Spoštovani,

Prišli smo do 2. številke 32. letnika revije *Logika in razvedrilna matematika*. Zdaj vas vabimo, da pripravite poliedrsko novoletno jelko. Nagradili bomo pet po našem mnenju najlepših jelk. Pogoji so naslednji. Slika novoletne jelke mora biti objavljena na spletni strani šole do 15. 1 .2023. Na naslov info@logika.si morate poslati povezavo na sliko z vaše internetne strani in priimek in ime mentorja, ki ga bomo pripisali k naslovu šole, da ne bi šole morebitne nagrade poslale nazaj s pripisom »tega nismo naročili.« Slike morajo biti dostopne do 1.2.2023.

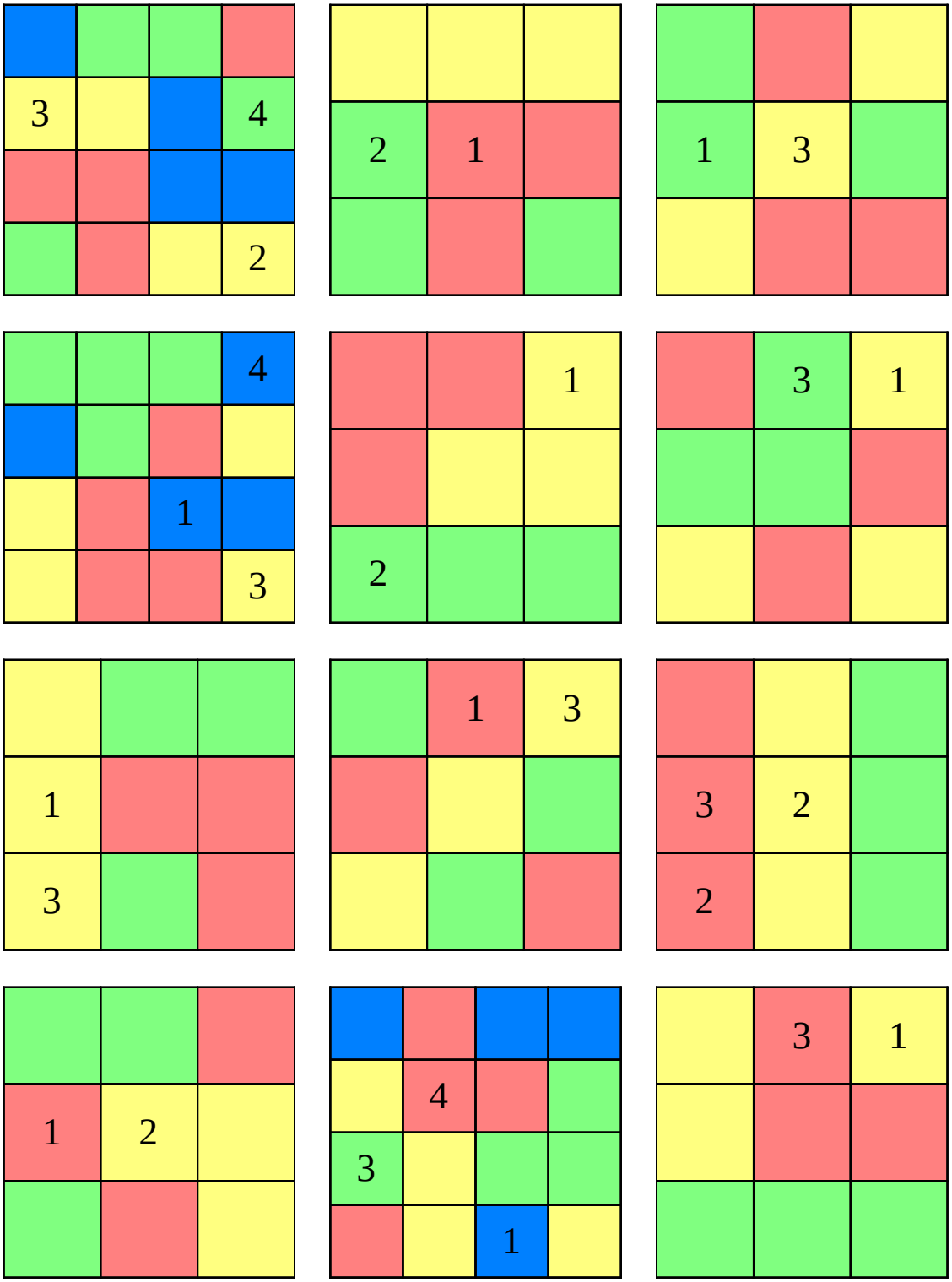


Novoletna jelka iz Črnomlja (2009)

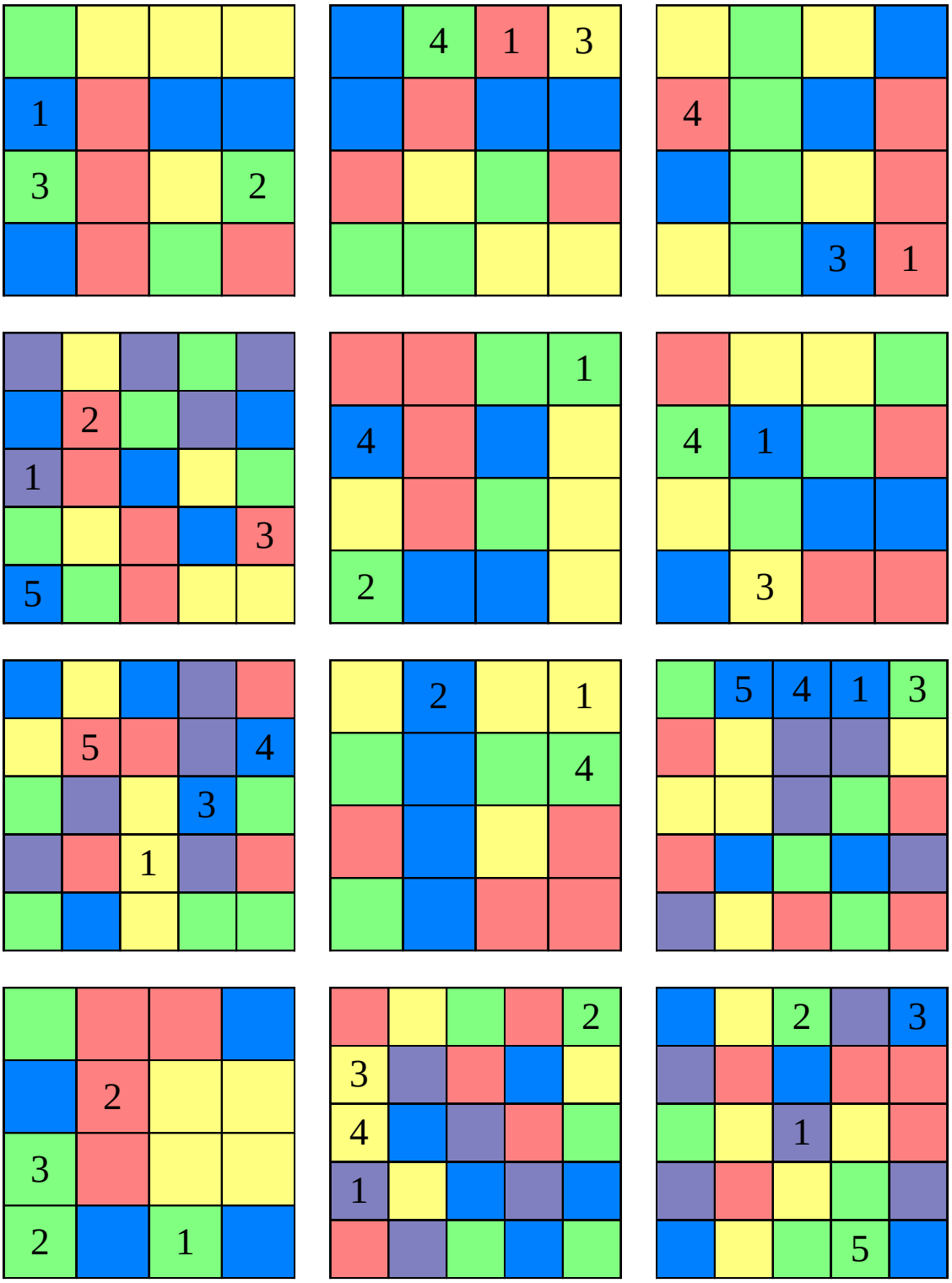
Barvni sudoku

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.

1.

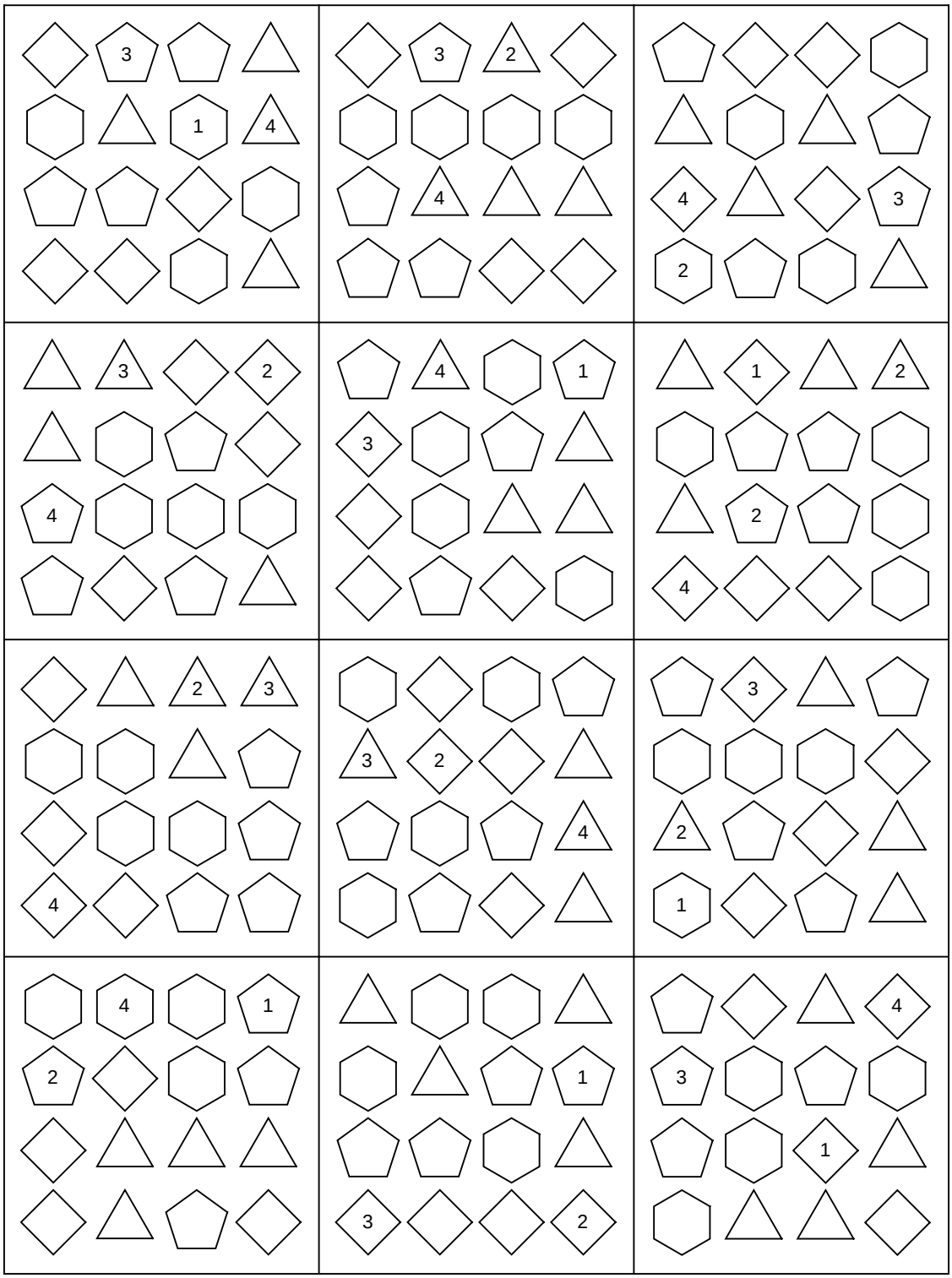


2.



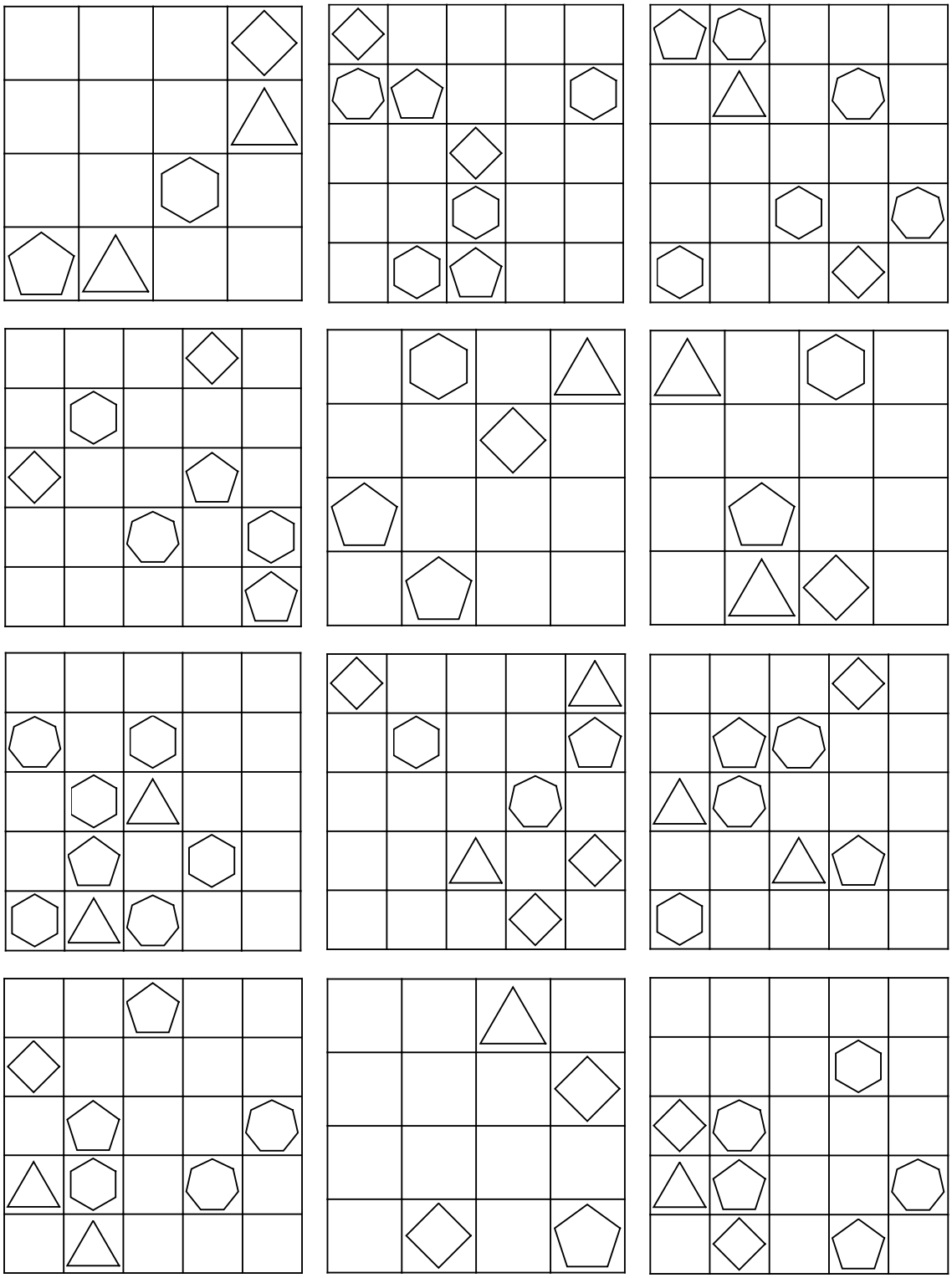
Sudoku z večkotniki

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



Latinski kvadrati

V n × n kvadratkov moraš narisati m-kotnike tako, da bo v vsaki vrstici in v vsakem stolpcu nastopalo vseh n različnih m-kotnikov.



