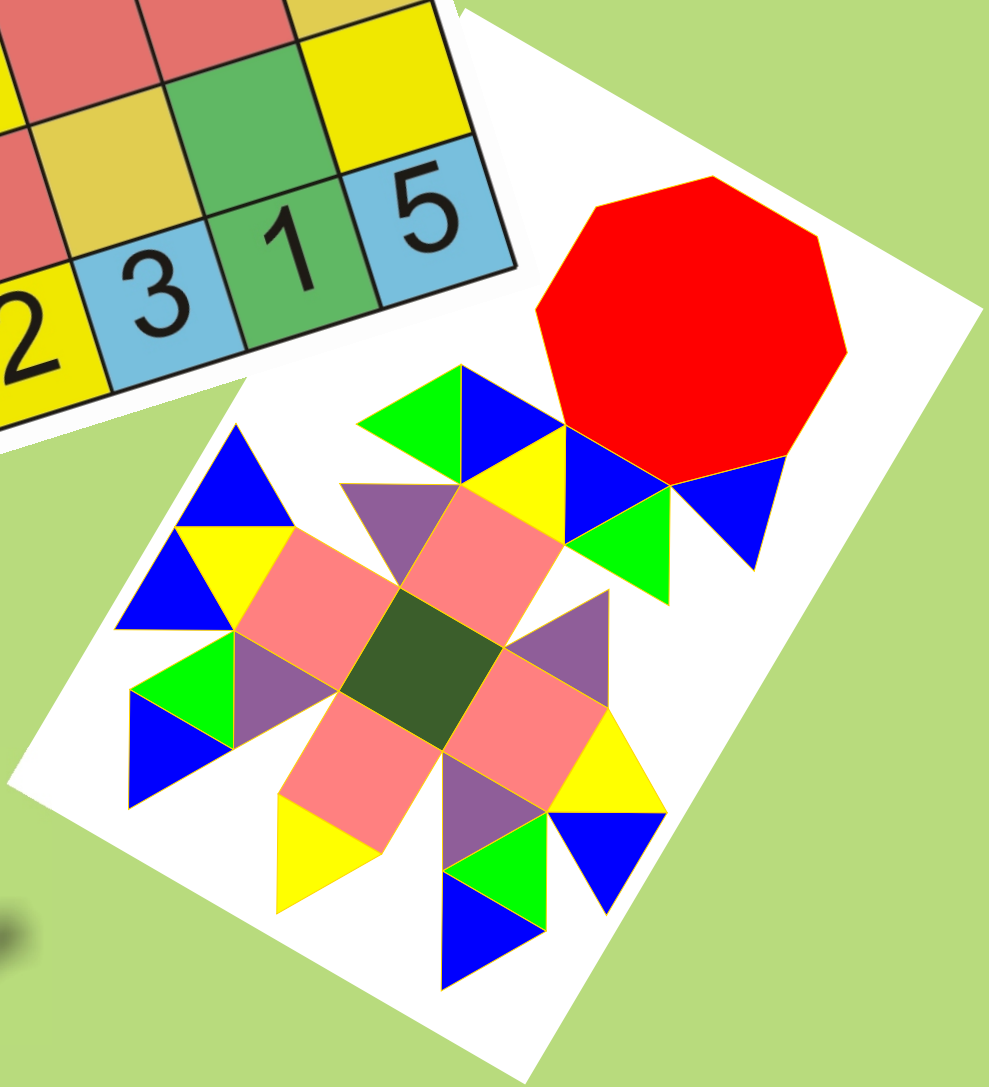
LOGIKA & razvedrilna matematika

Triindvajseti letnik, 2013-2014

1

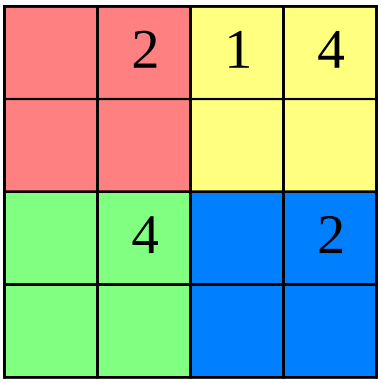


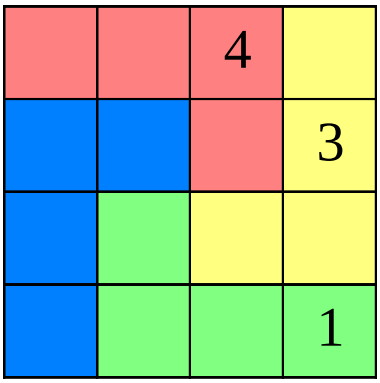


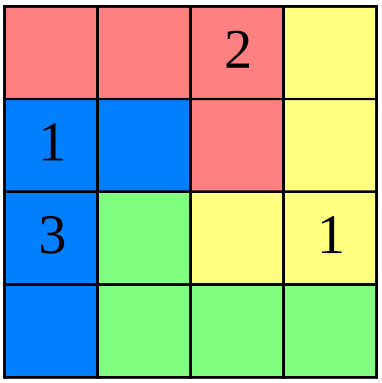


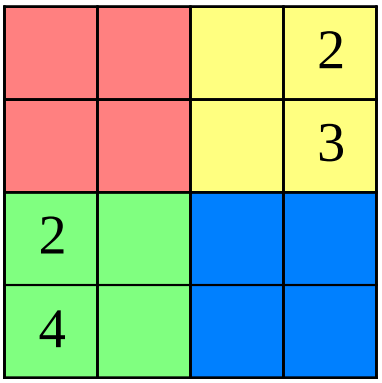
Barvni sudoku

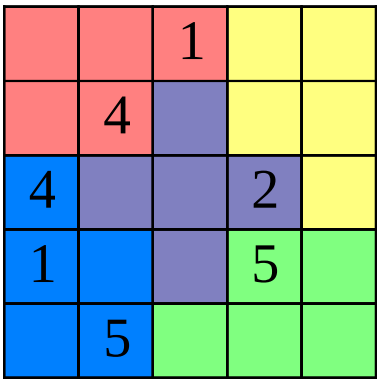
V n × n kvadratkov moraš vpisati začetna naravna števila od 1 do n, tako da bo v vsaki vrstici, v vsakem stolpcu in v kvadratkih iste barve nastopalo vseh n števil.

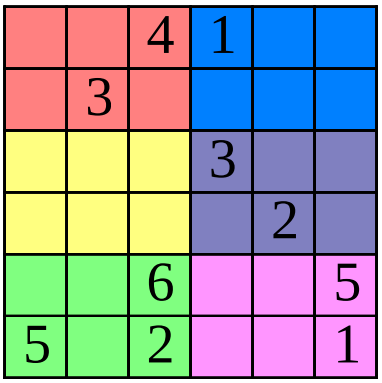


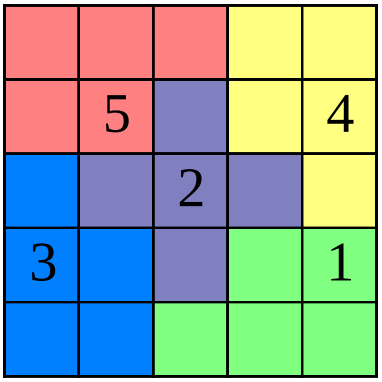


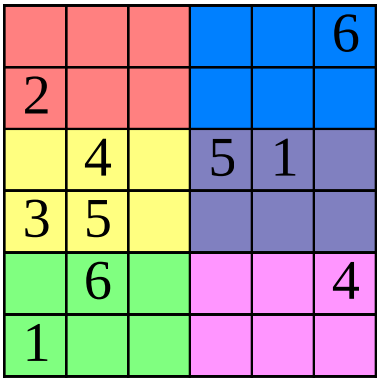


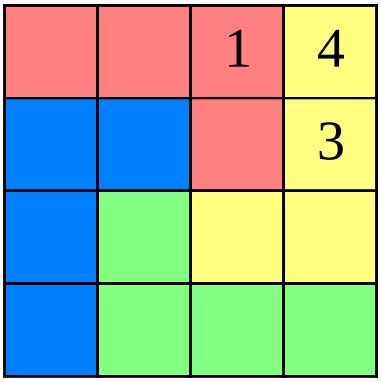


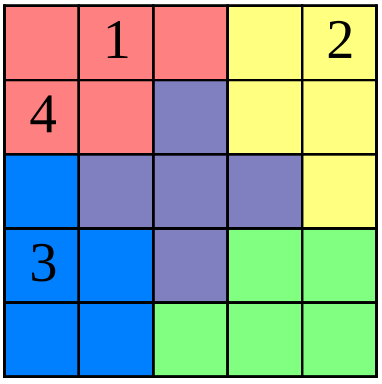


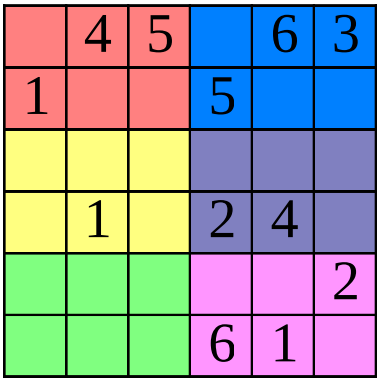


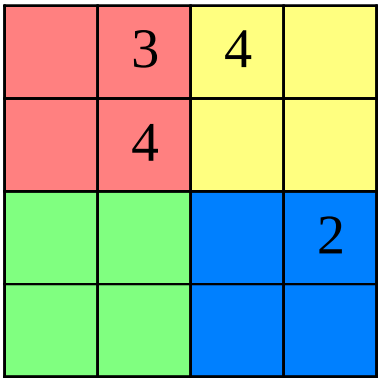












Latinski kvadrati

V n × n kvadratkov moraš vpisati začetna naravna števila od 1 do n, tako da bo v vsaki vrstici, v vsakem stolpcu nastopalo vseh n števil.

3			
4			3
2		3	4

				2
		5	3	1
	2	4		
			5	
1				

	2	5		
4			2	
		2		1
			4	
	1			

		2	
4			
	1		
	3		2

2		4	
4			
	1		

		1		
			2	
2				
5	3			
4		2		3

		2	
4			
		1	3
	3		

3			4
			2
	3	2	

5				
	2			
	3			5
		4		
4		1		

4	2			
			4	
		3		
	3		5	
2		5		

	3		
4			2
			4

	3		
4			
	1	3	

Sudoku s črkami

V n × n kvadratkov moraš vpisati začetna naravna števila od 1 do n, tako da bo v vsaki vrstici, v vsakem stolpcu in v kvadratkih z isto črko nastopalo vseh n števil.

B	B	B	D 2
D	C 2	A	A
B	D	A	D
C 3	C	A	C 1

B	C	C	B
C	D	A	D 2
A	D 3	C	B
D	B	A	A 1

D	D	B 4	C
A	C	B	A
D 2	D	C	A
B 3	A	B	C

B	D 1	D 2	D
C	A	A	A
B	B	D 4	B
C	A	C	C

C	B	B	B
D	D	C	A 3
C	A	B	A
D	C 2	D	A 1

C	A 3	A	A
D	B 2	C	B
C 1	C	A	B
D	D	B	D

B	D	A	D
A	C	C	D
C 2	B	D	A
B 3	B	C 4	A

C	D	D	B
A 4	D	A	C
A 1	C	C	D
A 2	B	B	B

D	D	B	D 4
B	A	A 1	A
C 3	A	C	C
B	D	C	B

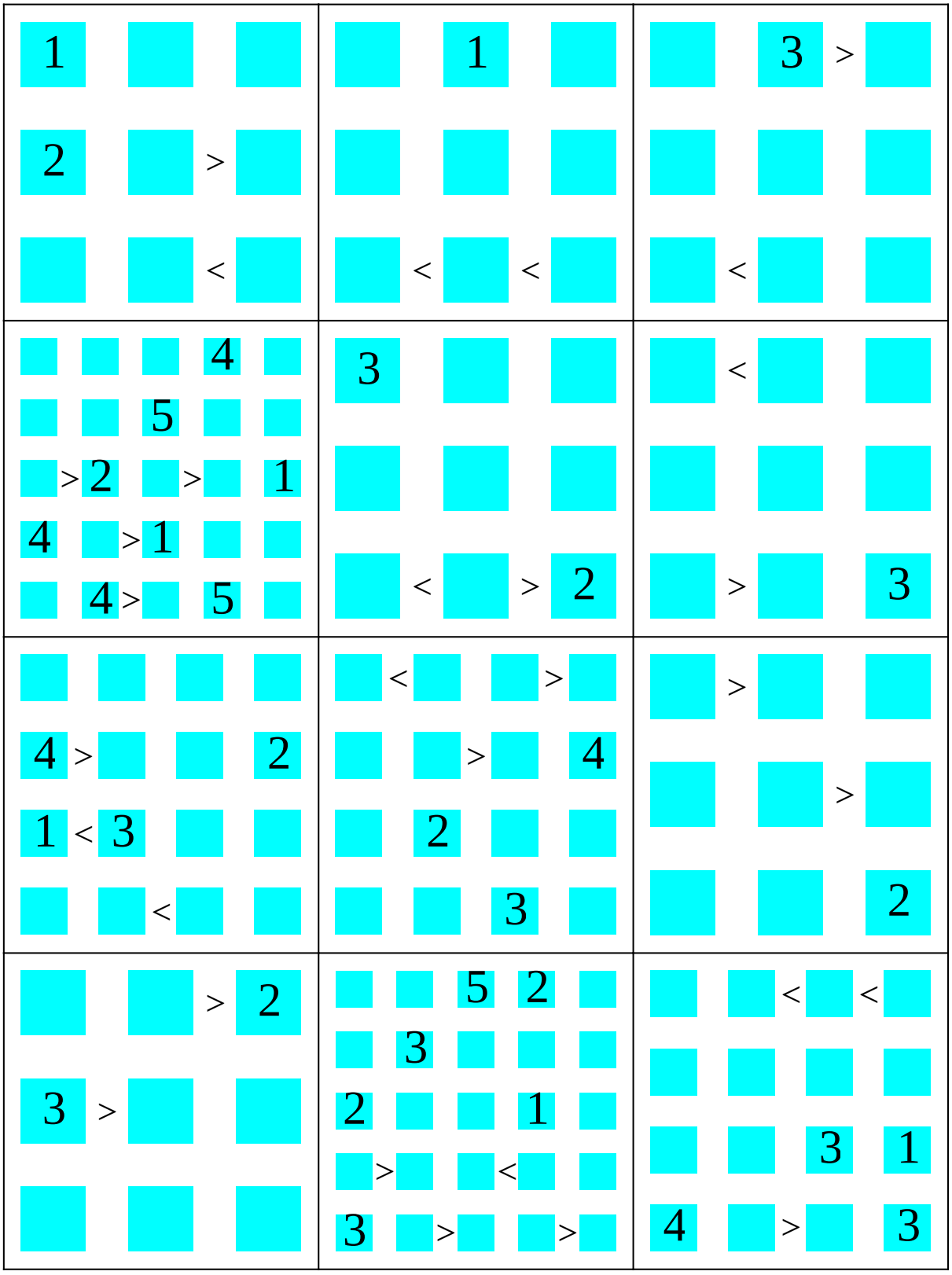
A	D 3	C 2	A
C	A	B	D
C	C	D	B
D	B 1	B	A

C	C	C	D
B 1	C	D	B
D 2	A	B	A
A 3	D	A	B

C	D 2	A 3	C
A 1	B	B	A
D	B	B 4	A
C	D	D	C

Futoshiki

V n × n kvadratkov moraš vpisati zaetna naravna števila od 1 do n, tako da bo v vsaki vrstici in v vsakem stolpcu nastopalo vseh n števil ter, da bodo izpolnjene vse relacije.