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.

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

B	C	B 1	D 4	E
A	B	E	A	B
B	A	D 5	D	A
E	E	D 2	E	C
A	C	C	D	C

A	C	D	A 4	C
D	D	E	C 2	D
A	A	C	B	C 3
A	E	B	E	E
B	B	B	E 5	D

A	C	D	D 3	C
D 5	E	B	B	A
C	E	D	E	C 4
E 4	E	A	B	C
A 2	A	B	D	B

B	E	C	D	D
E	C 4	B	C 2	A
B	C	B	A	D
E	E	A	A	C 5
D	A	E	D 1	B

D	A 1	E	C	B 5
E	C	D	A	B
D	C	E	C	B
A 4	B	A	A	D
E	D	B	E	C 3

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

A	B	B 2	E	A 5
A	E	D	B	C
C	E	D	D	D
A	D	B	A	B 4
E 3	C	E	C	C

E	B	A 5	C	C
E 2	A	A	C 1	E
C	A	A	C	E
D	D	B	E	D
D	B	B	B	D 3

D	D 1	B	B	D
D 5	E	A	C	E
D	B	C	B	B
C	A	E	A	C 2
A	C	A 4	E	E

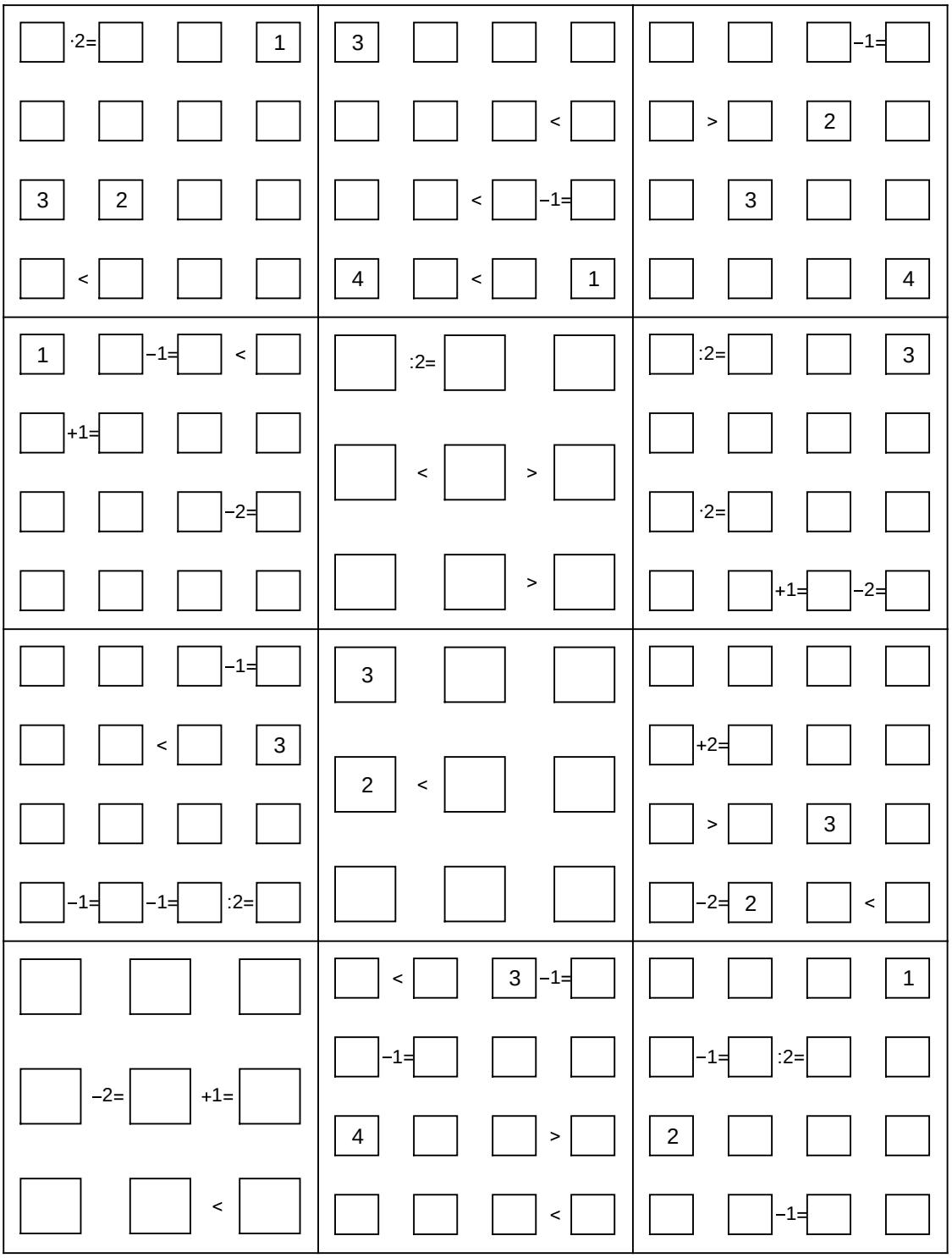
E	E	B 4	D	C
A 3	D	B	D	A
E	B	D	E	C
D 2	C	B	C	E
A 5	B	C	A	A

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

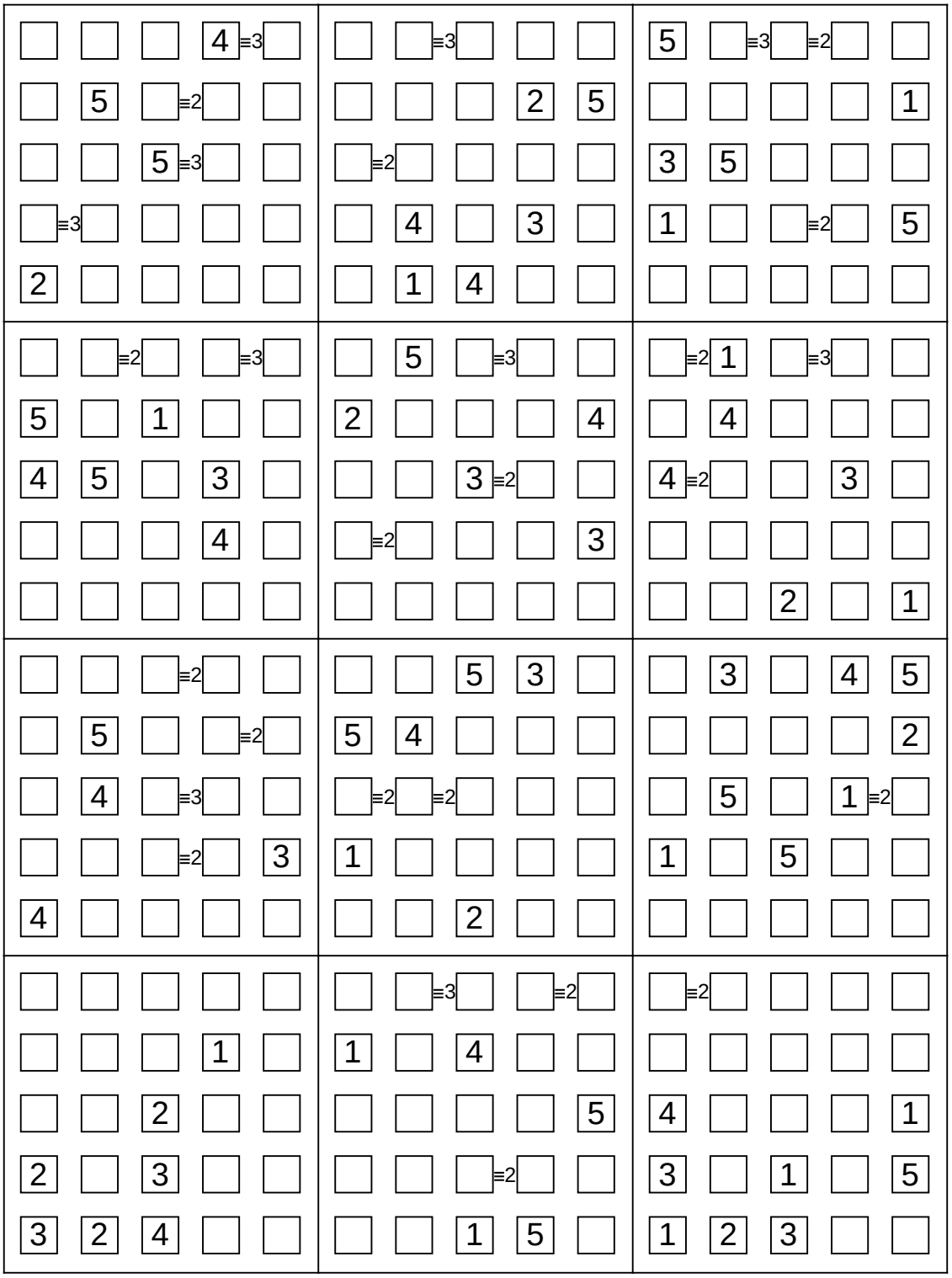
Futoshiki

V n × n kvadratkov moraš vpisati začetna 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. Tu a ≡k b pomeni, da je razlika med a in b deljiva s k.

1.



2.


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

Določi razpored



A JE LEVO OD *B*.	R
A JE SOSEDA OD *B*.	N
B JE DESNO OD *C*.	R



A JE SOSEDA OD *C*.	N
A JE DESNO OD *C*.	N



A JE LEVO OD *C*.	N
C JE DESNO OD *D*.	R
A JE DESNO OD *B*.	N



A JE LEVO OD *B*.	R
A JE DESNO OD *C*.	R
A JE SOSEDA OD *C*.	R
A JE SOSEDA OD *D*.	R



B JE SOSEDA OD *D*.	R
A JE DESNO OD *B*.	R
A JE LEVO OD *E*.	R
C JE DESNO OD *E*.	R
B JE LEVO OD *D*.	R



A JE SOSEDA OD *C*.	N
B JE DESNO OD *C*.	R
B JE DESNO OD *D*.	N
A JE DESNO OD *E*.	N
A JE DESNO OD *D*.	R



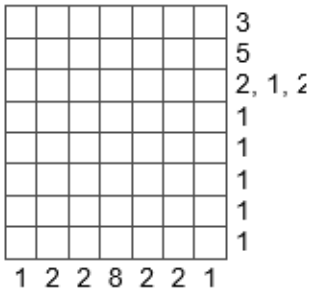
A JE SOSEDA OD *B*.	R
B JE DESNO OD *E*.	R
C JE SOSEDA OD *D*.	R
B JE LEVO OD *D*.	N
A JE SOSEDA OD *D*.	R

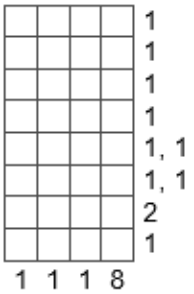


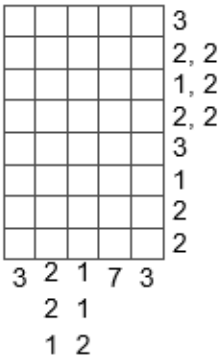
C JE SOSEDA OD *E*.	N
B JE LEVO OD *D*.	N
B JE SOSEDA OD *D*.	R
A JE LEVO OD *E*.	N
B JE LEVO OD *C*.	R
A JE SOSEDA OD *D*.	R

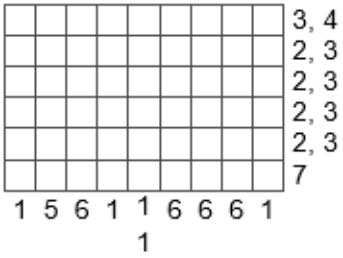
Gobelini

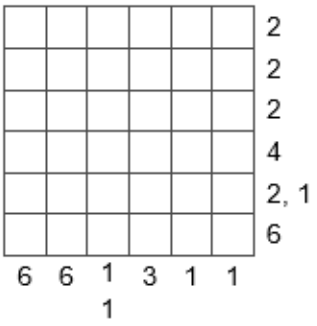
Kvadratke v razpredelnici moraš pobarvati sivo tako, da bo zaporedje sivih pasov v vrstici ustrezalo zaporedju števil na desni in da bo zaporedje sivih pasov v stolpcu ustrezalo zaporedju števil pod njim.

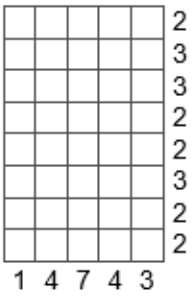


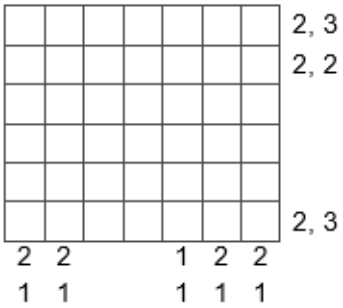


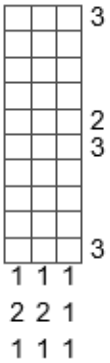


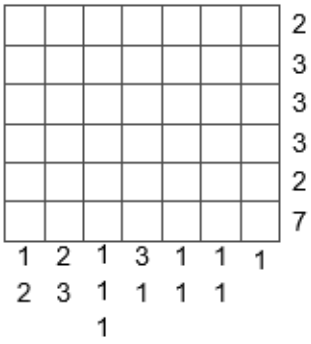


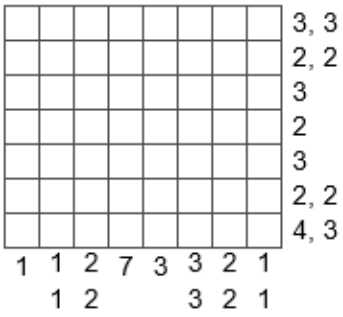


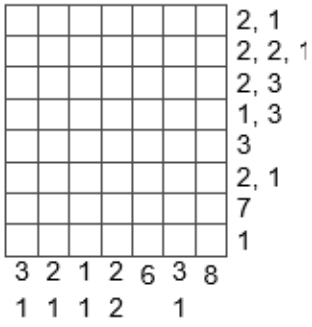


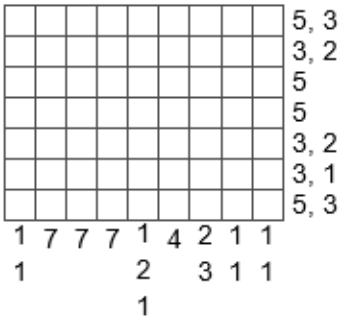






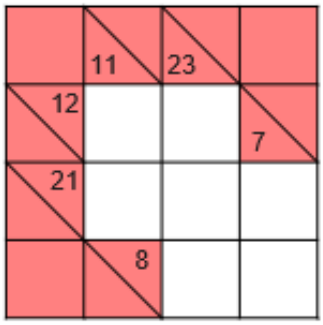


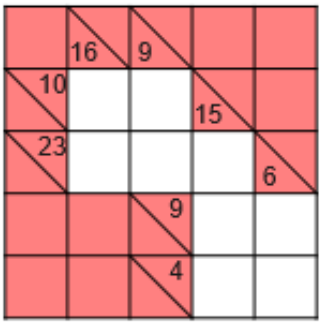


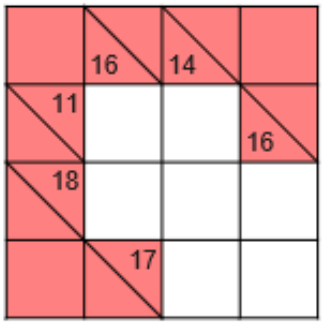


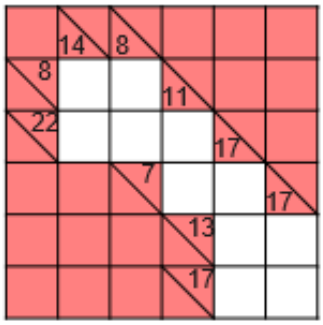
Križne vsote

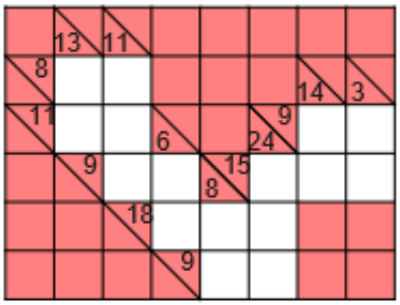
Naloga reševalca je, da izpolni bele kvadratke s števkami od 1 do 9 tako, da je vsota števk v zaporednih belih kvadratkih po vrsticah in stolpcih enaka številu, ki je zapisano v rdečem kvadratku na začetku vrstice (stolpca) nad (pod) diagonalo. Pri tem pa morajo biti vse števke v posamezni vrstici (stolpcu)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

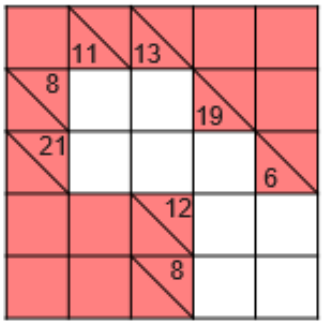


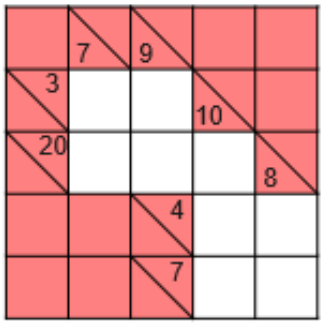


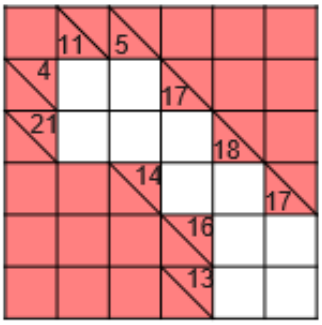


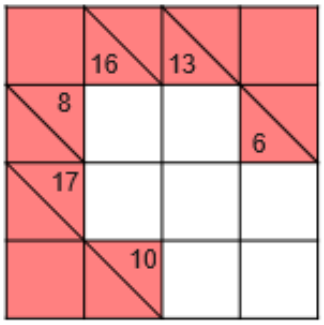


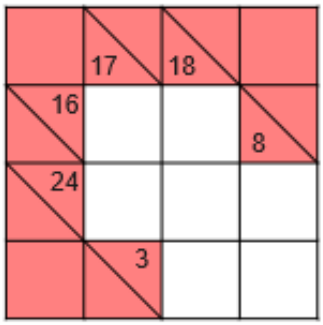


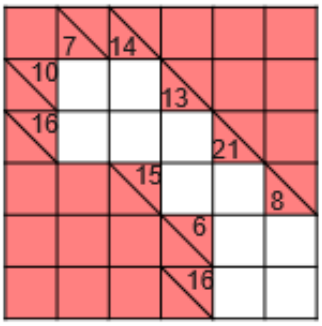


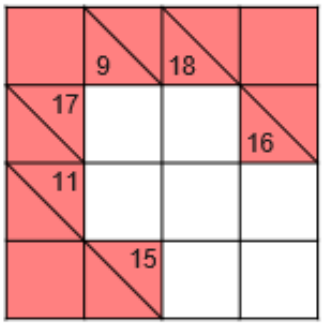






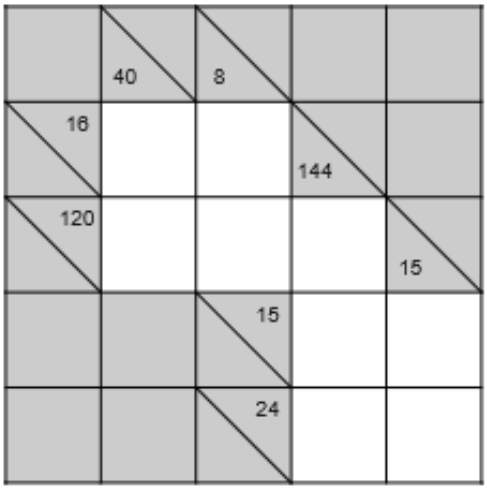


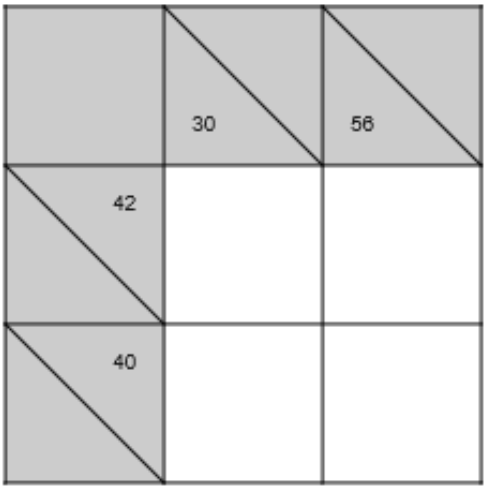


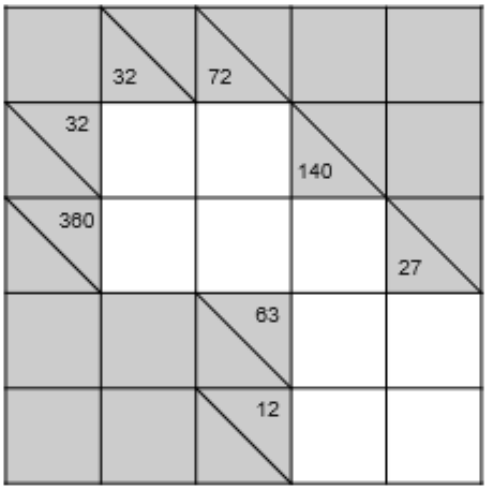


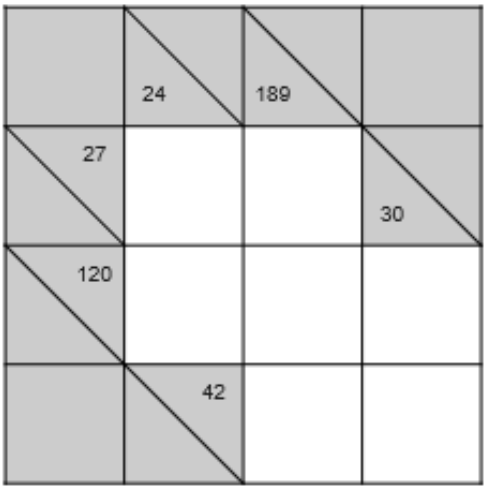
Križni produkti

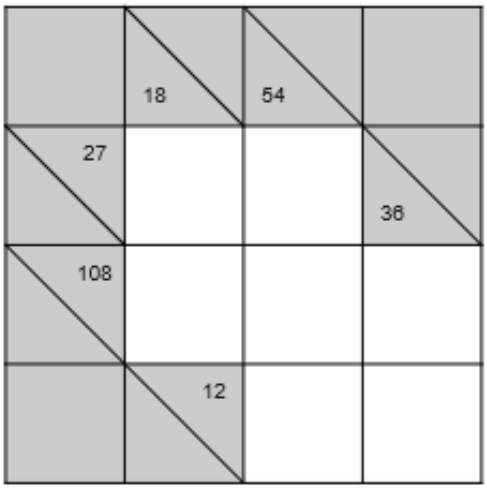
Naloga reševalca je, da izpolni bele kvadratke s števkami od 2 do 9 tako, da bo zmnožek števk v zaporednih belih kvadratkih po vrsticah in stolpcih enak številu, ki je zapisano v sivem kvadratku na začetku vrstice (stolpca) nad (pod) diagonalo. Pri tem pa morajo biti vse števke v posamezni vrstici (stolpcu) različne.

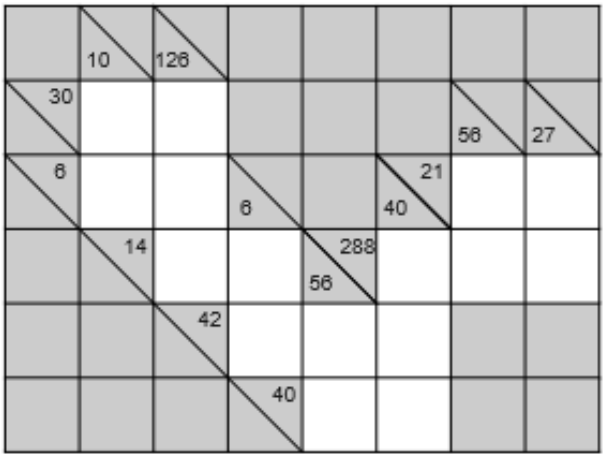






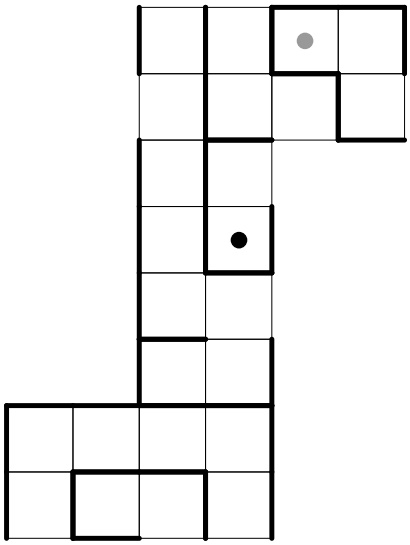


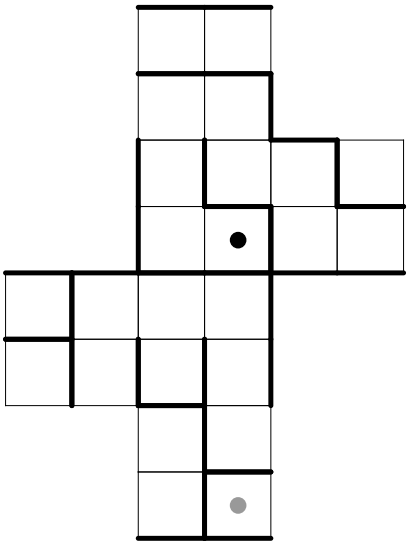


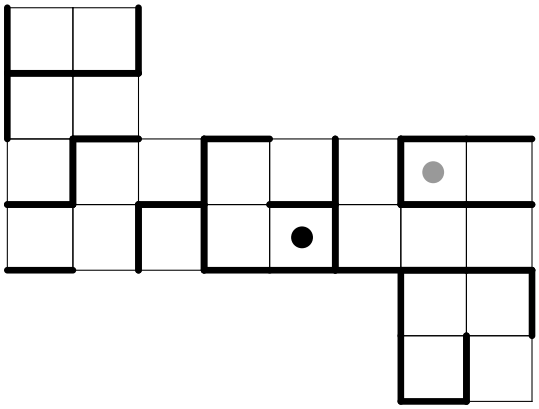


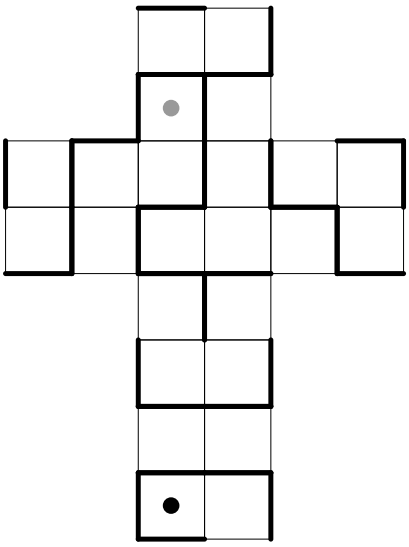
Labirint na kocki

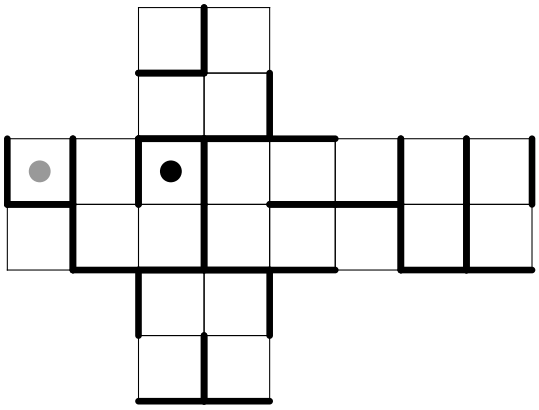
Poveži točki na kocki:

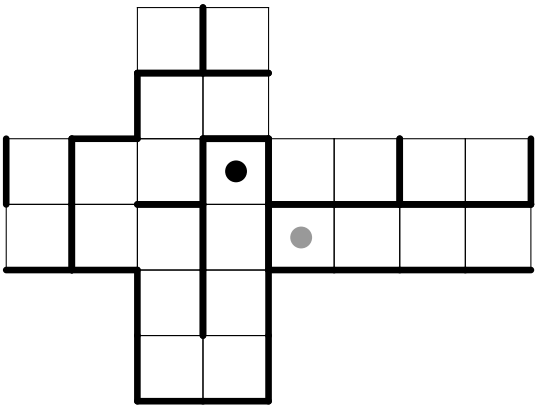






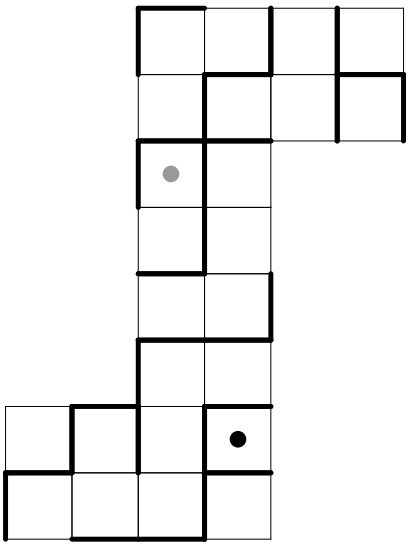


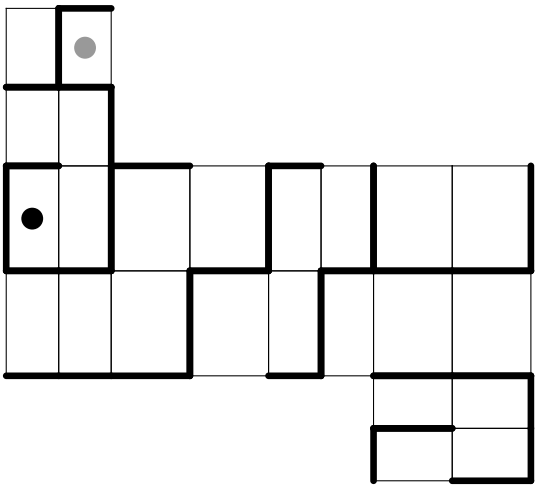


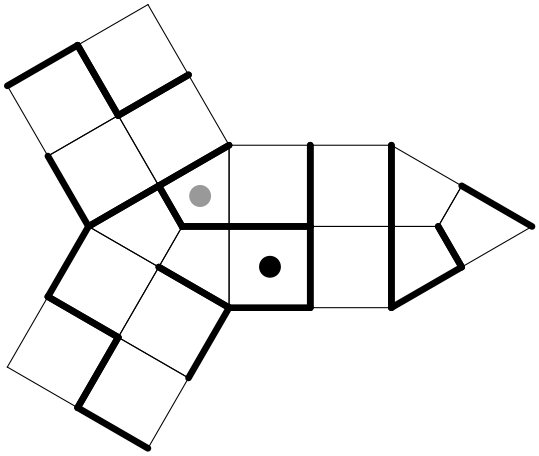


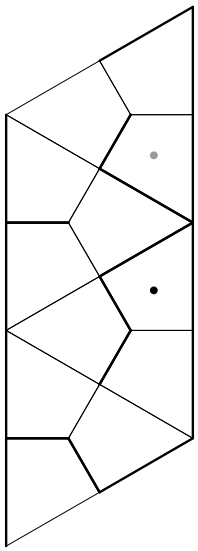
Labirinti na enostavnih poliedrih

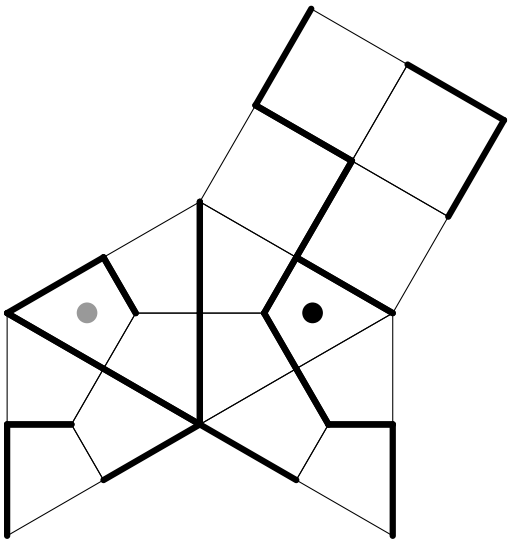
Poveži točki na poliedru:

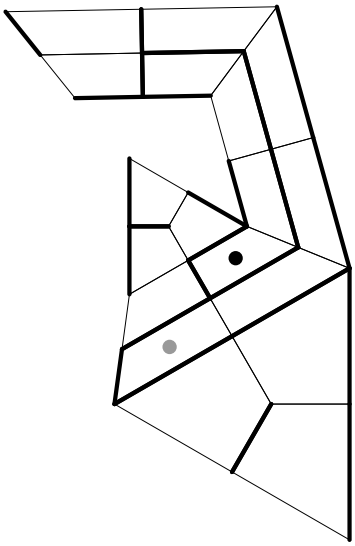








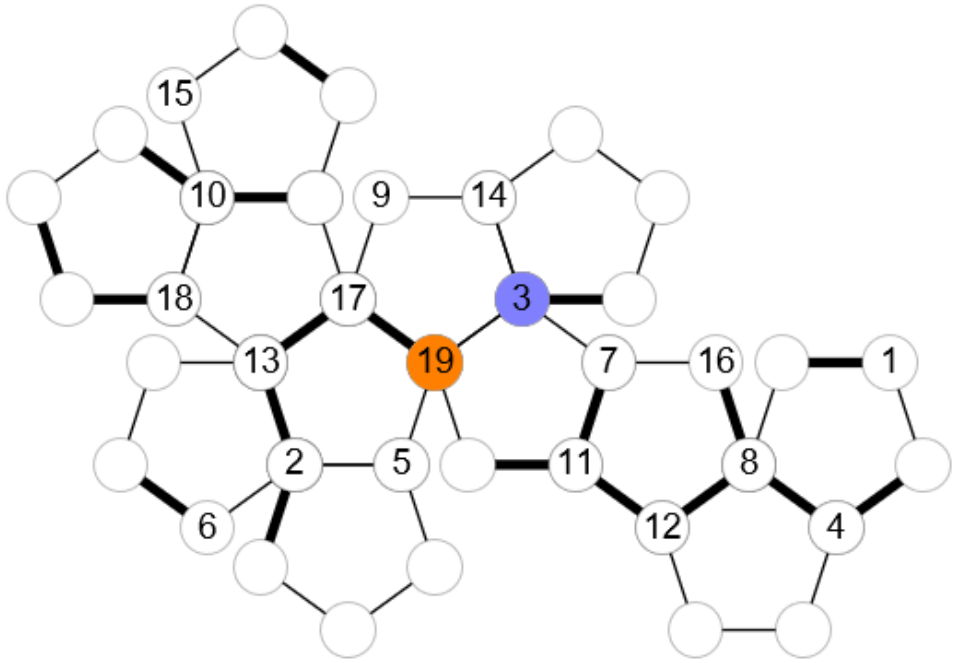




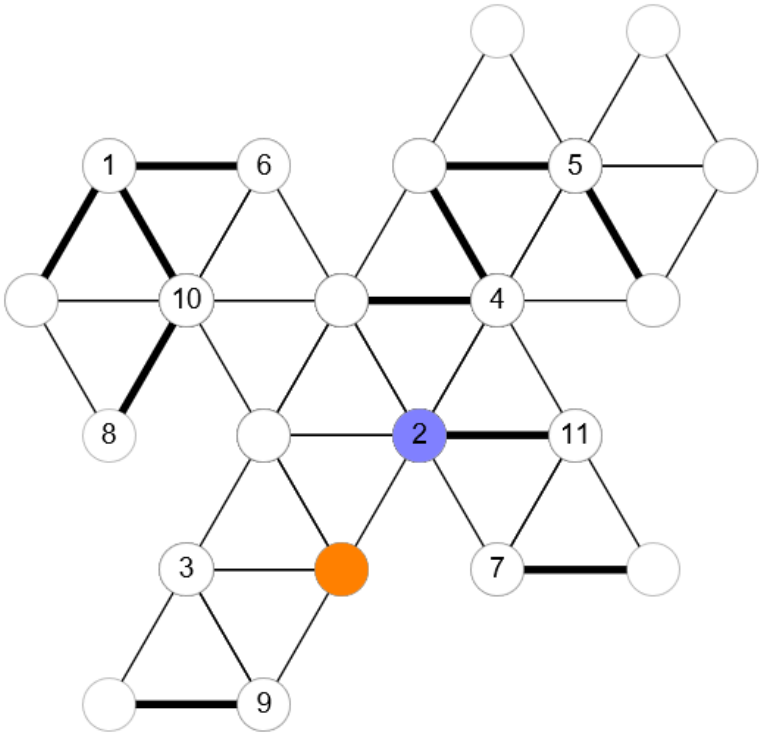
Labirinti na robovih poliedra

V naslednjih nalogah moramo povezati dve oglišči poliedra, ki je podan z mrežo. Poiskati moramo pot od oranžne do modre točke. Iz ene točke lahko gremo do druge točke, če je med njima debelejša črta ali pa točki predstavljata isto oglišče poliedra.

1.

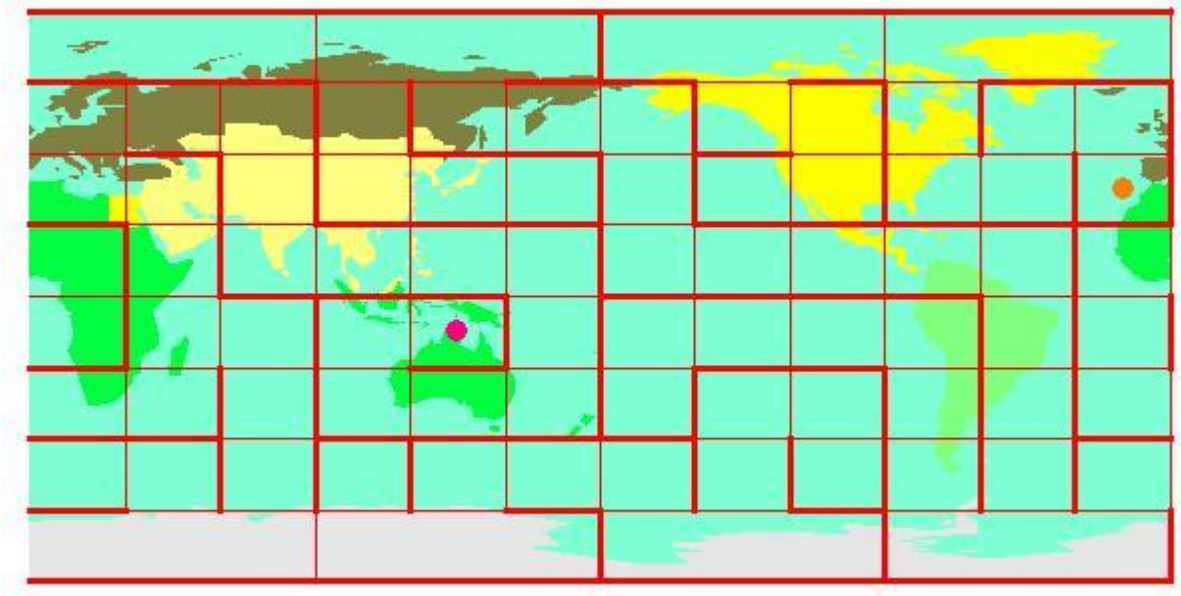


2.

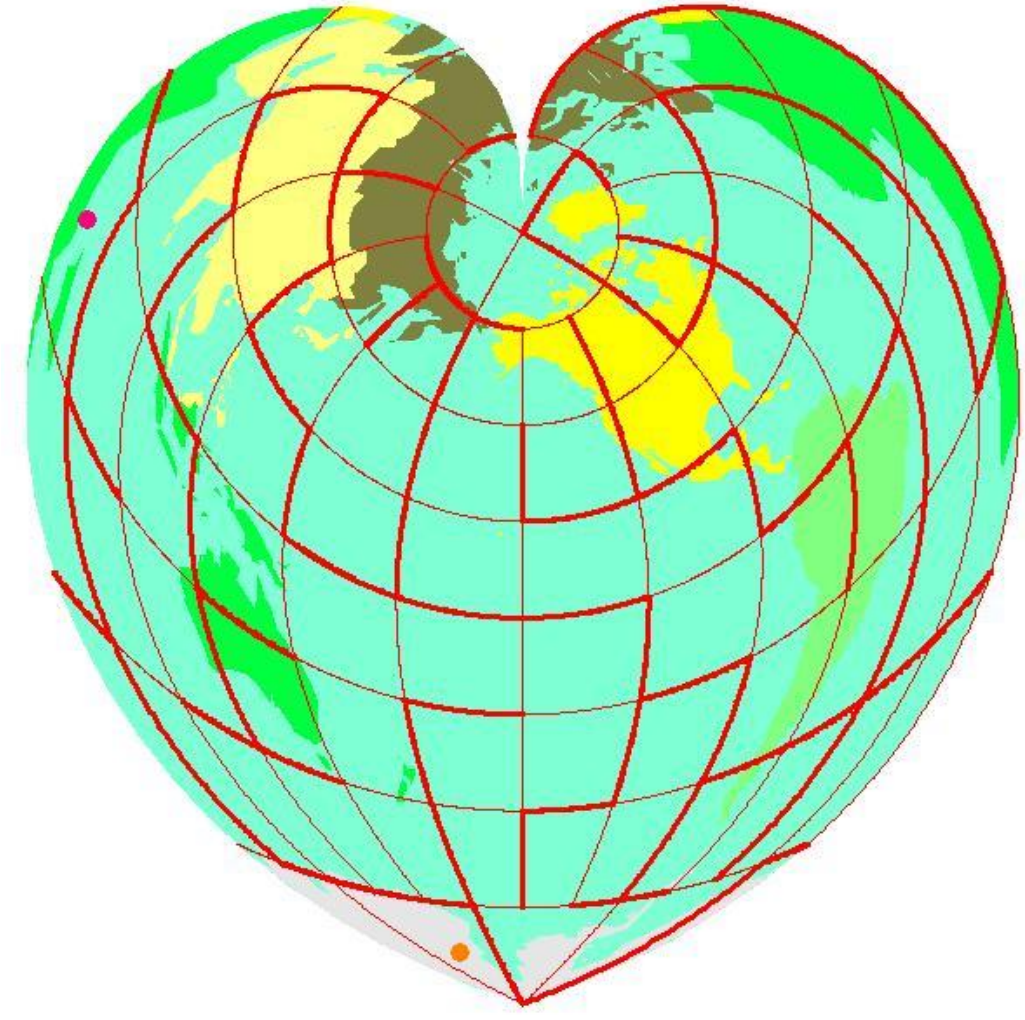


Labirint na zemljevidu

1.

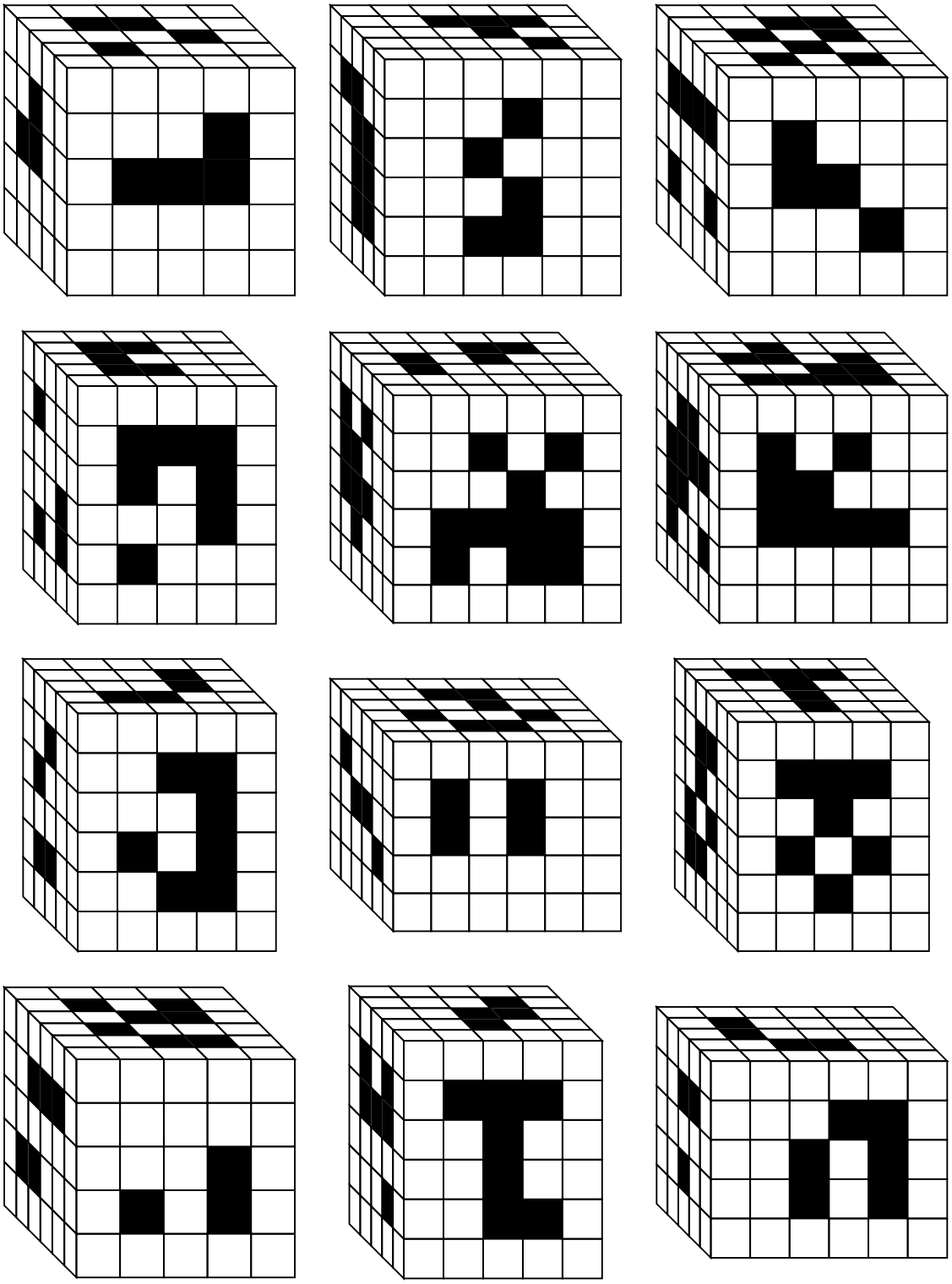


2.