Rdeči kvadratki

Naloga reševalca je, da poišče vse skrite rdeče kvadratke in jih označi z R. Pri tem veljata naslednji pravili: a) Vsako število v preglednici pove, koliko sosednih kvadratkov je rdečih. Kvadratek je soseden kvadratku, če imata skupno stranico ali oglišče. b) Kvadratki s številkami niso rdeči.

	0		
	1	3	2
1			
		2	

0		0	
	2		1
		2	
	2		

1	2	2	
	1	3	

	1		
		2	1
	1		
			1

			1
	1		1
		2	
	0		

	1		
			2
2		2	
		2	0

	0		1
1		0	

			2
	2		
	1		
1	1		1

		1	
	0		
			2
	0		

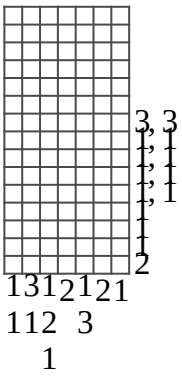
1			
	2	1	
1		0	

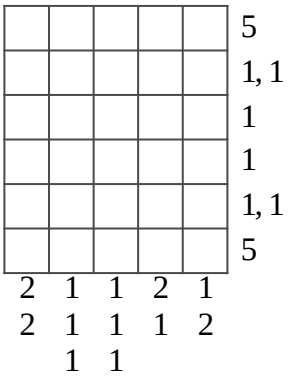
	0	1	
	1		2
0		1	

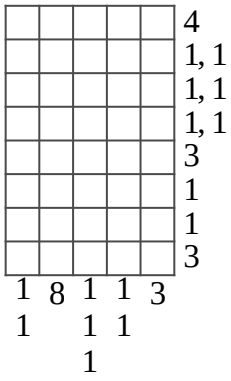
0		0	
1			
	2	2	1

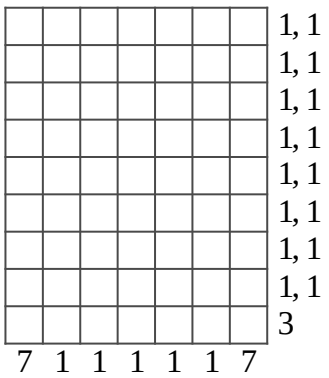
Gobelini

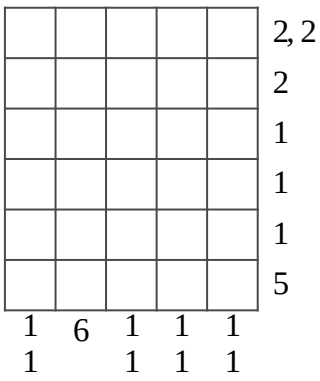
Kvadratke v razpredelnici moraš pobarvati sivo, tako da bo zaporedje sivih pasov v vrstici ustrezalo zaporedju števil na desni, in, da bo zaporedje sivih pasov v stolpcu ustrezalo zaporedju števil pod njim.

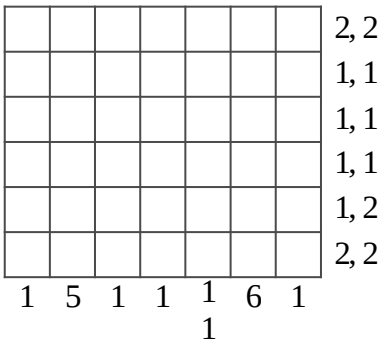


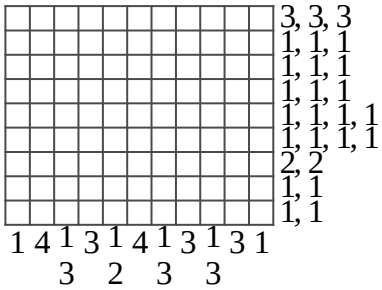


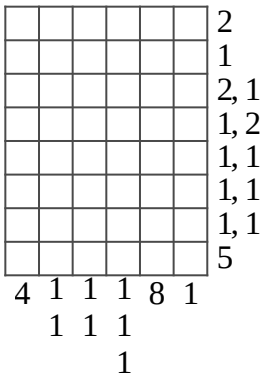


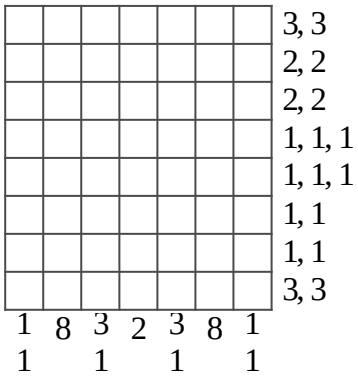


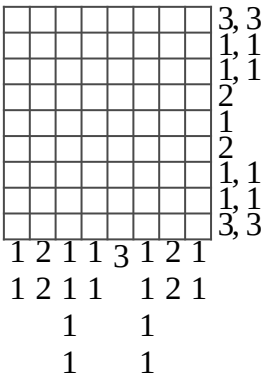


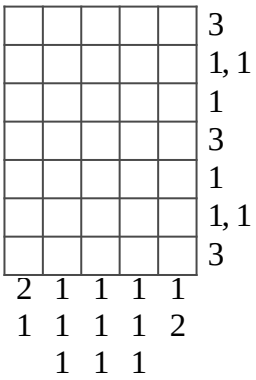


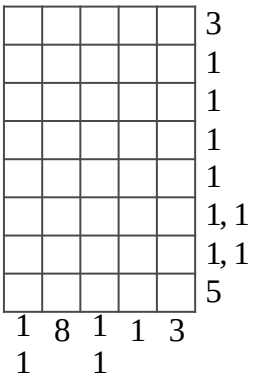






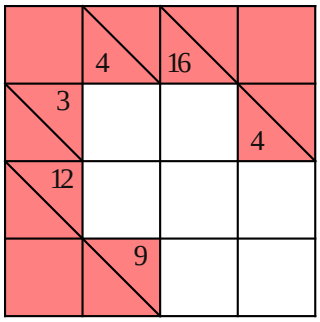


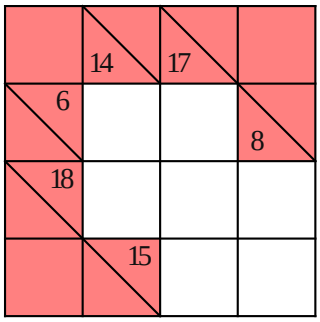


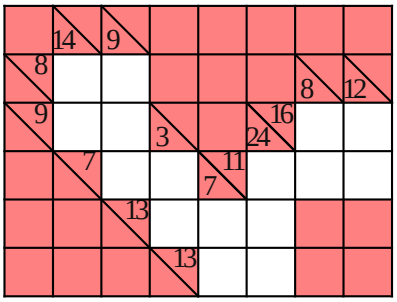


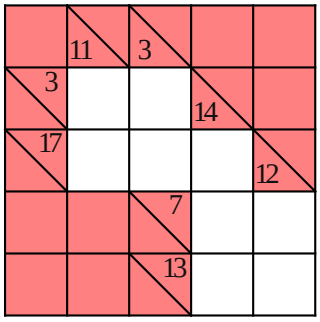
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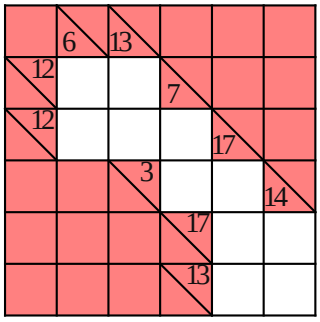
Naloga reševalca je, da izpolni bele kvadratke s števkami od 1 do 9, tako, da je vsota števk v zaporednih belih kvadratkih po vrsticah in stolpcih enaka številu, ki je zapisano v rdečem kvadratku na začetku vrstice (stolpca) nad (pod) diagonalo. Pri tem pa morajo biti vse števke v posamezni vrstici (stolpcu) različne.

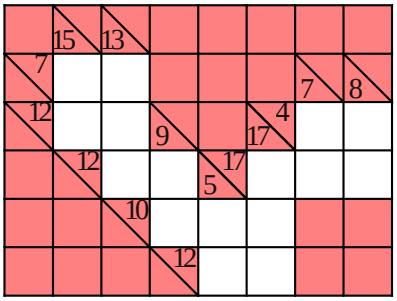


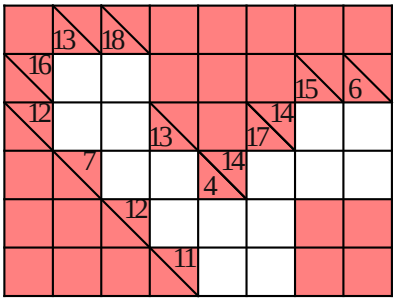


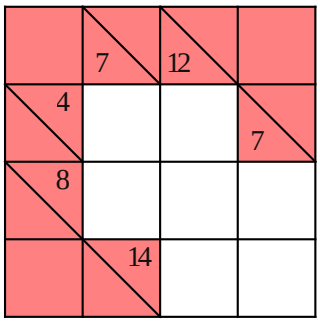


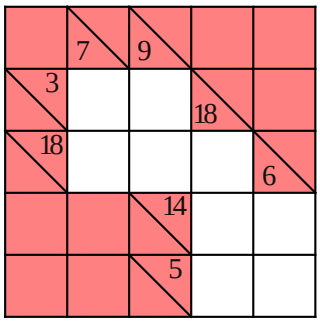


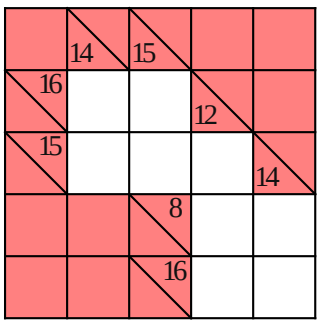


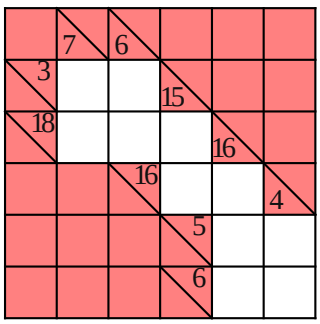


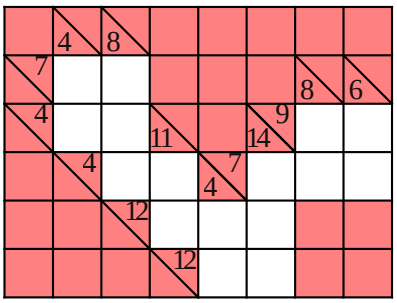






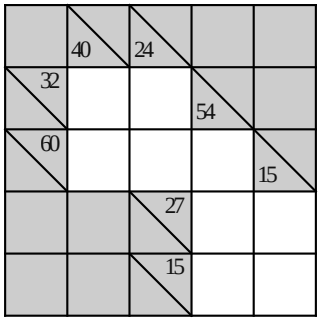


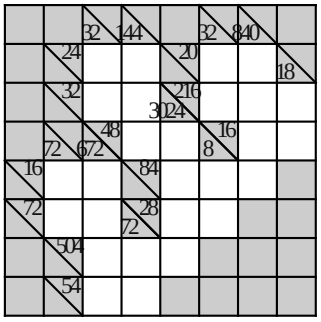


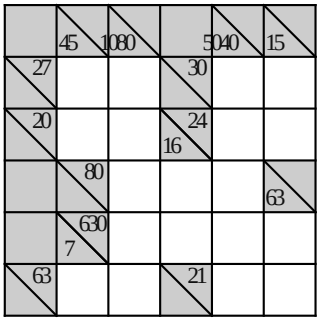


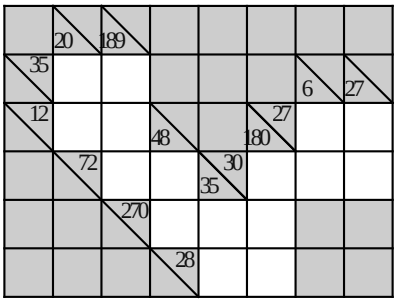
Križni produkti

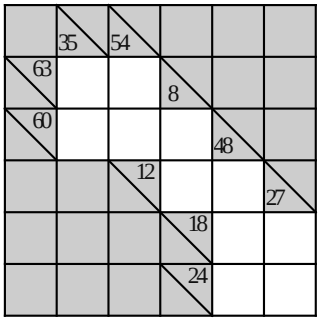
Naloga reševalca je, da izpolni bele kvadratke s števkami od 1 do 9, tako, da bo zmnožek števk v zaporednih belih kvadratkih po vrsticah in stolpcih enaka številu, ki je zapisano v sivem kvadratku na začetku vrstice (stolpca) nad (pod) diagonalo. Pri tem pa morajo biti vse števke v posamezni vrstici (stolpcu) različne.