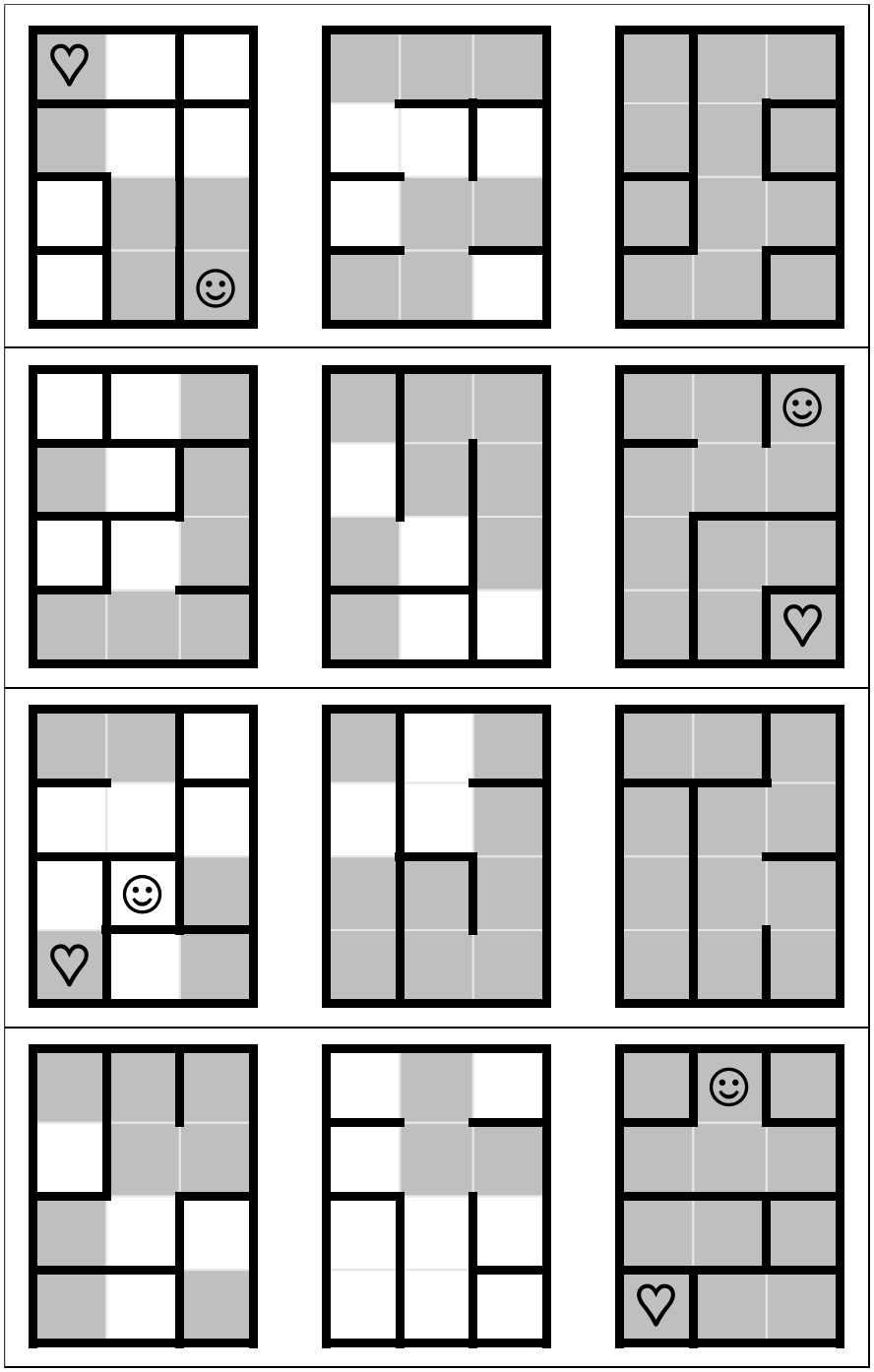
Odstranjene kocke

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?



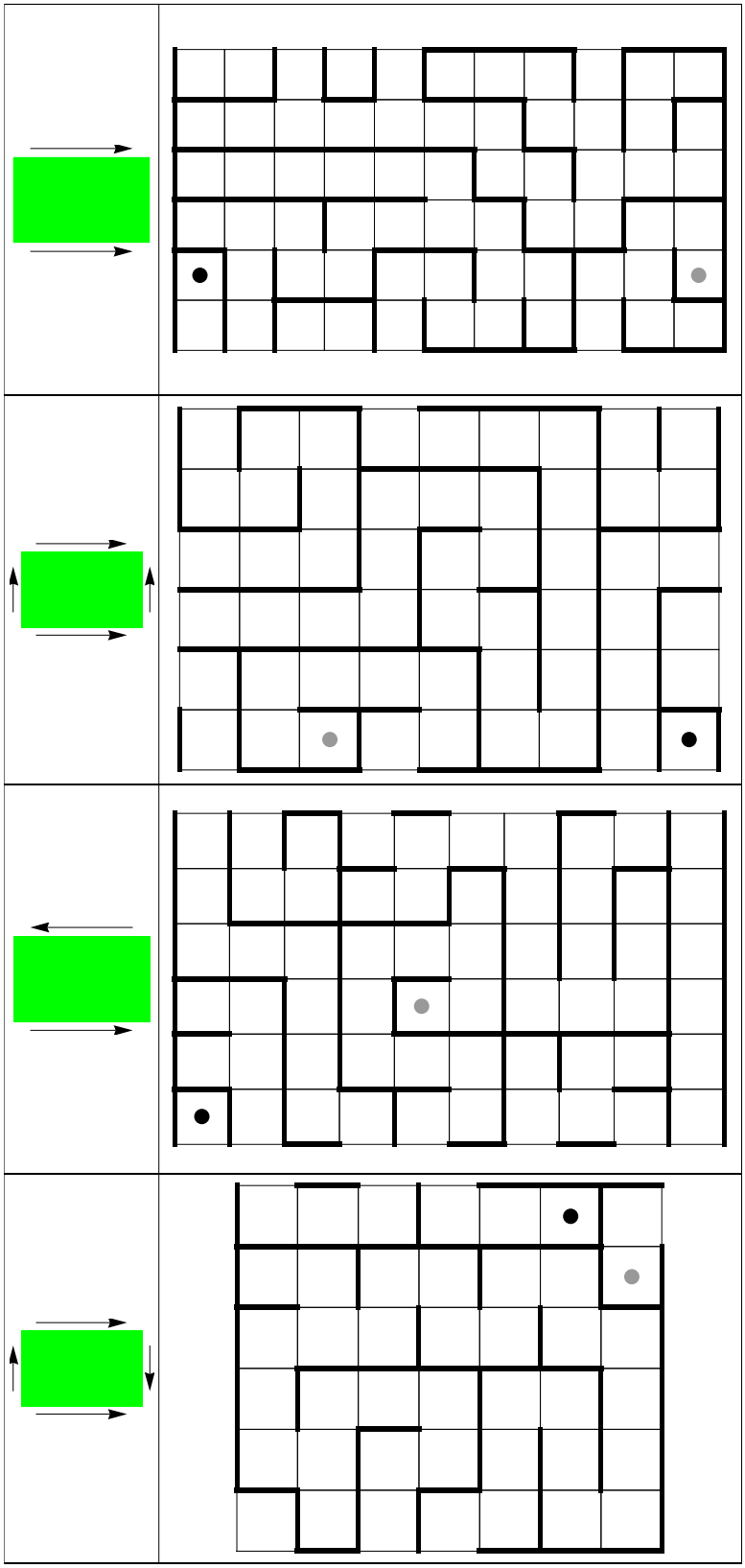
Labirint v kvadru

Kvader sestoji iz vodoravnih slojev kockastih oddelkov (zgornji, srednji in spodnji sloj so dani od leve proti desni). Odebeljene črte preprečujejo prehajanje med sosednjima oddelkoma istega sloja. Med oddelkom in oddelkom neposredno pod njim lahko prehajamo, če in samo če je prvi pobarvan belo.
Poišči najkrajšo pot od oddelka s smeškom do oddelka s srcem! Pot označi z zaporednimi naravnimi števili. Prvi oddelek označi z 1, vsak naslednji sosednji oddelek (kocko) pa s številom,, večjim za 1.



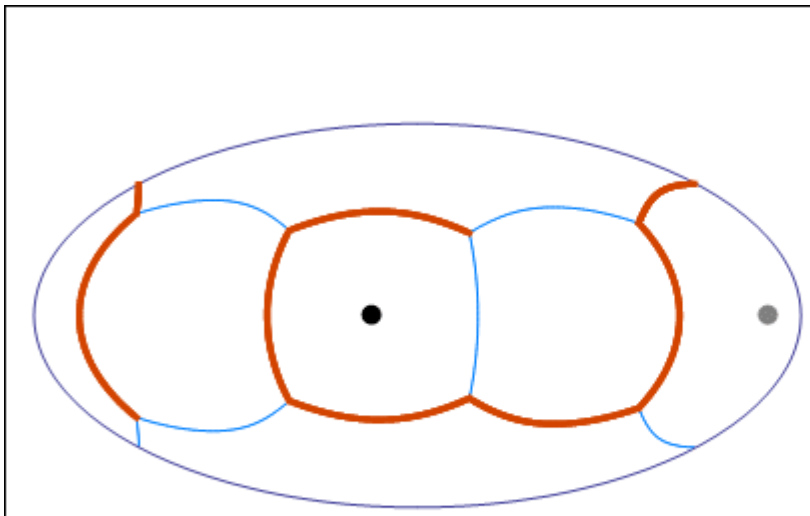
Labirinti na ploskvah

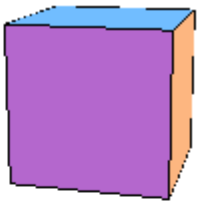
Podan je labirint na pravokotniku. Moramo poiskati pot od temnejše do svetlejše pike. Prehod med sosednjimi kvadratki je možen, če med njima ni odebeljene črte. Skica na levi pomeni, kako sta nasprotni stranici pravokotnika povezani (miselno ju moramo zlepiti).



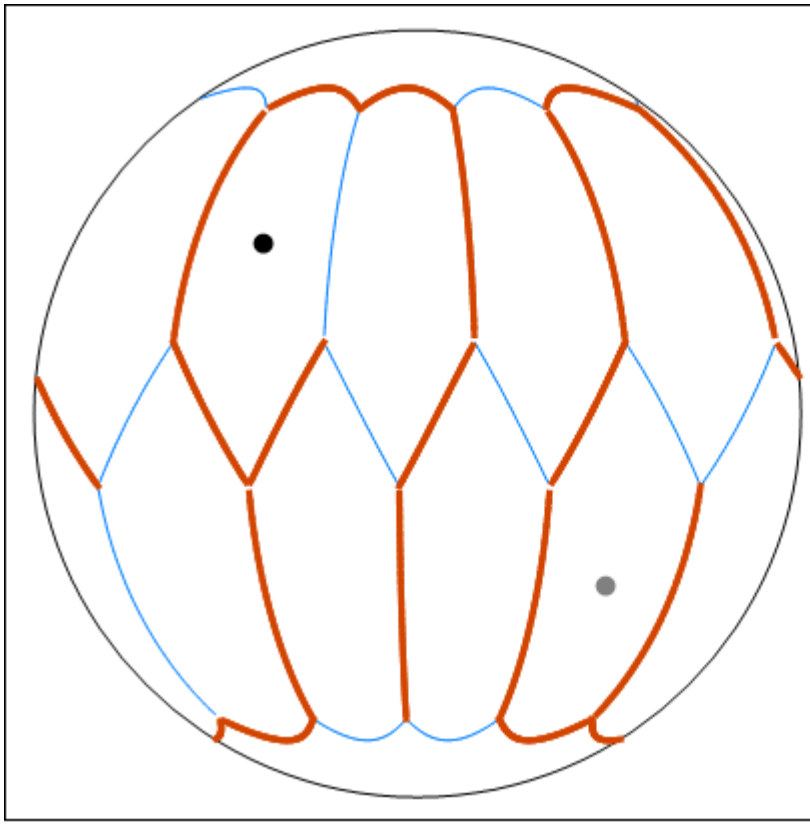
Labirinti na projekcijah teles

Telo je projicirano v ravnino. Na projekciji je podan labirint, kjer odebeljene črte preprečujejo prehod iz projekcije mejne ploskve na projekcijo sosednje mejne ploskve.





število mejnih ploskev	
število robov	
število oglišč	
tip rotacijske simetrije	

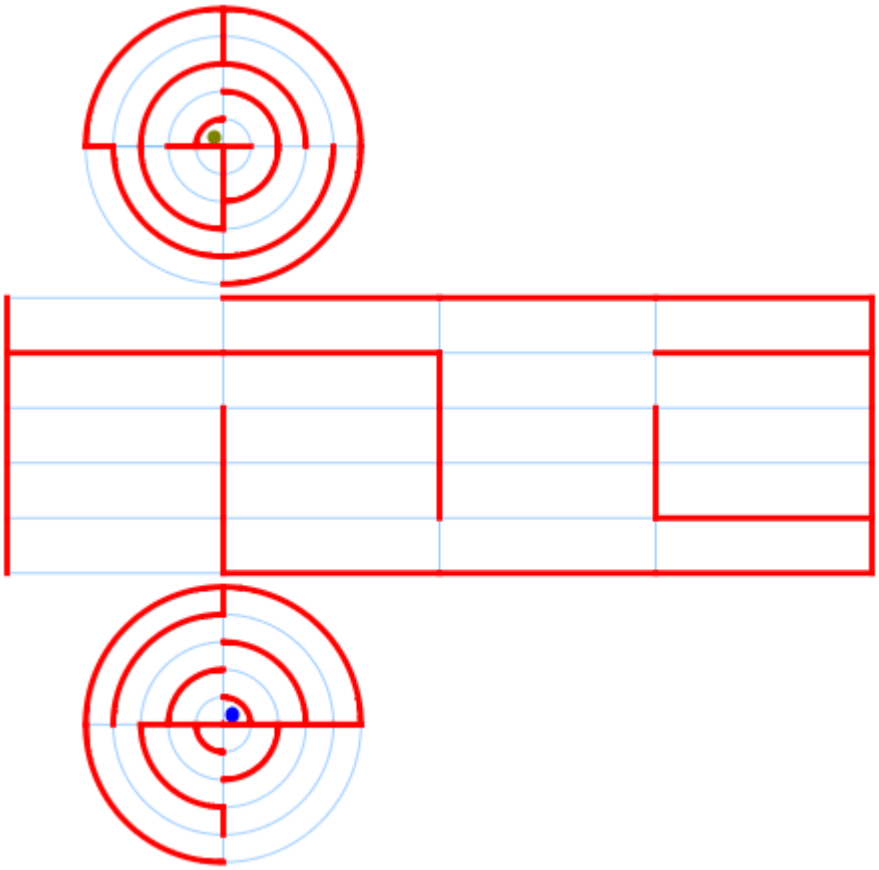




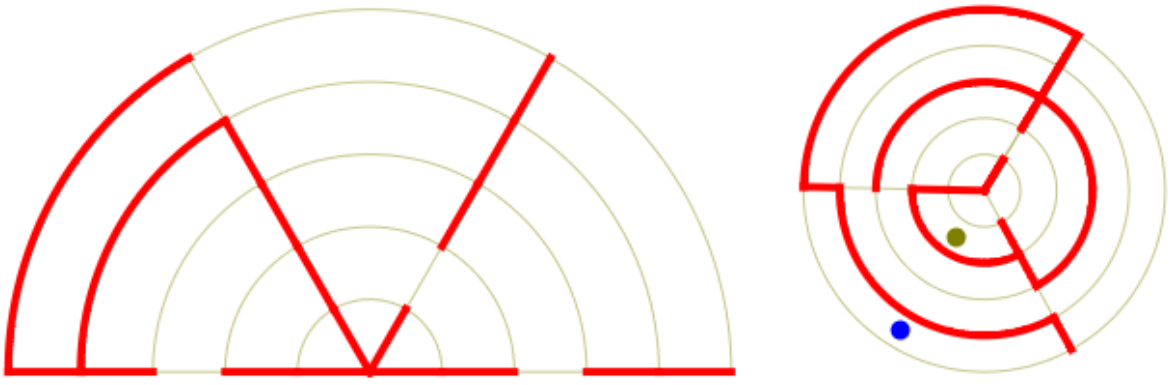
število mejnih ploskev	
število robov	
število oglišč	
tip rotacijske simetrije	

Labirinti na mreži valja in stožca

1.

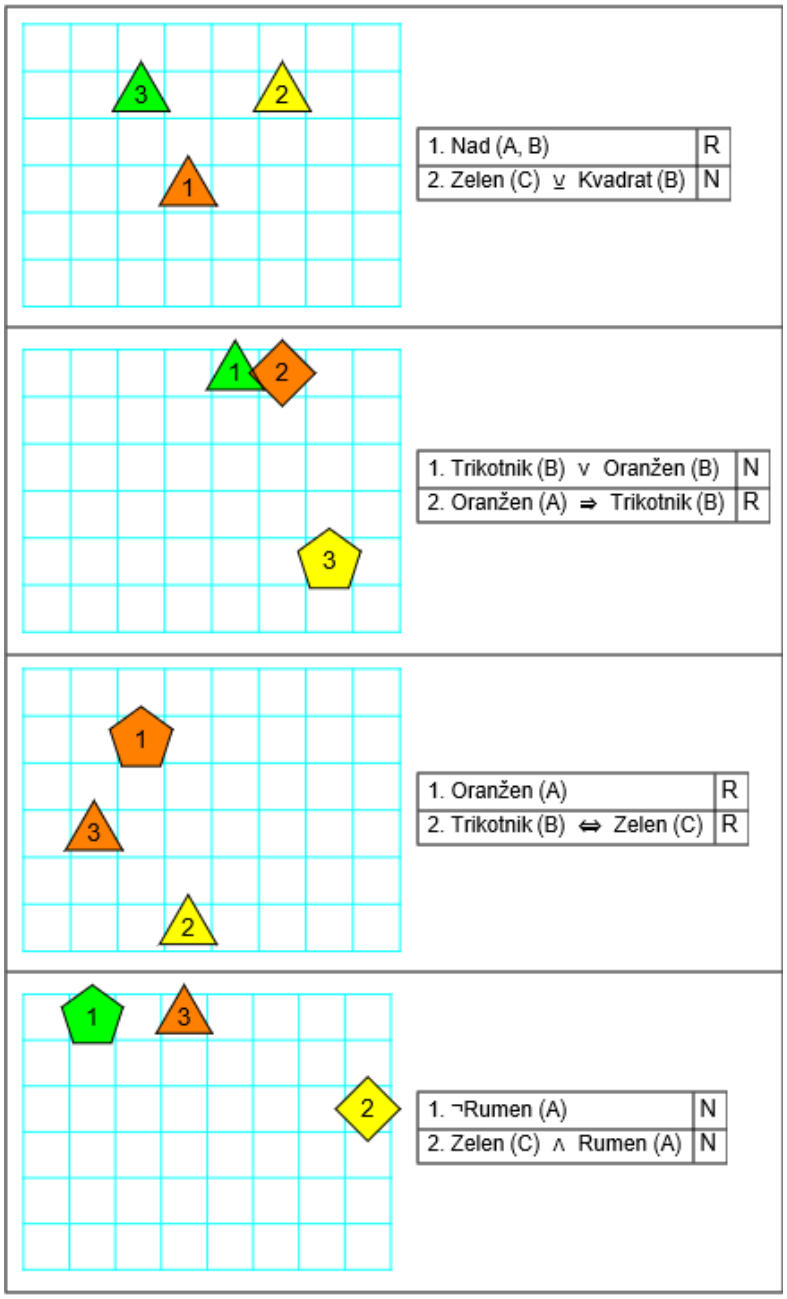


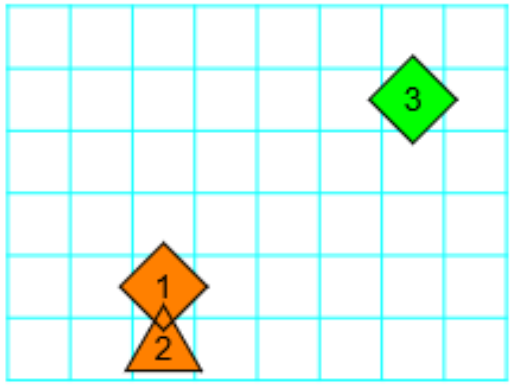
2.



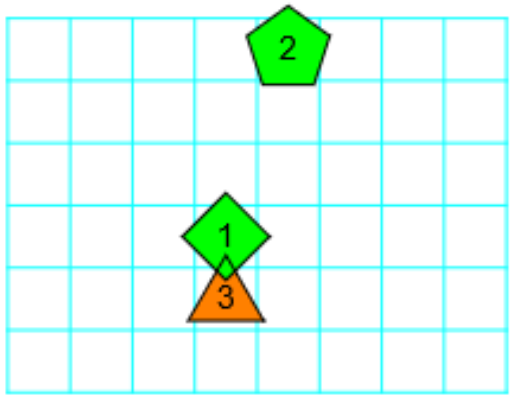
Analiziraj pogoje nalog

Dobro definirana naloga je naloga, pri kateri so njeni pogoji potrebni in zadostni za njeno rešitev. To pomeni, da noben pogoj ni odveč in da ima naloga enolično rešitev. Pri zastavljeni nalogi imamo lahko več možnosti:
Naloga nima rešitve, pogoji so protislovni.
Naloga ima več rešitev, to je, pogoji niso zadostni (za enolično rešitev).
Naloga ima enolično rešitev, vendar pogoji niso potrebni (vsaj en pogoj bi lahko izpustili in bi naloga še vedno imela enolično rešitev).
Naloga ima enolično rešitev in pogoji so potrebni (neodvisni) in seveda zadostni. Naloga je dobro definirana.
V naslednjih nalogah moramo ugotoviti, kako je s pogoji naloge.
Poiskati moramo imena A, B,C, … likov, ki so označeni z 1, 2, 3, …, če so izpolnjeni pogoji na desni strani slike. Ugotoviti moramo tudi, ali so pogoji neodvisni.

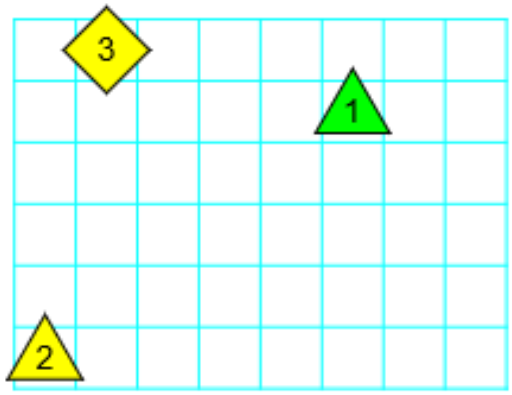




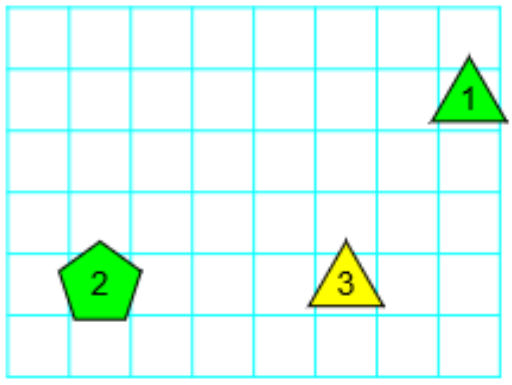
1. Zelen (C)	N
2. Zelen (A) ⊻ Rumen (A)	N
3. Kvadrat (A) v Petkotnik (C)	R



1. Petkotnik (B)	N
2. Levo od (B, C)	N
3. Zelen (C) ⊻ Petkotnik (B)	R



1. Levo od (A, C)	N
2. Trikotnik (C) v Oranžen (A)	R
3. Oranžen (B) ⊻ Kvadrat (B)	N



1. Nad (A, C)	N
2. Oranžen (C) v Rumen (A)	N
3. Kvadrat (B) ⊻ Zelen (B)	R

Logična naloga

Štiri prijateljice (Iva, Dora, Jana, Nina) imajo konje različnih imen (Blisk, Tornado, King, Reno), ki so različnih pasem (poni, lipicanec, arabec, lisjak) in so iz različnih krajev (Ljubljana, Medvode, Maribor, Lendava.
Za vsakega določi ime, priimek, kraj bivanja in poklic.

1. Reno ni poni.
2. Nina nima lipicanca.
3. Tornado ni iz Medvod.
4. Reno ni iz Medvod.
5. Dora ni doma iz Ljubljane.
6. Arabec ni iz Maribora.
7. Lipicanec ni iz Maribora.
8. King je iz Maribora.
9. Dora nima lisjaka.
10. Dora nima Bliska.
11. Iva nima Bliska.
12. Lipicanec ni iz Lendave.
13. Arabec ni iz Lendave.
14. Nina nima Rena.
15. Lisjak ni iz Lendave.
16. Lipicanec ni iz Ljubljane.

	Blisk	Tornado	King	Reno	poni	lipicanec	arabec	lisjak	Ljubljana	Medvode	Maribor	Lendava
Iva												
Dora												
Jana												
Nina												
Ljubljana												
Medvode												
Maribor												
Lendava												
poni												
lipicanec												
arabec												
lisjak												

ime	konj	pasma	kraj
Iva			
Dora			
Jana			
Nina			

Naloga v esperantu

Kvar amikinoj (Maja, Ella, Jana, Ada) havas kvar cxevalojn (Sxtormo, Tornado, Reno, Floberto) de diversaj rasoj (poneo, arabo, vulpo, islandano). Divenu iliajn nomojn kaj la nomojn kaj bredojn de iliaj cxevaloj.

1. Jana havas nek Tornadon nek Floberton.
2. Sxtormo estas nek poneo nek vulpo.
3. Floberto estas nek poneo nek vulpo.
4. Ella ne havas Tornadon.
5. Ada cxevalo estas islandano.
6. Reno ne estas vulpo.
7. Sxtormo ne estas arabo.

	Sxtormo	Tornado	Reno	Floberto	poneo	arabo	vulpo	islandano
Maja								
Ella								
Jana								
Ada								
poneo								
arabo								
vulpo								
islandano								

nomo	cxevalo	raso
Maja		
Ella		
Jana		
Ada		

Otok vitezov in oprod

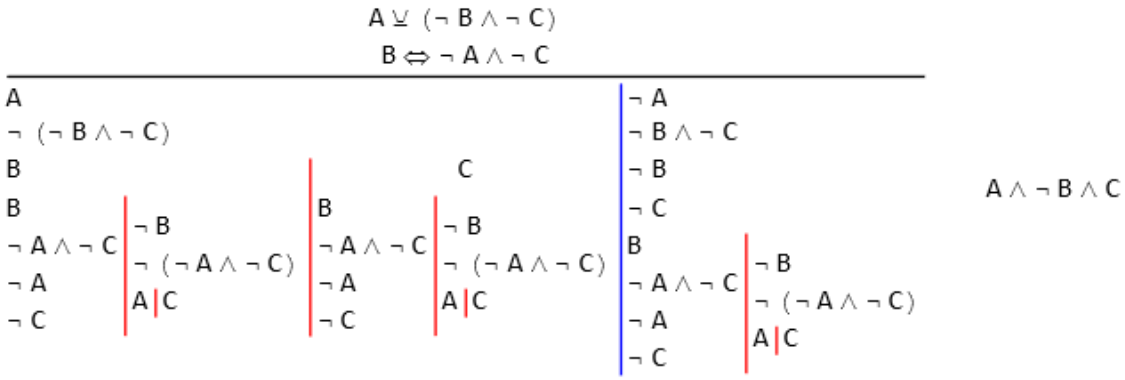
Na otoku vitezov in oprod vitezi dajejo resnične izjave, oprode pa neresnične.
Recimo, da srečamo domačina A in ta izreče izjavo P. Potem je resnična izjava $A \Leftrightarrow P$. Če pa A ne more izreči izjave P, potem je resnična izjava $A \veebar P$.

Zdaj pa vzemimo dva otočana A in B. Otočan A lahko izjavi P, otočan B pa lahko izjavi R. Potem je resnična izjava $(A \Leftrightarrow P) \wedge (B \Leftrightarrow R)$.
Kaj pa, če A ne more izjaviti P in B ne more izjaviti R. Potem velja $(A \veebar P) \wedge (B \veebar R)$.
Če A lahko izreče P, B pa ne more izreči R, sklepamo $(A \Leftrightarrow P) \wedge (B \veebar R)$.
Kaj pa, če natanko eden od obeh ne more dati svoje izjave: $((A \Leftrightarrow P) \wedge (B \veebar R)) \vee ((A \veebar P) \wedge (B \Leftrightarrow R))$.
Kaj pa, če vsaj eden ne more dati svoje izjave: $(A \veebar P) \vee (B \veebar R)$.
Zdaj pa lahko oba dasta svoi izjavi ali pa nobeden: : $((A \Leftrightarrow P) \wedge (B \Leftrightarrow R)) \vee ((A \veebar P) \wedge (B \veebar R))$.