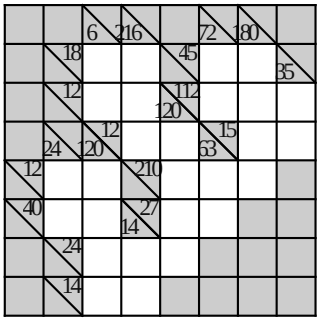


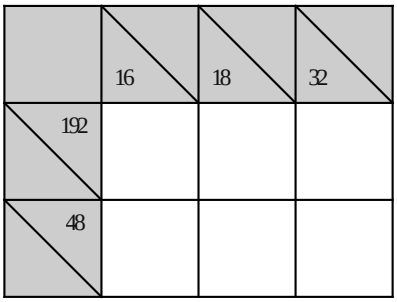


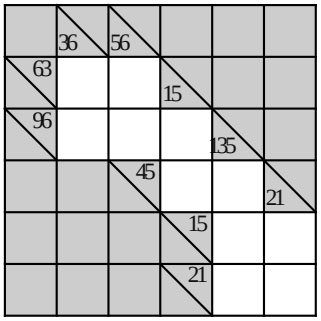


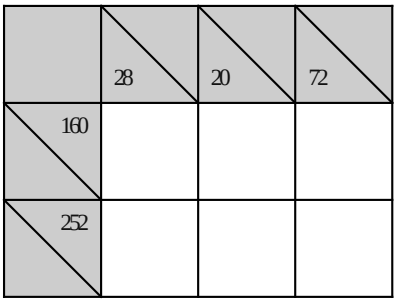


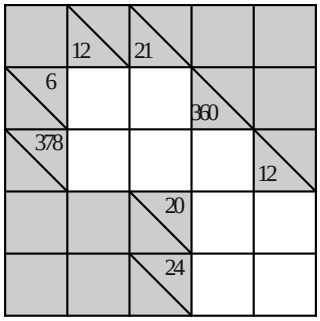


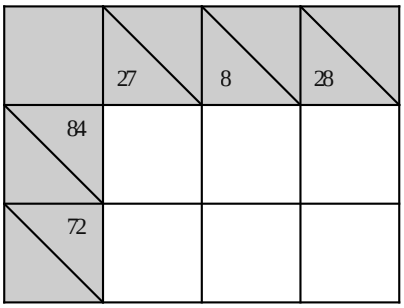


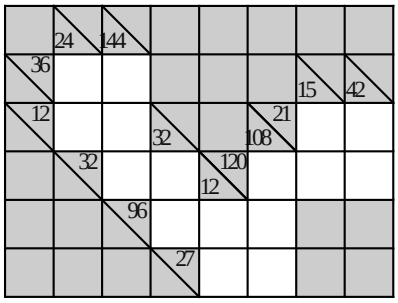






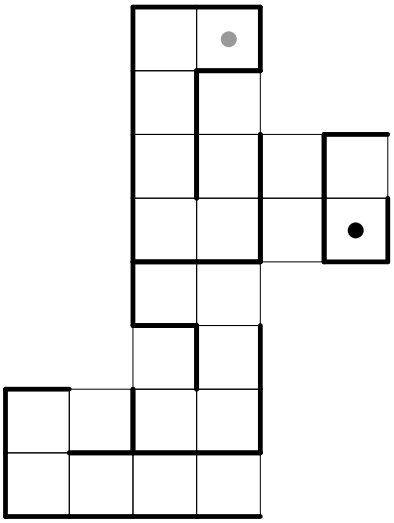


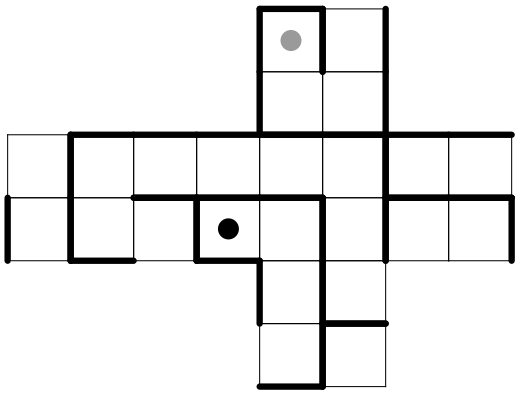


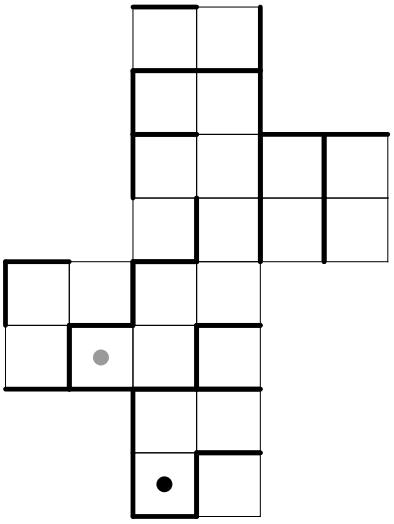


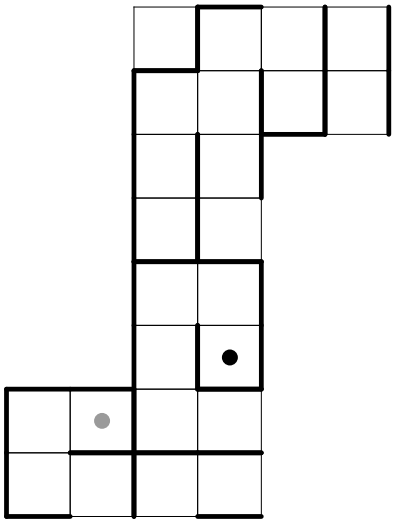
Labirint na kocki

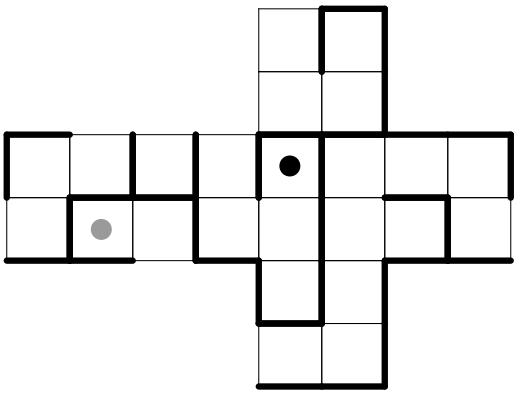
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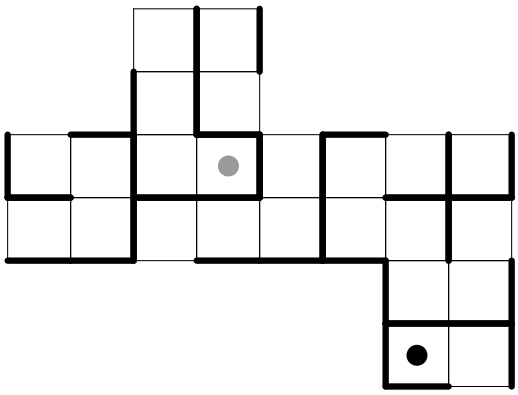






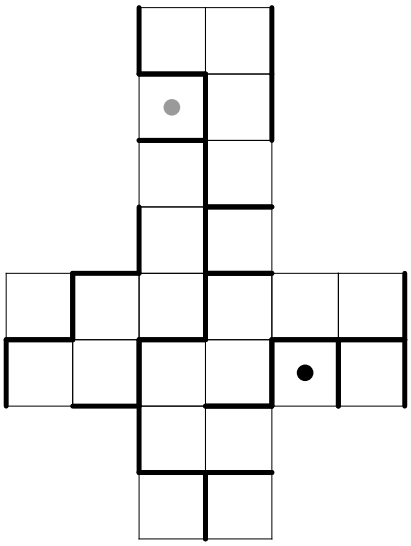


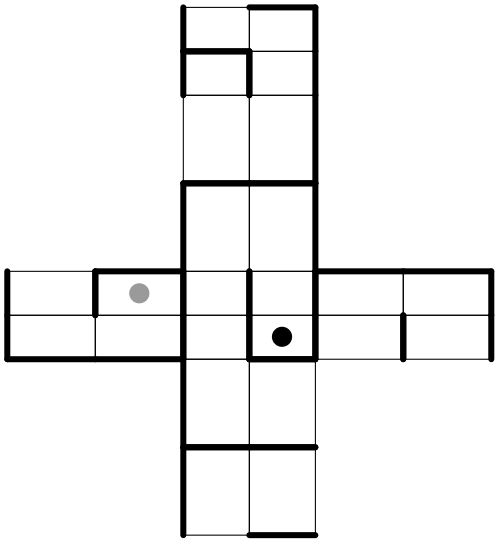


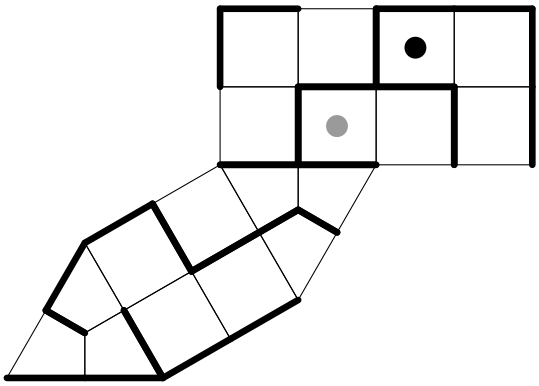


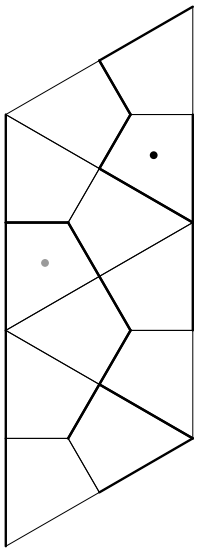
Labirinti na enostavnih poliedrih

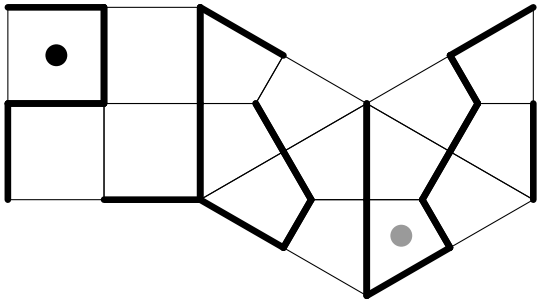
Poveži točki na poliedru:

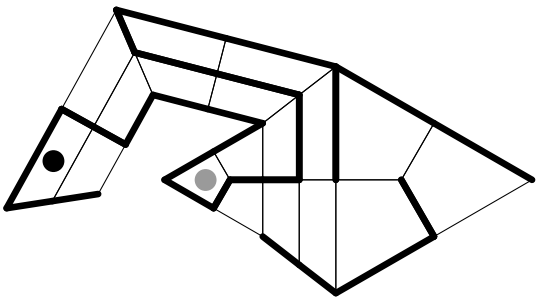




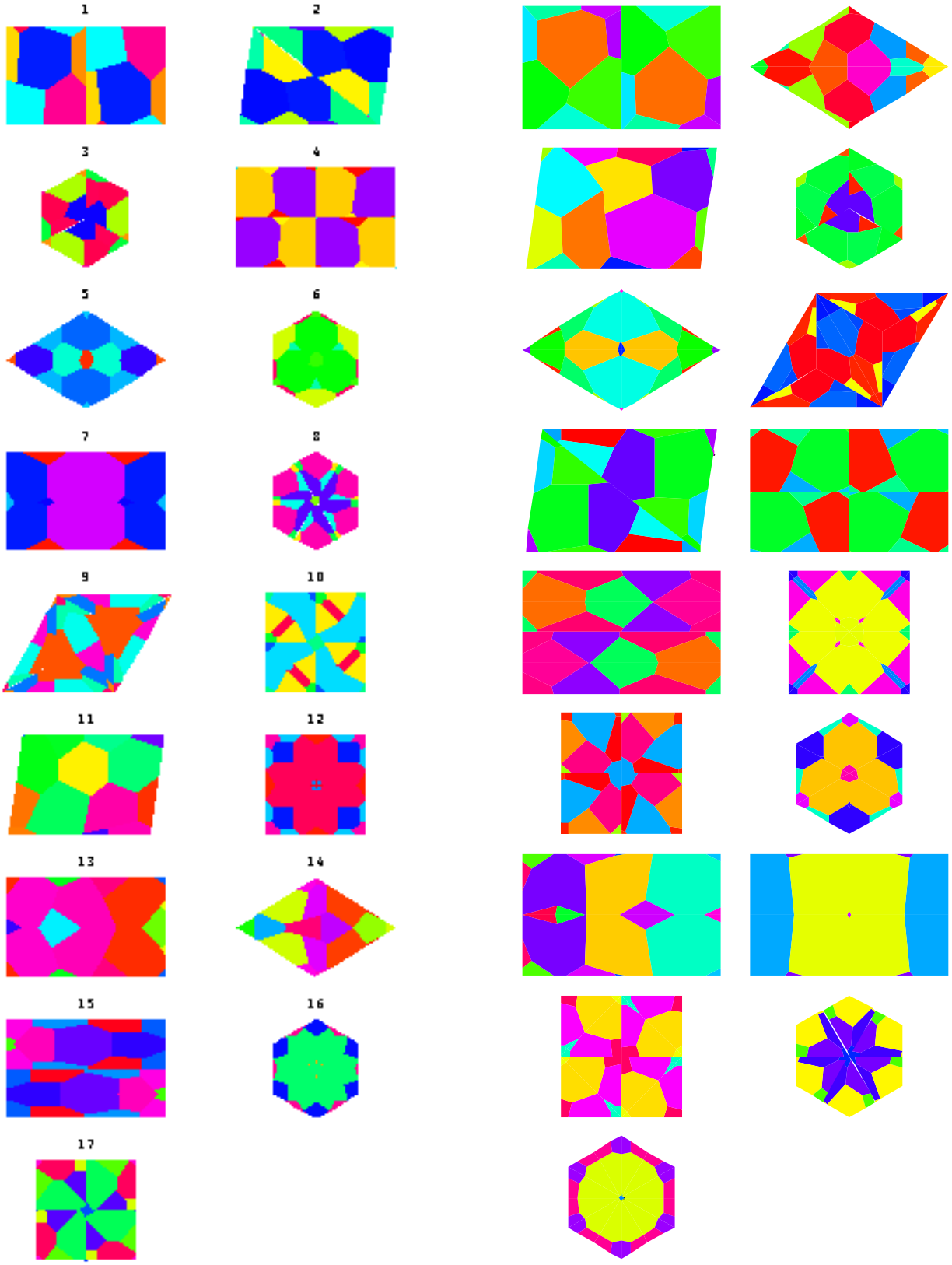






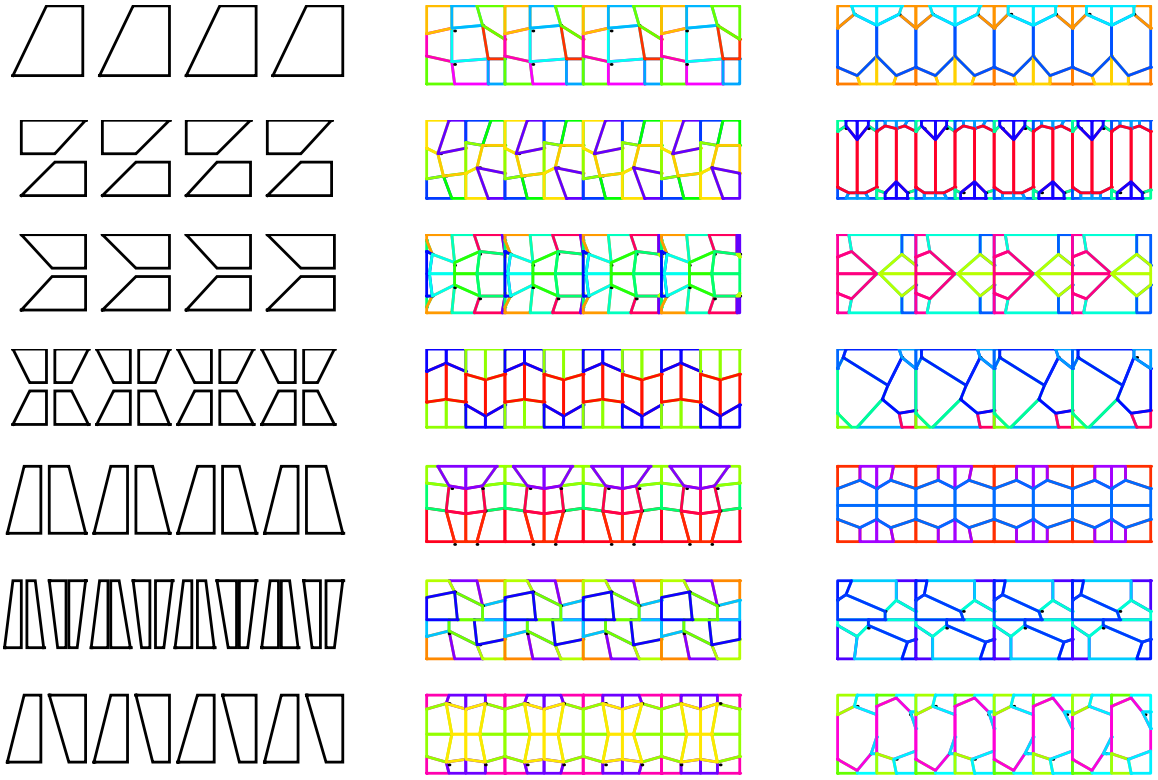


Poveži sličici, ki pripadata isti grupi

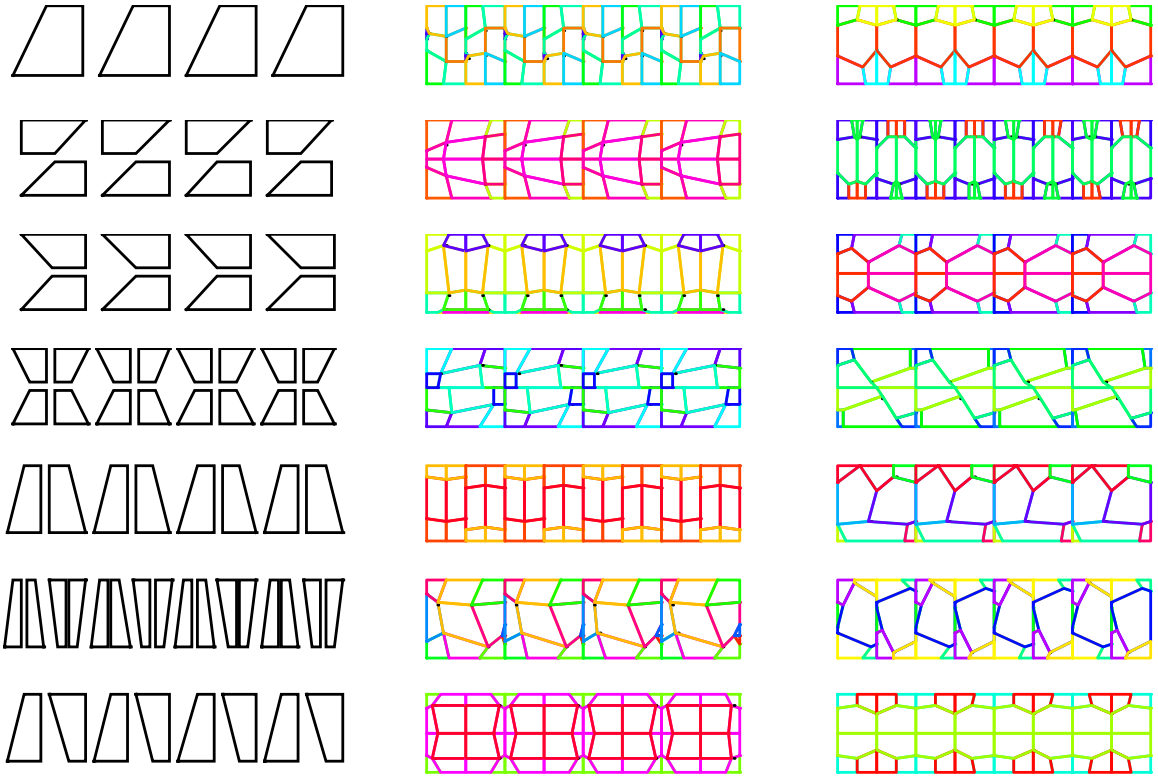


Poveži sličici, ki pripadata isti grupi

a)

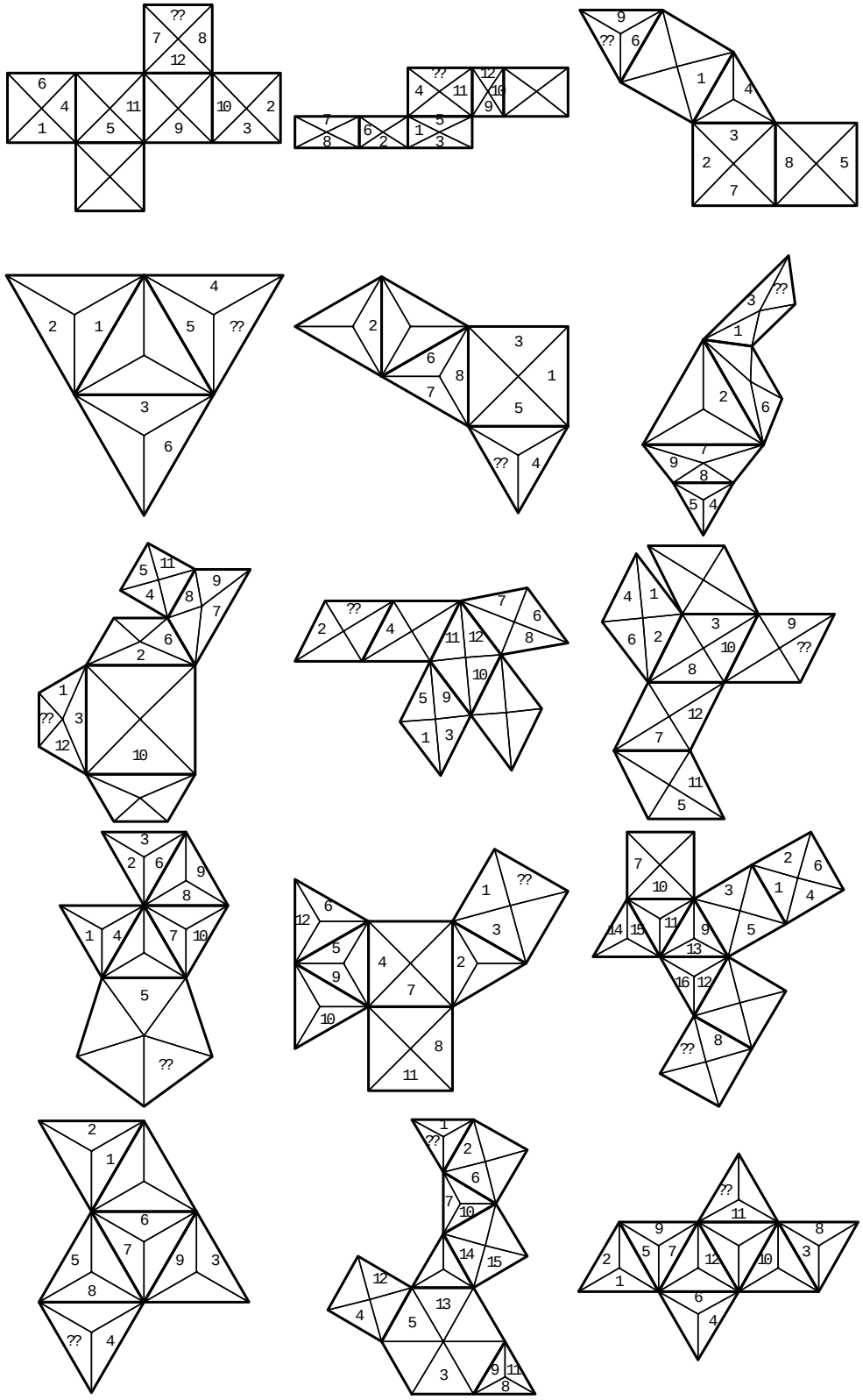


b)

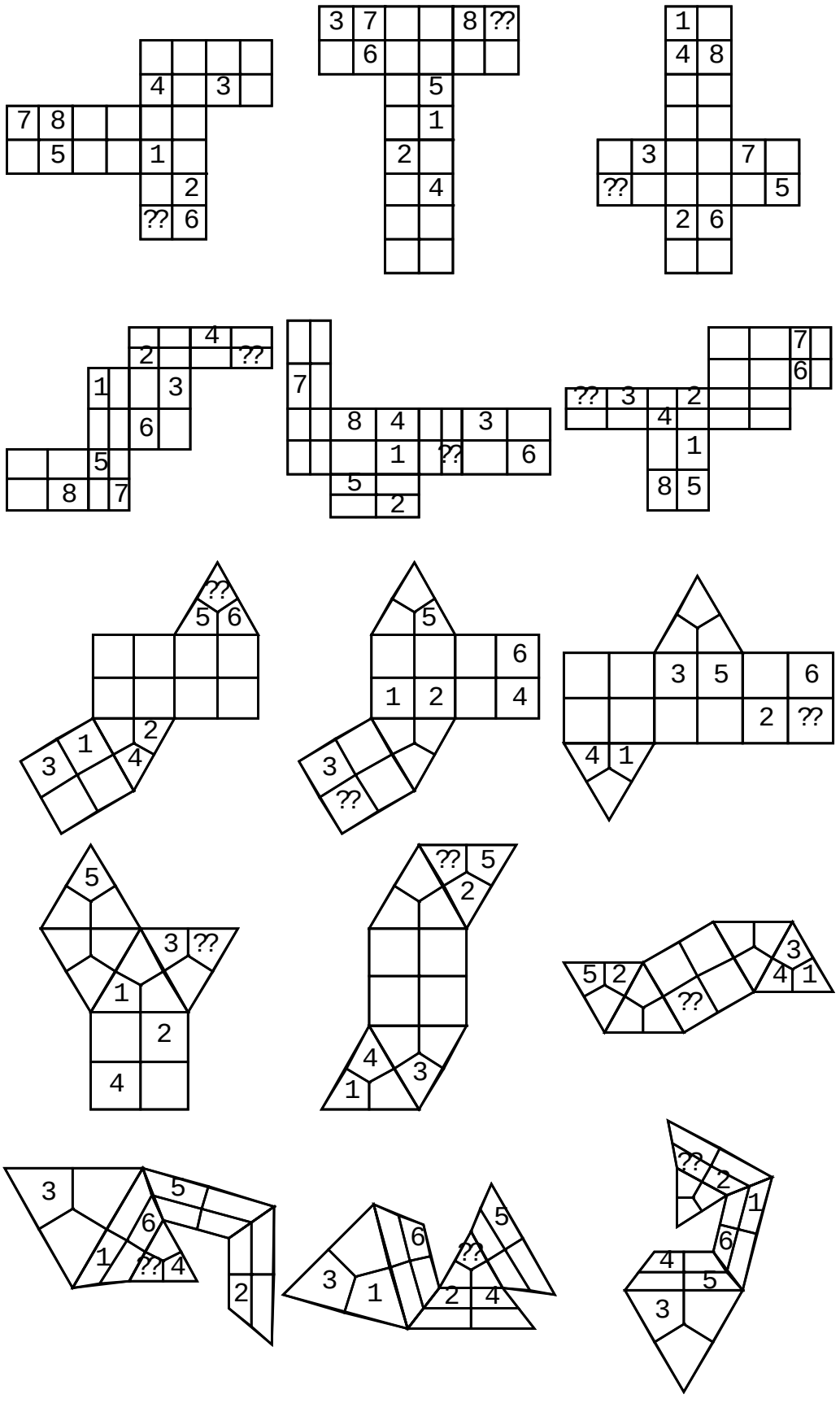


Prostorska predstavljivost

a) Katero številko moramo vpisati na mesto znaka ??, da bosta stranici pripadali istemu robu poliedra?