Drevesa za dve izjavi

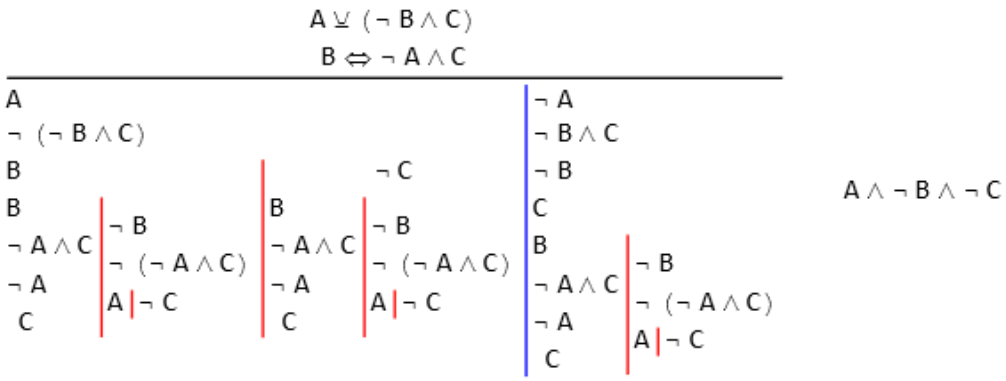
Vsa drevesa (128) za dve izjavi. Prve otočan A ne more izjaviti, drugo B lahko izreče.

1.



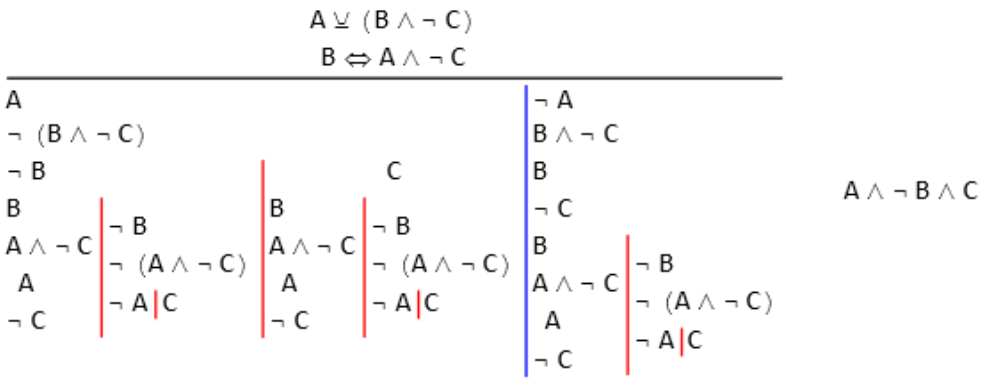
A ∧ ¬ B ∧ C

2.



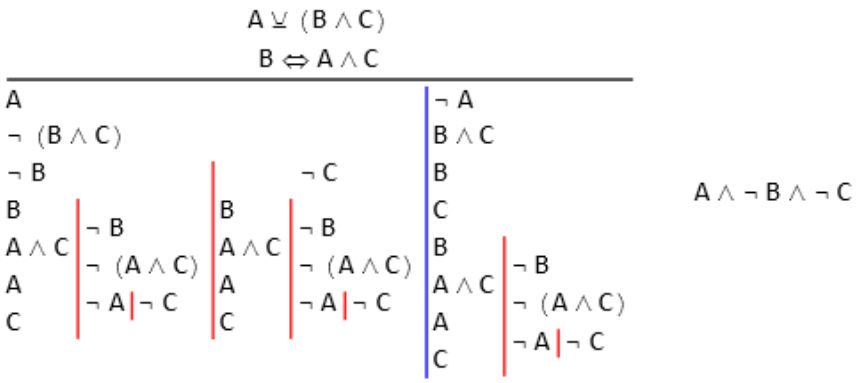
A ∧ ¬ B ∧ ¬ C

3.



A ∧ ¬ B ∧ C

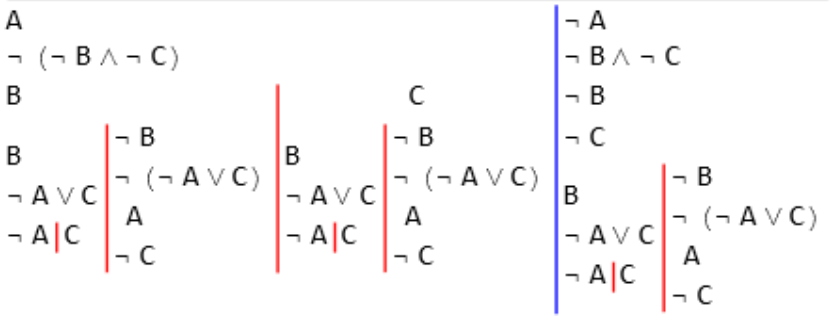
4.



A ∧ ¬ B ∧ ¬ C

5.

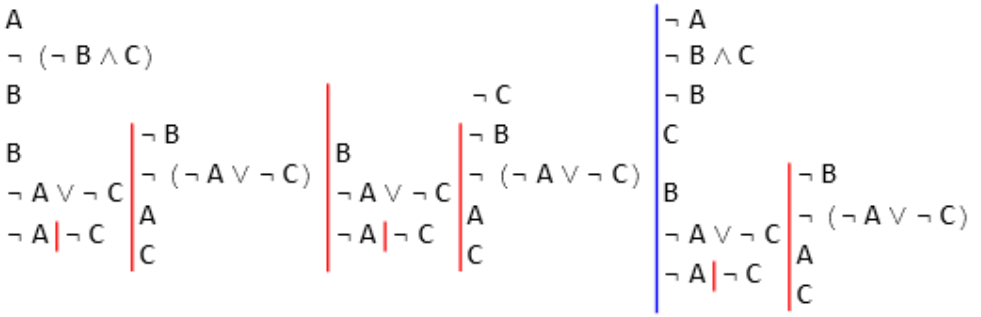
$$A \veebar (\neg B \wedge \neg C)$$
$$B \Leftrightarrow \neg A \vee C$$



$A \wedge B \wedge C$

6.

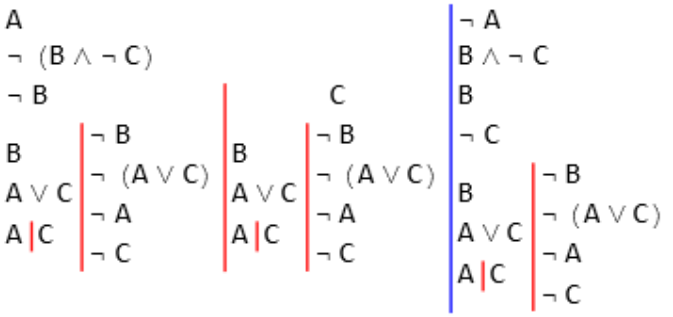
$$A \veebar (\neg B \wedge C)$$
$$B \Leftrightarrow \neg A \vee \neg C$$



$A \wedge B \wedge \neg C$

7.

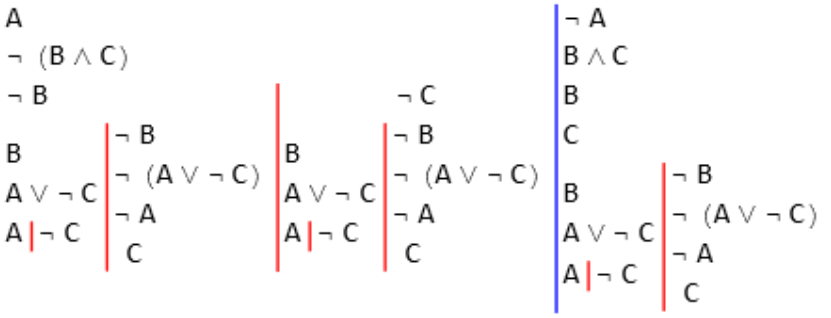
$$A \veebar (B \wedge \neg C)$$
$$B \Leftrightarrow A \vee C$$



$A \wedge B \wedge C$

8.

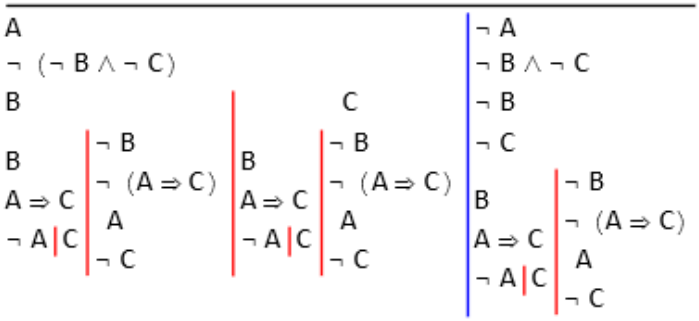
$$A \veebar (B \wedge C)$$
$$B \Leftrightarrow A \vee \neg C$$



$A \wedge B \wedge \neg C$

9.

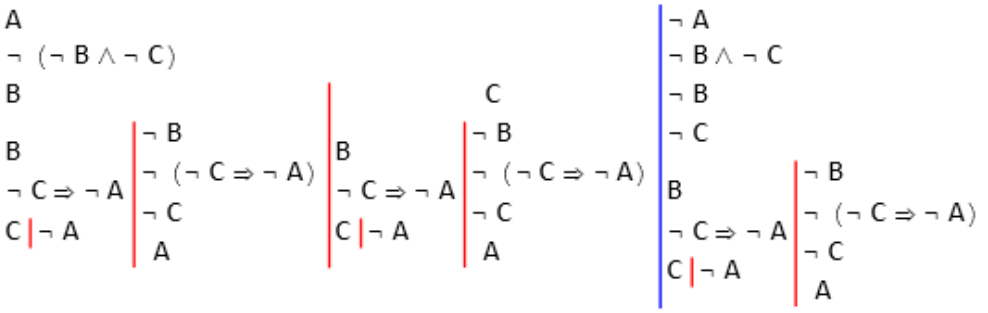
$A \veebar (\neg B \wedge \neg C)$
$B \Leftrightarrow (A \Rightarrow C)$



$A \wedge B \wedge C$

10.

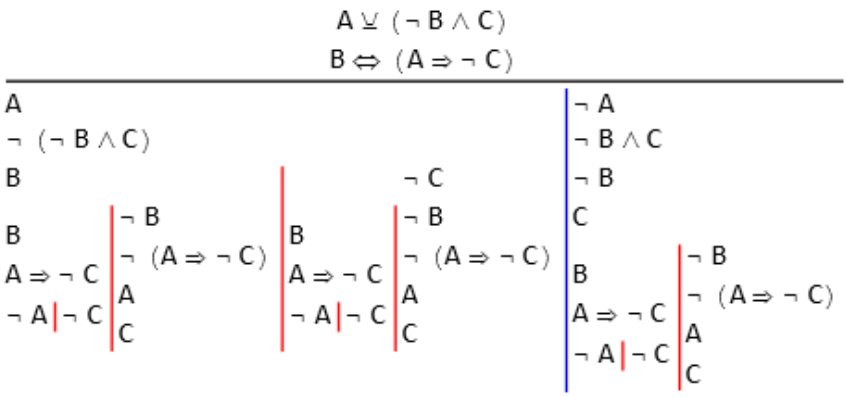
$A \veebar (\neg B \wedge \neg C)$
$B \Leftrightarrow (\neg C \Rightarrow \neg A)$



$A \wedge B \wedge C$

11.

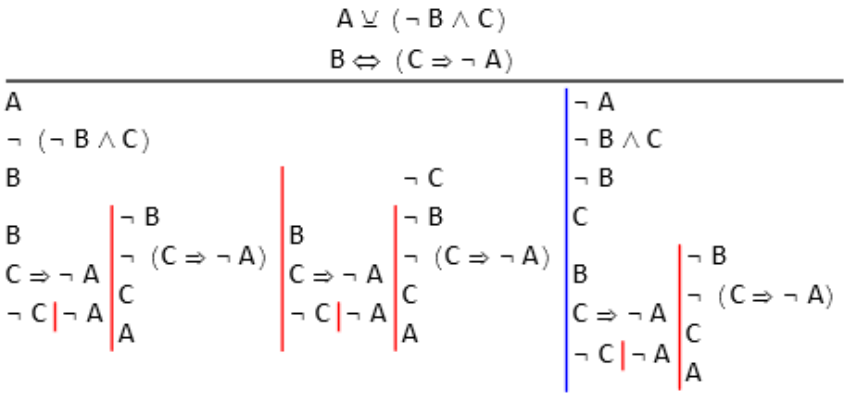
$A \veebar (\neg B \wedge C)$
$B \Leftrightarrow (A \Rightarrow \neg C)$



$A \wedge B \wedge \neg C$

12.

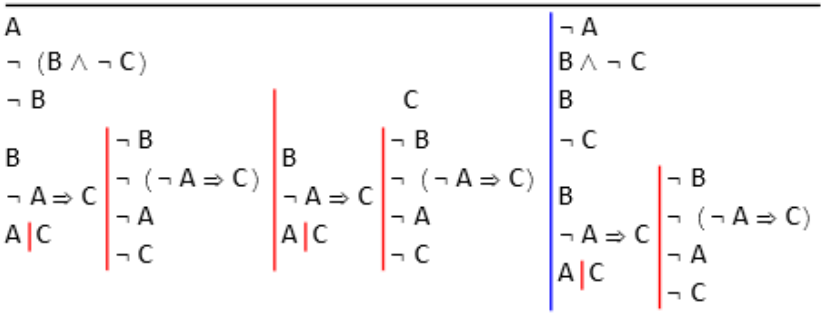
$A \veebar (\neg B \wedge C)$
$B \Leftrightarrow (C \Rightarrow \neg A)$



$A \wedge B \wedge \neg C$

13.

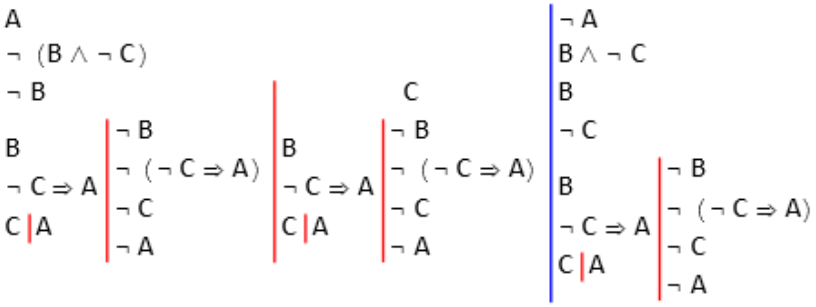
$A \veebar (B \wedge \neg C)$
$B \Leftrightarrow (\neg A \Rightarrow C)$



$A \wedge B \wedge C$

14.

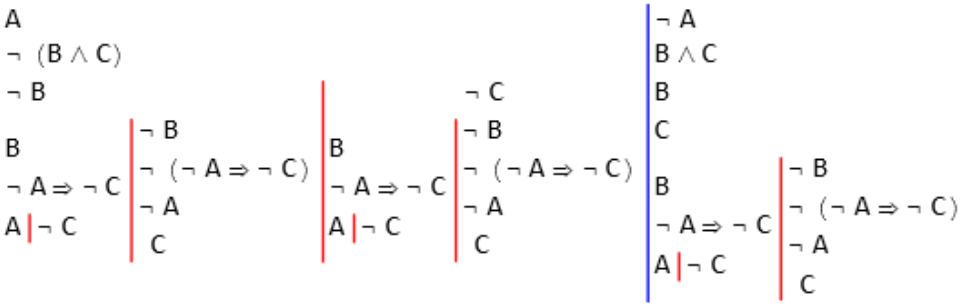
$A \veebar (B \wedge \neg C)$
$B \Leftrightarrow (\neg C \Rightarrow A)$



$A \wedge B \wedge C$

15.