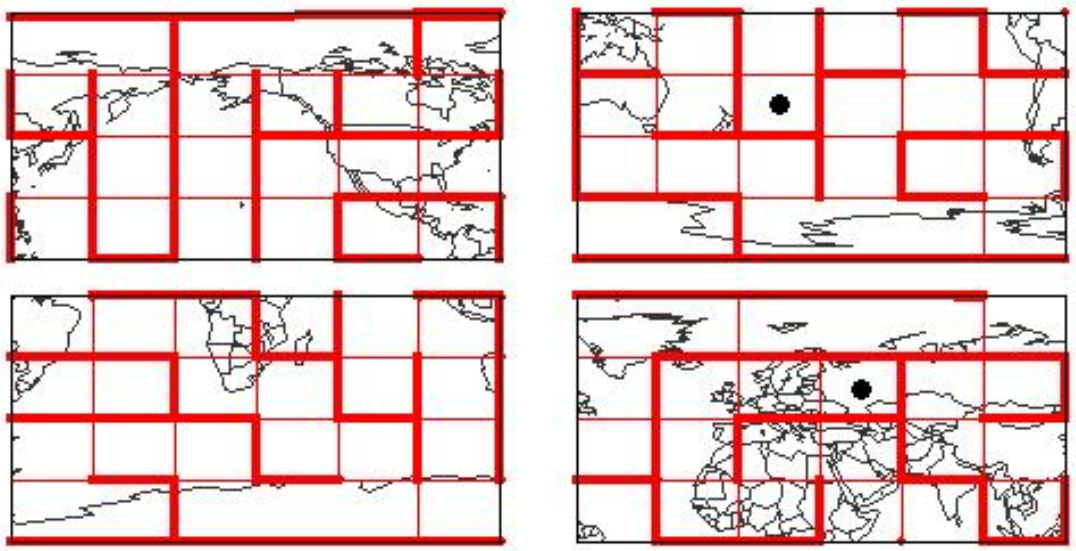


b) Katero številko moramo vpisati na mesto znaka ??, da bosta oglišči pripadali istemu oglišču poliedra?

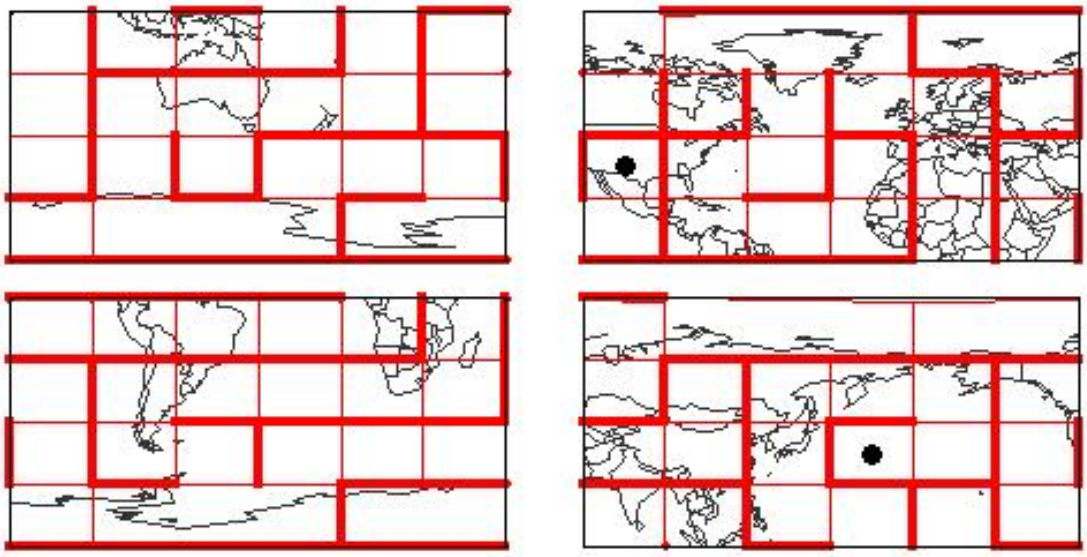


Labirinti na zemljevidu

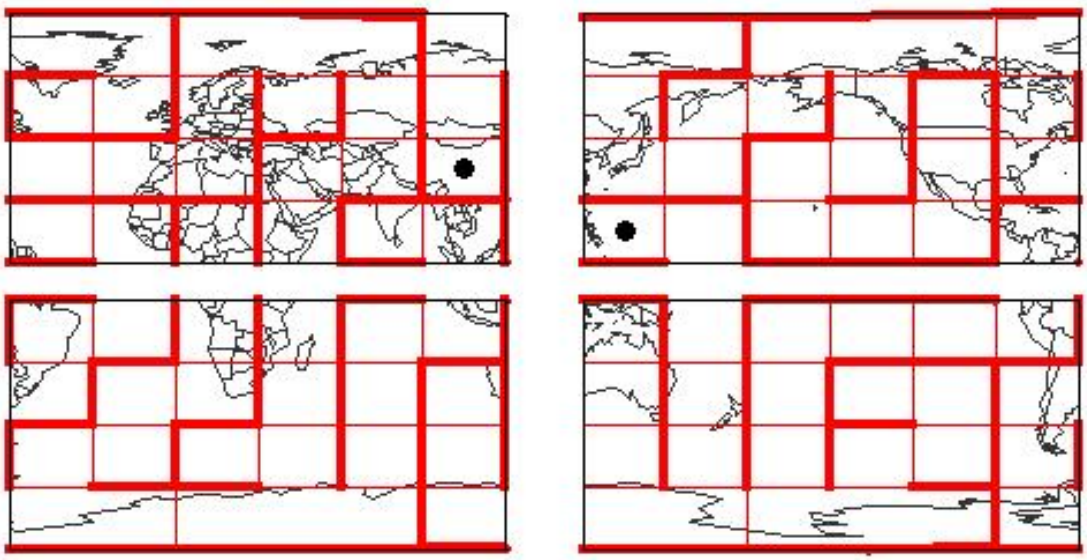
a)



b)

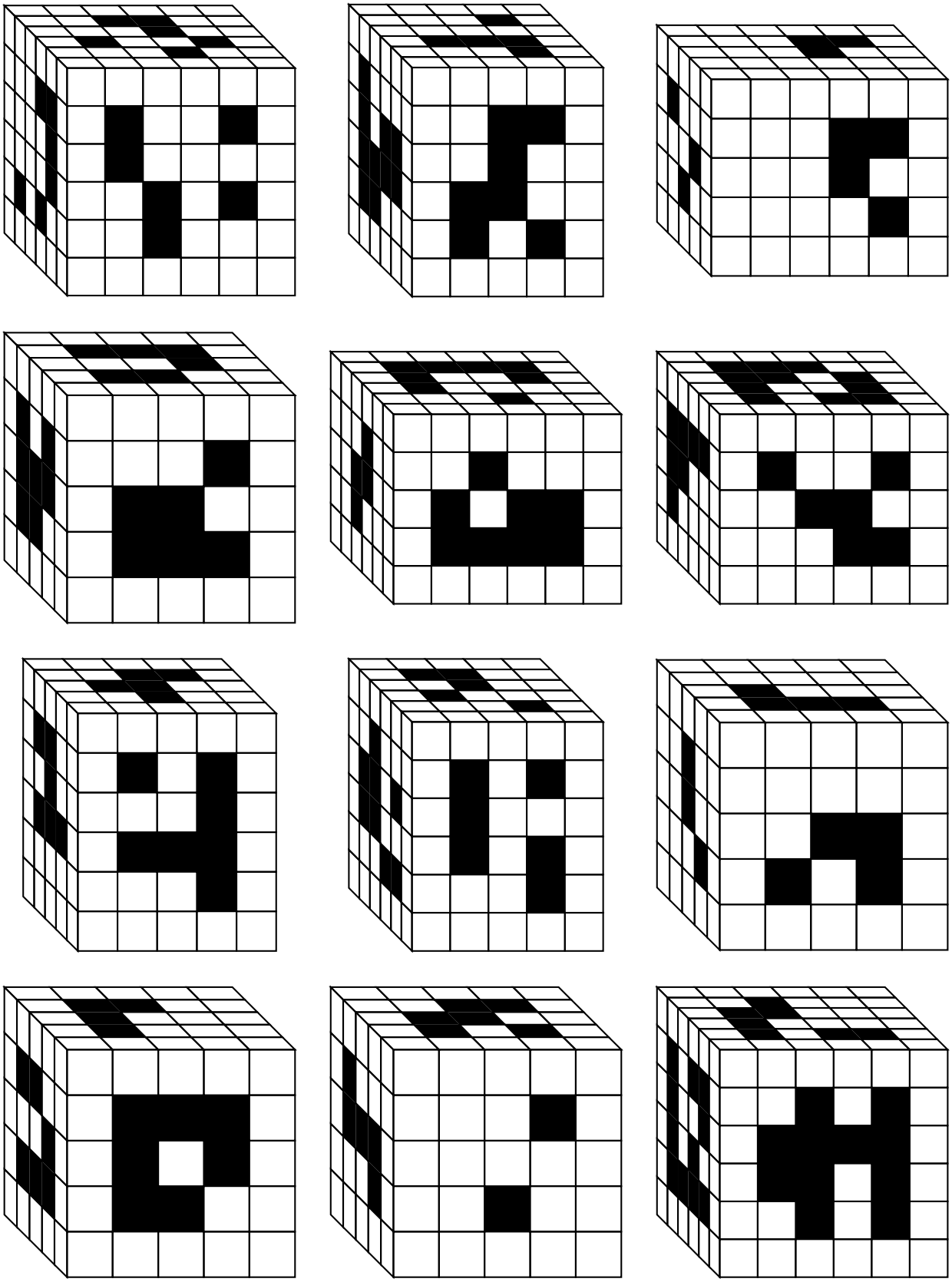


c)



Odstranjene kocke

Dan je kvader, ki sestoji iz kockic. Odstranimo vse kocke, ki so zaznamovane črno od vrha do dna, od leve do desne in od spredaj do zadaj. Koliko kock smo odstranili?



Nagradna logična naloga

Štirje prijatelji (Miha, Jure, Lan, Cene) z različnimi priimki (Gornik, Gorjanc, Rop, Gaber) različnih poklicev (matematik, igralec, kuhar, politik) so iz različnih krajev (Maribor, Ptuj, Koper, Lendava). Za vsakega doloci ime, priimek, kraj bivanja in poklic.

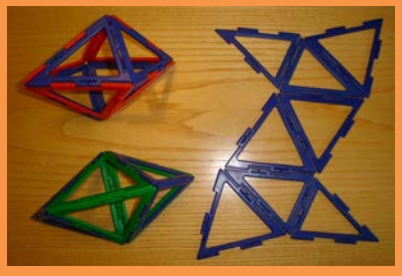
1. Rop ni po poklicu kuhar.
2. Kuhar je doma na Ptuju.
3. Igralec ni doma ne v Kopru ne v Lendavi.
4. Lan se ne piše Gorjanc.
5. Politik ni doma iz Kopra.
6. Rop ni doma iz Maribora.
7. Gaber je doma v Lendavi.
8. Gorjanc ni po poklicu igralec.
9. Miha se piše Gornik.
10. Jure je doma v Kopru.

	Gornik	Gorjanc	Rop	Gaber	matematik	igralec	kuhar	politik	Maribor	Ptuj	Koper	Lendava
Miha												
Jure												
Lan												
Cene												
Maribor												
Ptuj												
Koper												
Lendava												
matematik												
igralec												
kuhar												
politik												

ime	priimek	poklic	kraj
Miha			
Jure			
Lan			
Cene			

Nagradno vprašanje

Na sliki je mreža, iz katere lahko dobimo dva različna poliedra. Ali obstaja še kakšna takšna mreža?



Odgovore pošljite na naslov Logika d.o.o, Svetčeva pot 11, 1241 Kamnik, s pripisom “nagradna uganka”, do 15. oktobra 2013.

Kako je Euler izračunal približek za π

V prvi lanskoletni številki revije smo govorili o računanju števila π z vrsta za arkustangens. Ta vrsta je bila uporabljena za računanje od 17. do 20. stoletja. Eno od takih formul, ki izvirajo iz te vrste je uporabil tudi Jurij Vega l. 1789, ko je izračunal π točno na 126 decimalk.
Euler se ni toliko zanimal za samo računanje tega števila ampak bolj za izpeljavo novih formul.
V [1] je Euler izpeljal formulo $\arctan(t) = \frac{t}{1+t^2} \sum_{i=0}^{\infty} \frac{(2\,i)!!}{(2\,i+1)!!} \left(\frac{t^2}{1+t^2}\right)^i$. Trdil je, da je ta formula boljša od Leibnizove formule $\arctan(t) = \sum_{i=0}^{\infty} \frac{t^{2\,i-1}}{2\,i-1}$, ker je za $t = \frac{1}{3}, \frac{1}{7}, \frac{3}{79}$, ima faktor $\frac{t^2}{1+t^2}$ v njegovi vrsti vrednosti $\frac{1}{10}, \frac{2}{100}, \frac{144}{100000}$, s katerimi pa je lažje računati. To je ilustriral s primerom $\pi = 8 \arctan\left(\frac{1}{3}\right) + 4 \arctan\left(\frac{1}{7}\right)$. Izračunal je 8 členov vrste za arkustangens na 27 decimalk in ugotovil, da velja $\pi \approx 3.14159265$.



Pro parte priore.

term. I. = 2, 4 etc.
— II. = - 16 etc.
— III. = - - 128 etc.
— IV. = - - 109,714285,714285,714285,7142 etc.
— V. = - - - - 97,523809,523809,523809,523 etc.
— VI. = - - - - - 8,865800,865800,865800,865 etc.
— VII. = - - - - - - 81,838161,838161,838161,8 etc.
— VIII. = - - - - - - - 76,382284,382284,382284, etc.

Pars. I. = 2,574004427 | 231435 | 231435 | 231435 etc.

Pro parte posteriore.

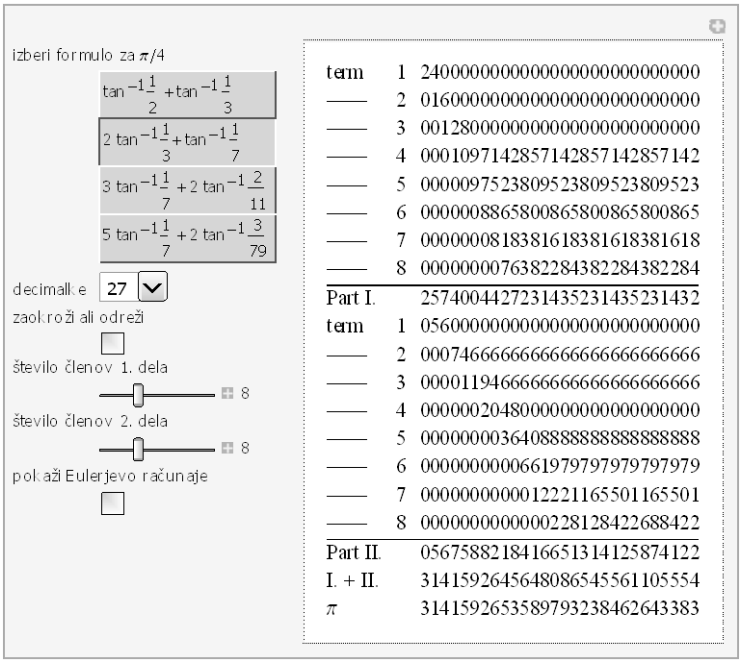
term. I. = 0, 560 etc.
— II. = - - 74666666666666666666666666 etc.
— III. = - - - 1194066666666666666666666 etc.
— IV. = - - - - 204800000000000000000 etc.
— V. = - - - - - 36408888888888888888 etc.
— VI. = - - - - - - 6619797979797979979 etc.
— VII. = - - - - - - - - 1222116550116550 etc.
— VIII. = - - - - - - - - - 228128422688422 etc.

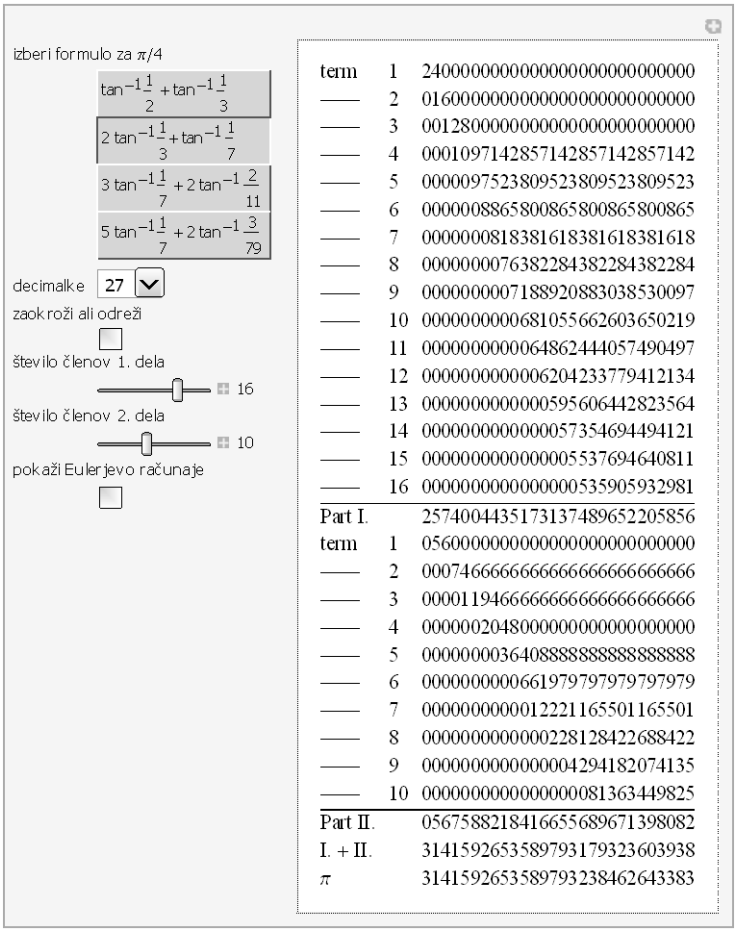
Pars II. = 0, 567588218416651311412587|4125 etc.

Hinc

Na naslednji strani je dodal še člene 9–16 prvega dela in člene 9–10 drugega dela ter ugotovil, da velja $\pi \approx 3.14159265358979315$.

V demonstraciji [Izidor Hafner,"Euler's Estimate of Pi" http://demonstrations.wolfram.com/EulersEstimateOfPi/Wolfram Demonstrations Project] smo želeli prikazati Eulerjevo računanje.





Reference:
[1] L. Euler, "Investigatio quarundam serierum, quae ad rationem peripheriae circuli ad diametrum vero proxime definiendam maxime sunt accommodatae," *Nova Acta Academiae Scientarum Imperialis Petropolitinae* 11, 1798, pp. 133-149.
www.math.dartmouth.edu/~euler/tour/tour_08.html.
[2] E. Sandifer. "How Euler Did It: Estimating π." *MAA Online*. Feb 2009. (Jun 20, 2013)
www.maa.org/editorial/euler/HEDI%2064 %20 Estimating %20 pi.pdf.

Rešitve

Barvni sudoku

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

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

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

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

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

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3	2	4	6	1	5

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4	1	3	2
3	2	1	4

Latinski kvadrati

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3	2	1	4
1	4	2	3

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

Sudoku s črkami

4 B	1 B	3 B	2 D
1 D	2 C	4 A	3 A
2 B	3 D	1 A	4 D
3 C	4 C	2 A	1 C

1 B	4 C	2 C	3 B
3 C	1 D	4 A	2 D
2 A	3 D	1 C	4 B
4 D	2 B	3 A	1 A

1 D	3 D	4 B	2 C
4 A	1 C	2 B	3 A
2 D	4 D	3 C	1 A
3 B	2 A	1 B	4 C

4 B	1 D	2 D	3 D
2 C	4 A	3 A	1 A
1 B	3 B	4 D	2 B
3 C	2 A	1 C	4 C

1 C	3 B	2 B	4 B
2 D	1 D	4 C	3 A
3 C	4 A	1 B	2 A
4 D	2 C	3 D	1 A

2 C	3 A	1 A	4 A
4 D	2 B	3 C	1 B
1 C	4 C	2 A	3 B
3 D	1 D	4 B	2 D

1 B	3 D	2 A	4 D
4 A	1 C	3 C	2 D
2 C	4 B	1 D	3 A
3 B	2 B	4 C	1 A

3 C	1 D	4 D	2 B
4 A	2 D	3 A	1 C
1 A	4 C	2 C	3 D
2 A	3 B	1 B	4 B

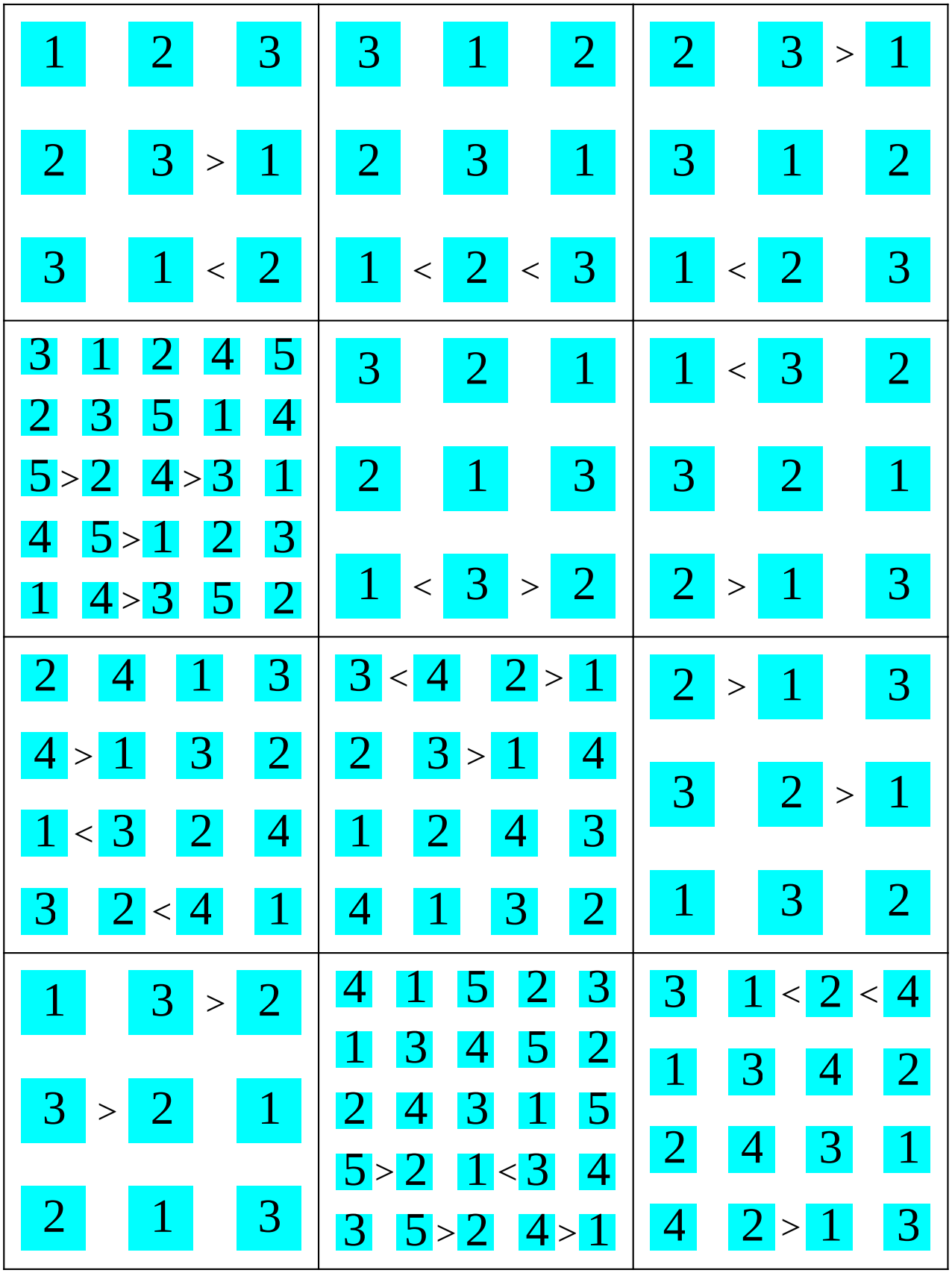
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4 B	2 A	1 A	3 A
3 C	4 A	2 C	1 C
1 B	3 D	4 C	2 B

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1 C	2 A	3 B	4 D
3 C	4 C	1 D	2 B
2 D	1 B	4 B	3 A

4 C	2 C	1 C	3 D
1 B	3 C	4 D	2 B
2 D	4 A	3 B	1 A
3 A	1 D	2 A	4 B

4 C	2 D	3 A	1 C
1 A	3 B	2 B	4 A
3 D	1 B	4 B	2 A
2 C	4 D	1 D	3 C

Futoši


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

Rdeči kvadratki

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	1	3	2
1	R		R
		2	

0		0	
	2		1
R	R	2	R
	2		

R			
1	2	2	
		R	R
	1	3	R

	1		
	R	2	1
	1		R
			1

			1
	1	R	1
		2	
	0		R

	1	R	R
			2
2	R	2	
	R	2	0

			R
	0		1
1		0	
R			

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	2		R
R	1		R
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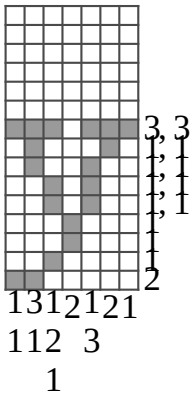
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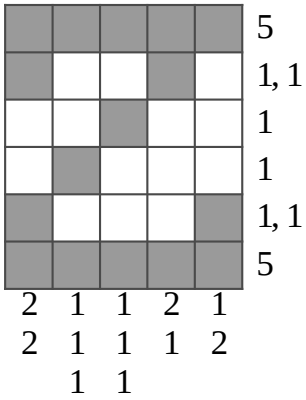
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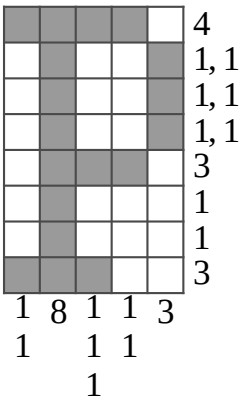
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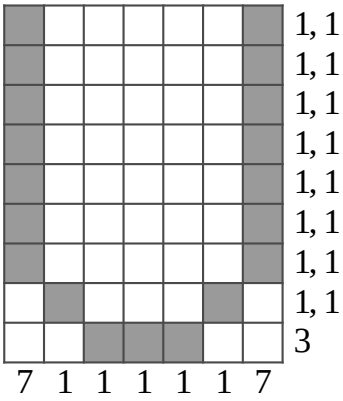
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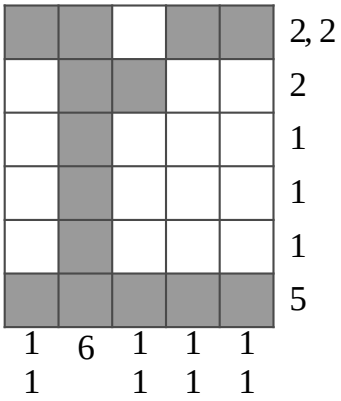
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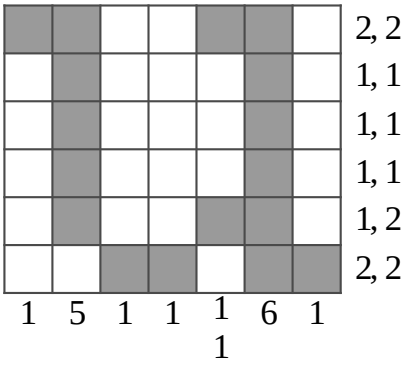

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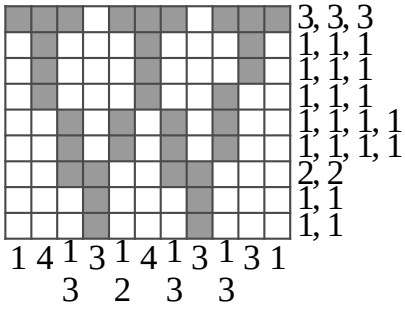

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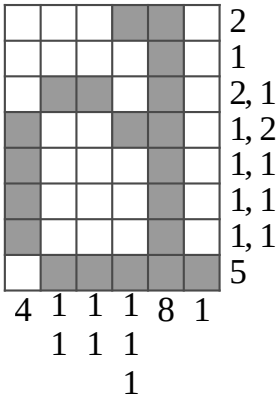

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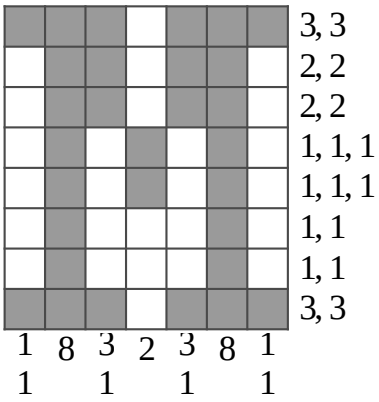

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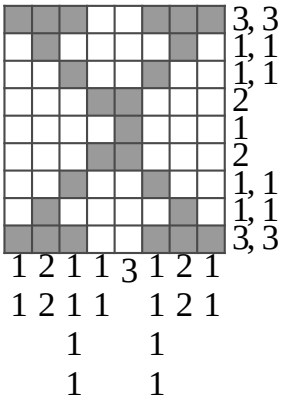

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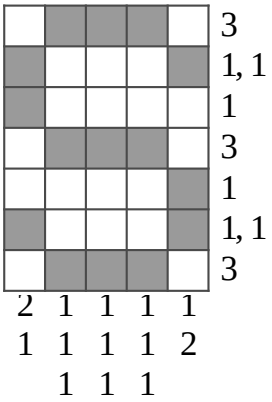

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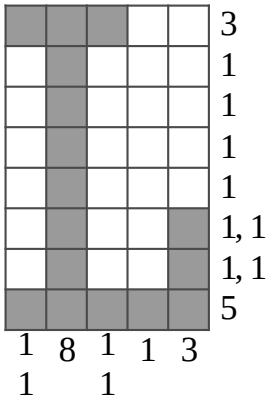

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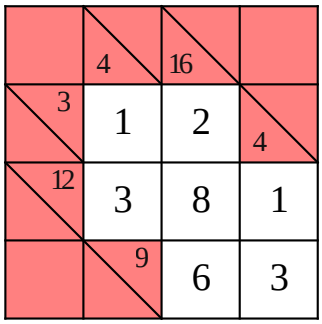

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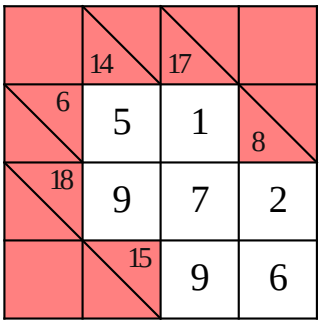

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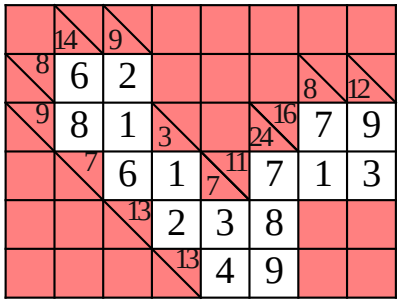

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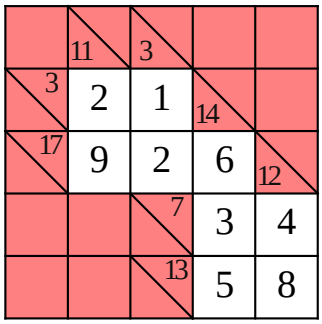

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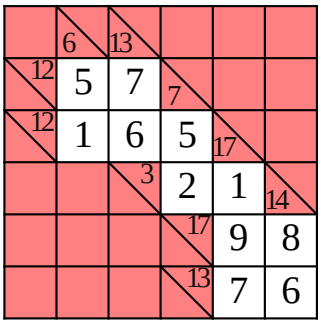
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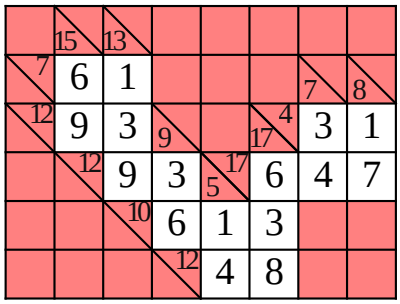


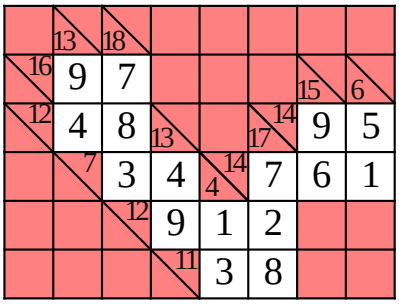


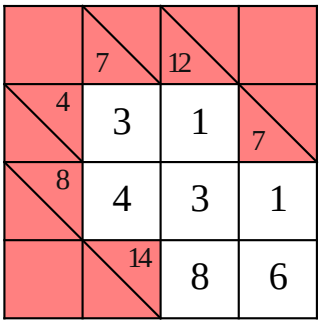


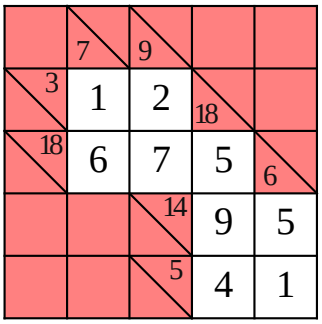


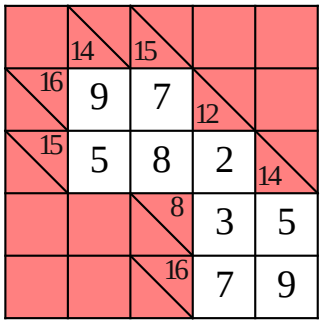


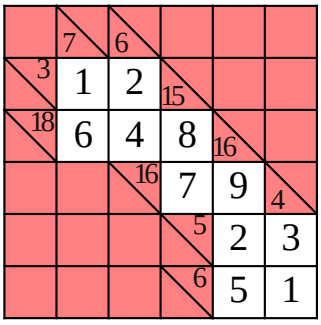


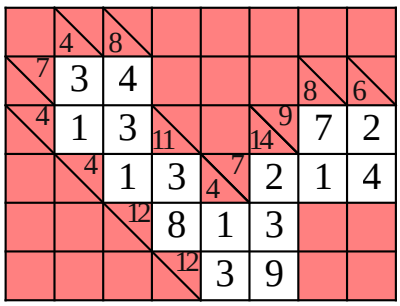




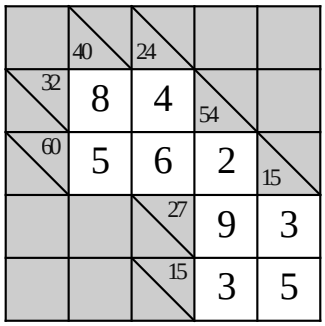


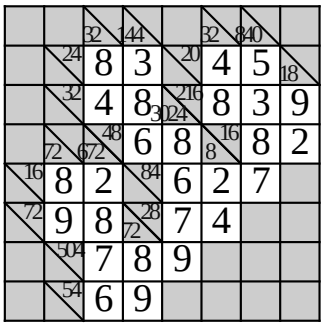


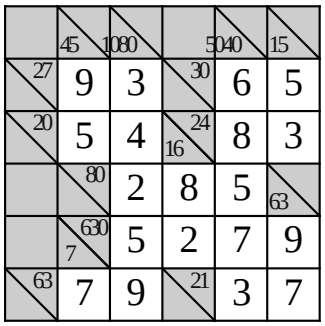


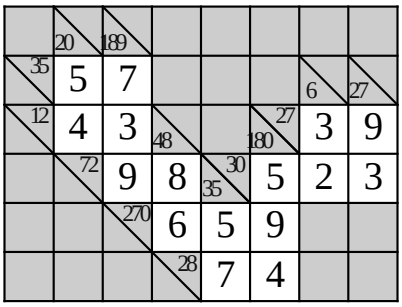


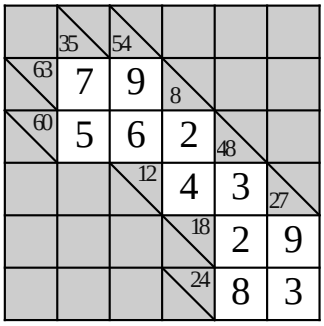
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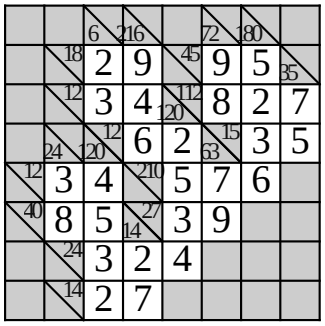


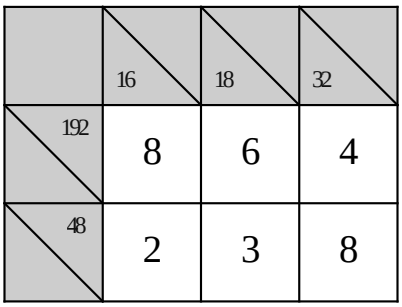


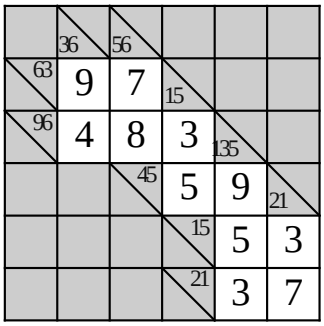


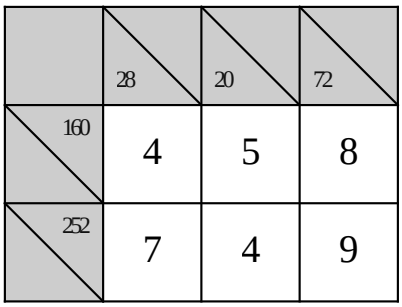


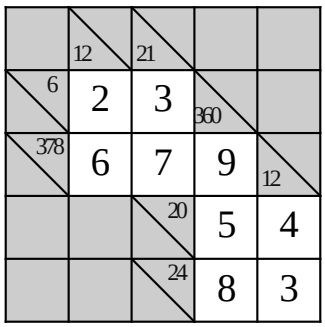


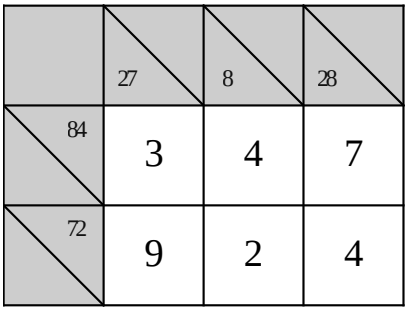


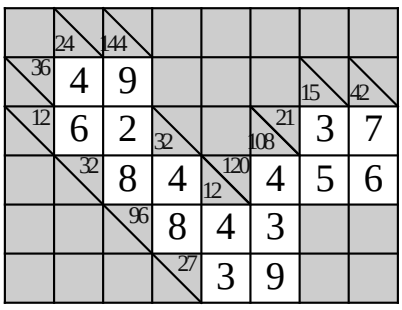




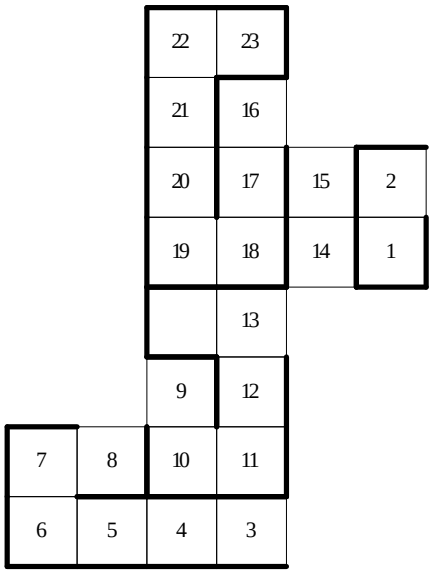


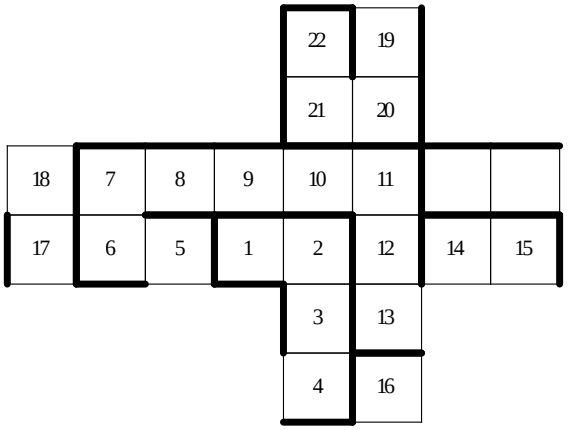


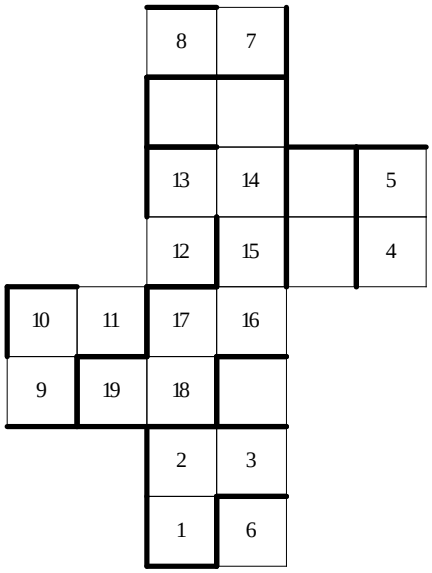


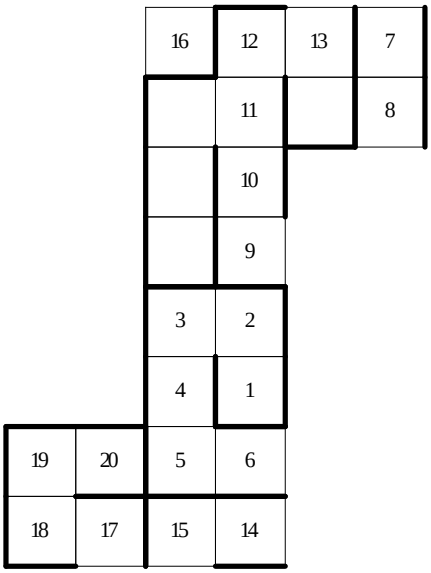


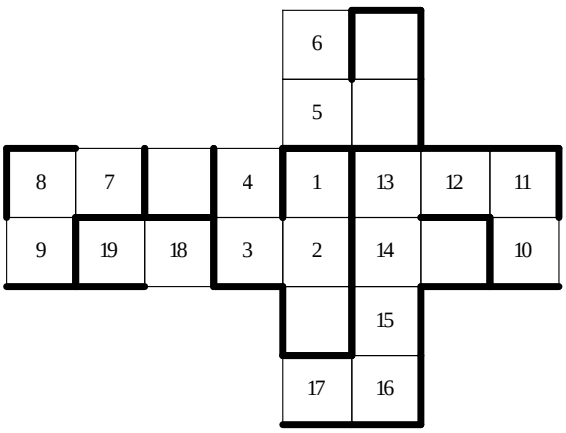
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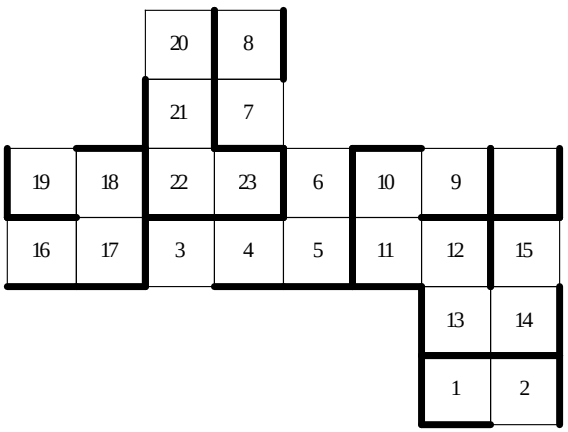




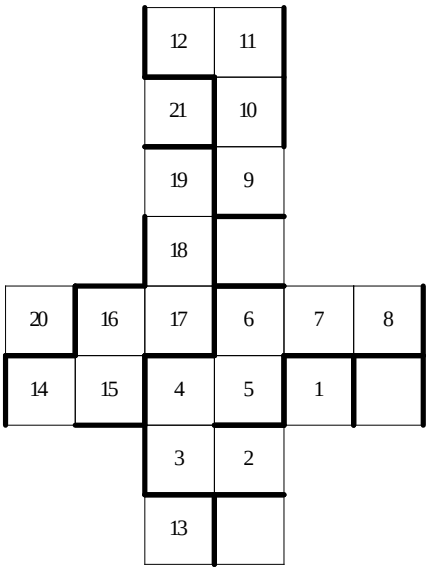


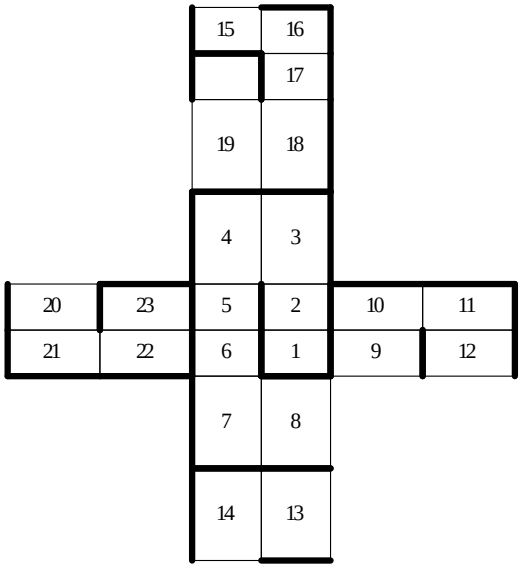


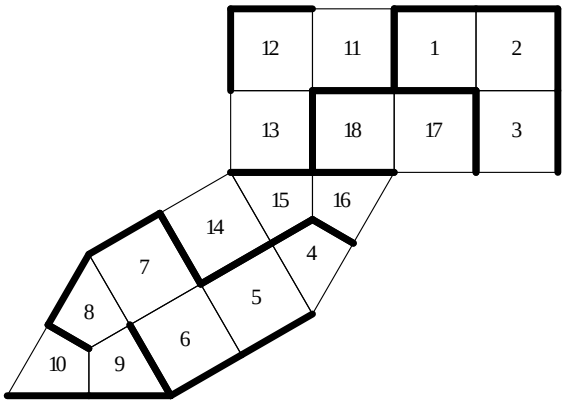


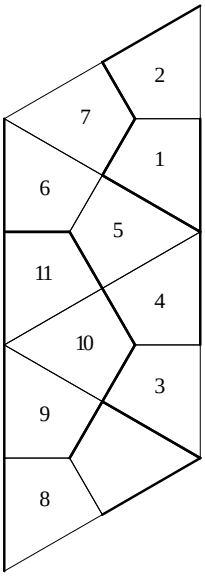


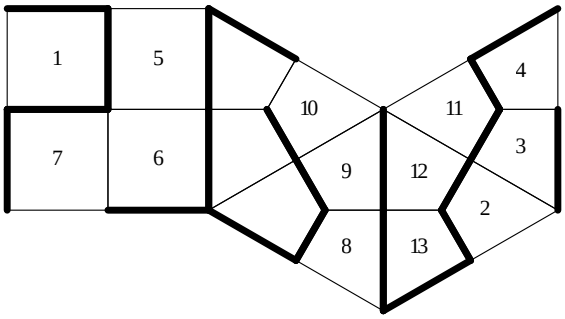
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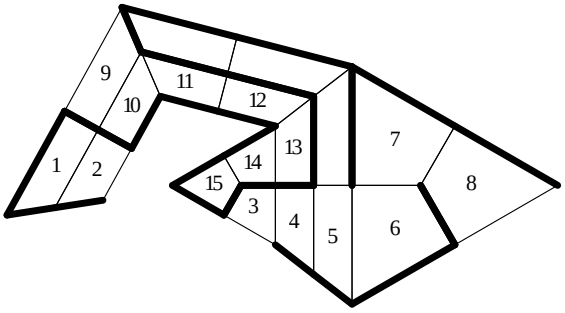












Grupe

Sličice na drugi sliki moramo zaporedoma označiti:
{1, 14, 11, 3, 5, 9, 2, 4, 15, 12, 17, 6, 13, 7, 10, 8, 16}
Linearne grupe:
a) {1, 6, 3, 7, 5, 4, 2}, {4, 6, 3, 5, 1, 2, 7}
b) {6, 4, 2, 7, 3, 5, 1}, {5, 4, 3, 7, 1, 2, 6}

Prostorska predstavljivost

a)

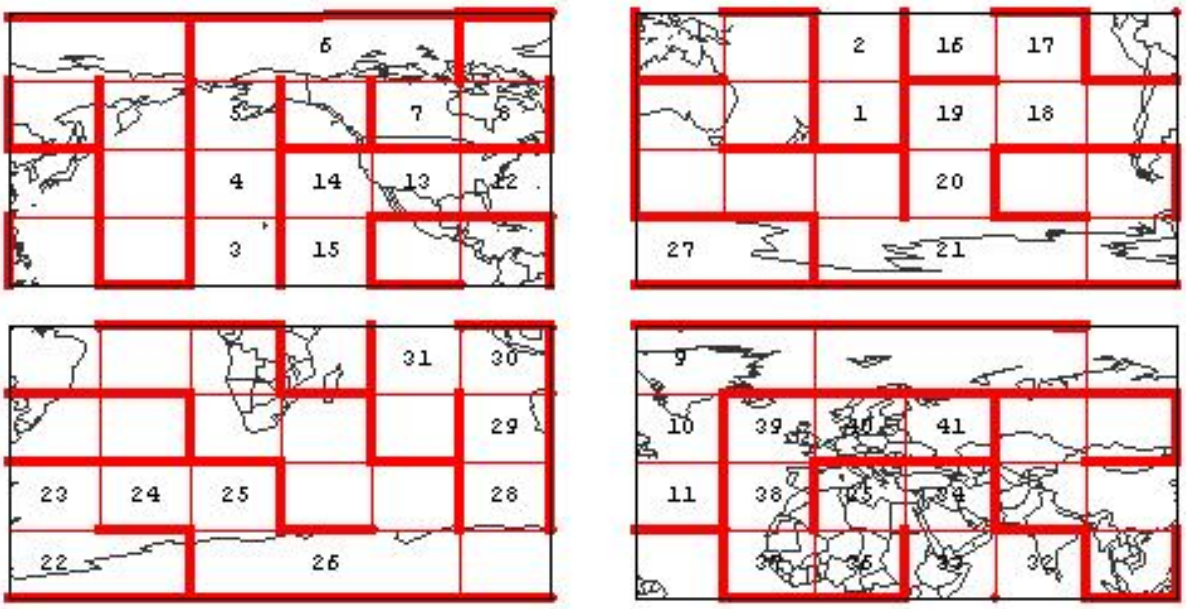
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1	6	7	7
2	6	7	9
3	5	6	11
4	9	6	14
5	2	4	9

b)

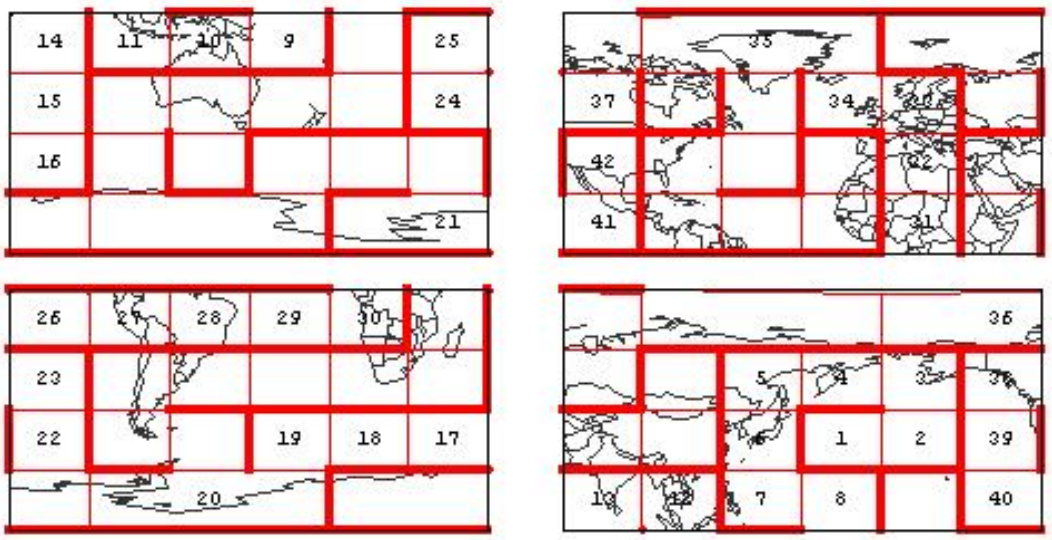
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4	5	3	1
5	2	6	4

Labirinti na zemljevidu

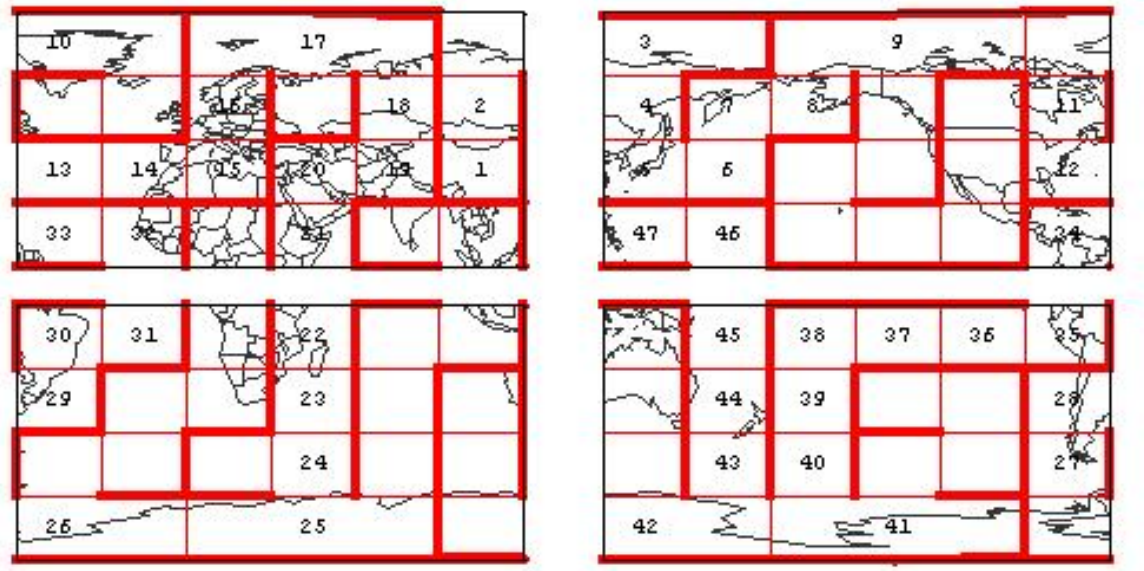
a)



b)



c)



Odstranjene kockice

87 87 42
63 84 94
68 79 43
60 50 120

Izdaja: Založniško podjetje **LOGIKA d.o.o., Svetčeva pot 11, 1241 Kamnik**. Poslovni račun pri NLB: 02312-0016592829. Davčna številka: SI56917309. Podjetje je obvezni zavezanec po zakonu o DDV. Za izdajatelja*: Izidor Hafner*.
E-mail: **logika@siol.net**.
Spletna stran: **http://www.logika.si**.
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Glavni in odgovorni urednik: *dr. Izidor Hafner* (**http://matematika.fe.uni-lj.si/people/izidor/homepage/**)
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