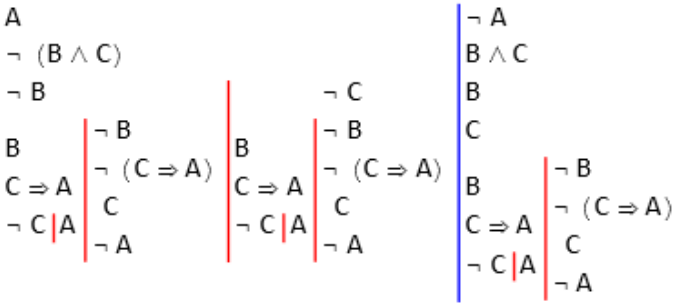
$A \veebar (B \wedge C)$
$B \Leftrightarrow (\neg A \Rightarrow \neg C)$



$A \wedge B \wedge \neg C$

16.

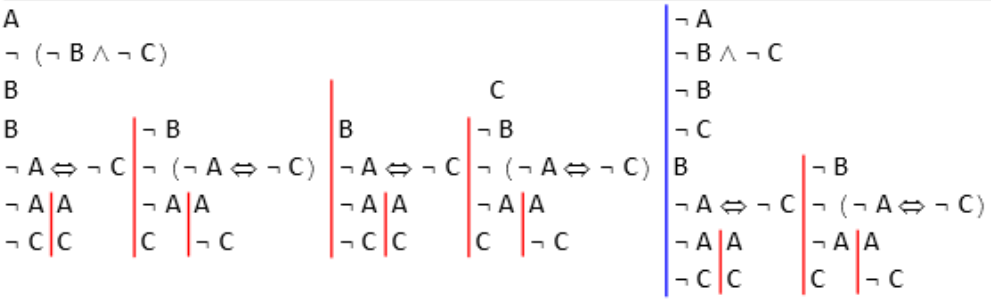
$A \veebar (B \wedge C)$
$B \Leftrightarrow (C \Rightarrow A)$



$A \wedge B \wedge \neg C$

17.

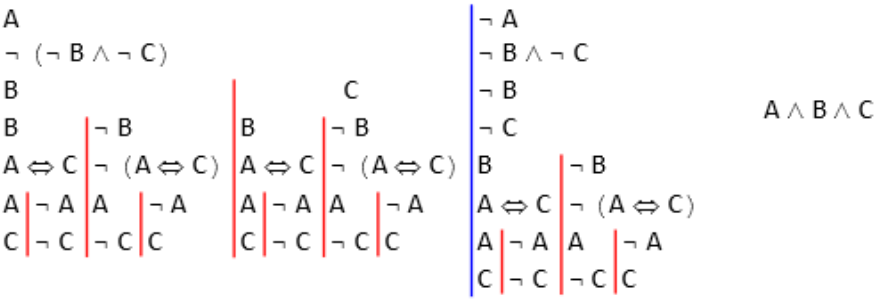
$$A \veebar (\neg B \wedge \neg C)$$
$$B \Leftrightarrow (\neg A \Leftrightarrow \neg C)$$



$A \wedge B \wedge C$

18.

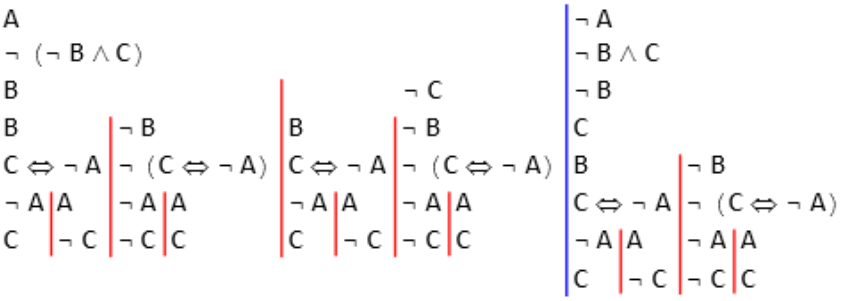
$$A \veebar (\neg B \wedge \neg C)$$
$$B \Leftrightarrow (A \Leftrightarrow C)$$



$A \wedge B \wedge C$

19.

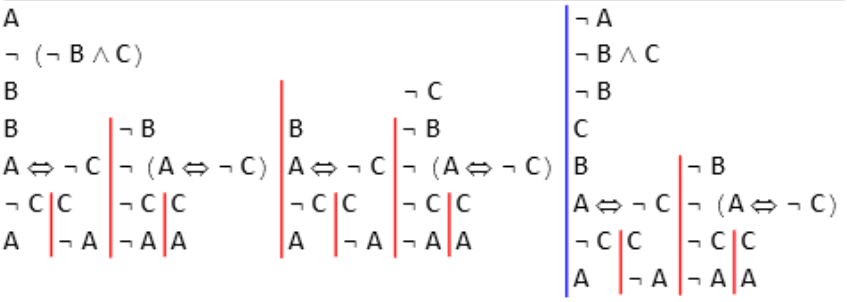
$$A \veebar (\neg B \wedge C)$$
$$B \Leftrightarrow (C \Leftrightarrow \neg A)$$



$A \wedge B \wedge \neg C$

20.

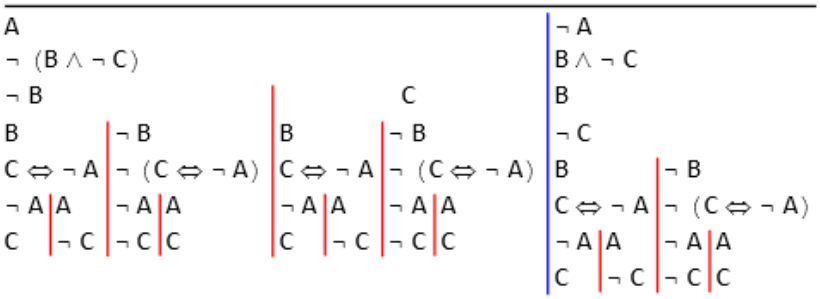
$$A \veebar (\neg B \wedge C)$$
$$B \Leftrightarrow (A \Leftrightarrow \neg C)$$



$A \wedge B \wedge \neg C$

21.

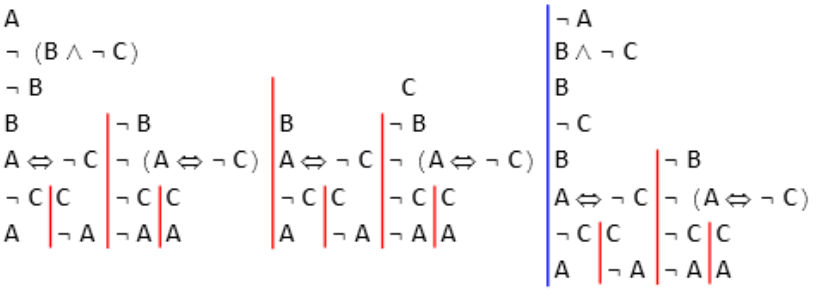
$$A \veebar (B \wedge \neg C)$$
$$B \Leftrightarrow (C \Leftrightarrow \neg A)$$



$A \wedge \neg B \wedge C$

22.

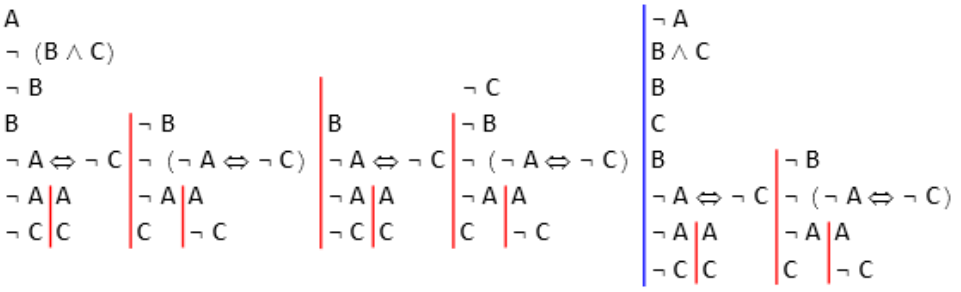
$$A \veebar (B \wedge \neg C)$$
$$B \Leftrightarrow (A \Leftrightarrow \neg C)$$



$A \wedge \neg B \wedge C$

23.

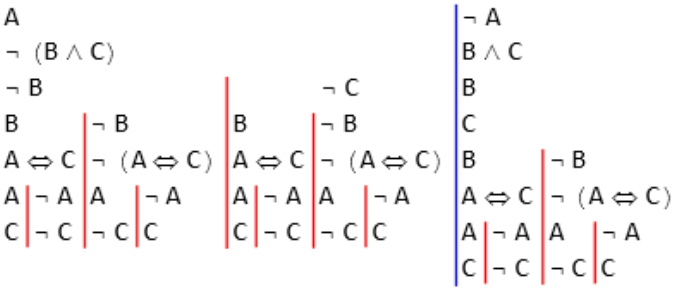
$$A \veebar (B \wedge C)$$
$$B \Leftrightarrow (\neg A \Leftrightarrow \neg C)$$



$A \wedge \neg B \wedge \neg C$

24.

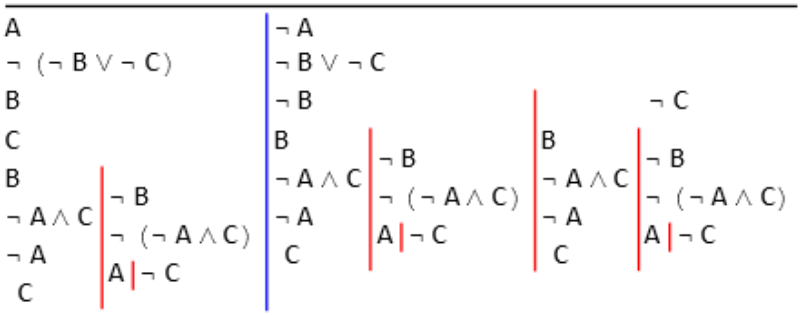
$$A \veebar (B \wedge C)$$
$$B \Leftrightarrow (A \Leftrightarrow C)$$



$A \wedge \neg B \wedge \neg C$

25.

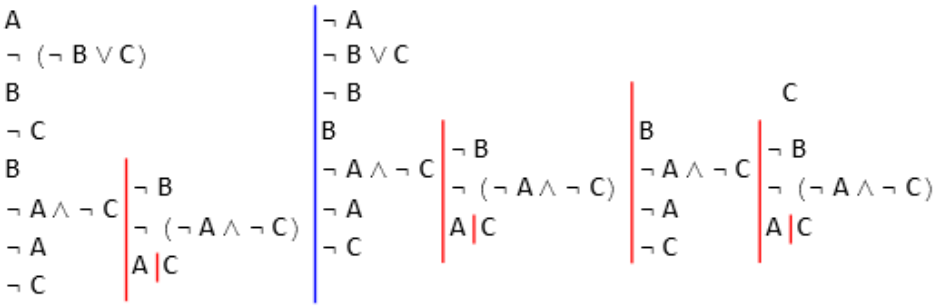
$A \veebar (\neg B \vee \neg C)$
$B \Leftrightarrow \neg A \wedge C$



$\neg A \wedge \neg B \wedge \neg C$

26.

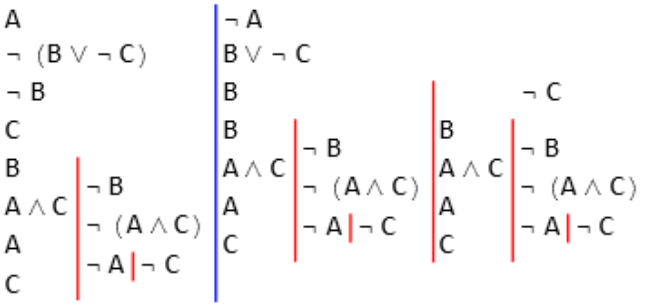
$A \veebar (\neg B \vee C)$
$B \Leftrightarrow \neg A \wedge \neg C$



$\neg A \wedge \neg B \wedge C$

27.

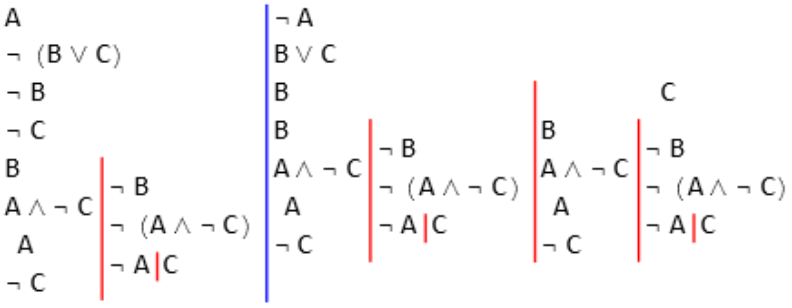
$A \veebar (B \vee \neg C)$
$B \Leftrightarrow A \wedge C$



$\neg A \wedge \neg B \wedge \neg C$

28.

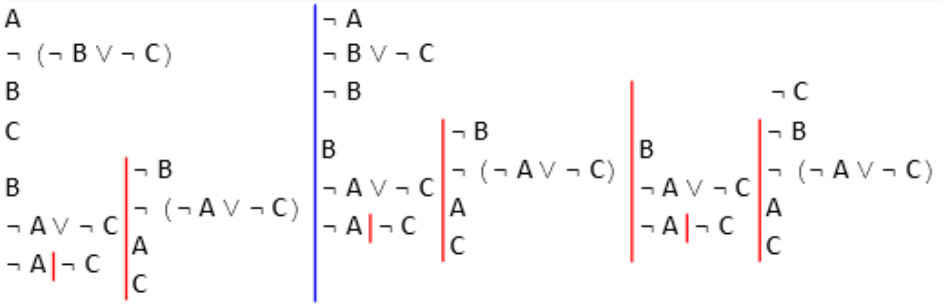
$A \veebar (B \vee C)$
$B \Leftrightarrow A \wedge \neg C$



$\neg A \wedge \neg B \wedge C$

29.

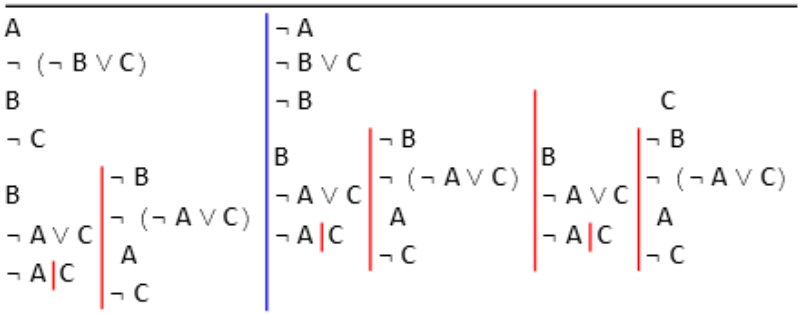
$A \veebar (\neg B \vee \neg C)$
$B \Leftrightarrow \neg A \vee \neg C$



$\neg A \wedge B \wedge \neg C$

30.

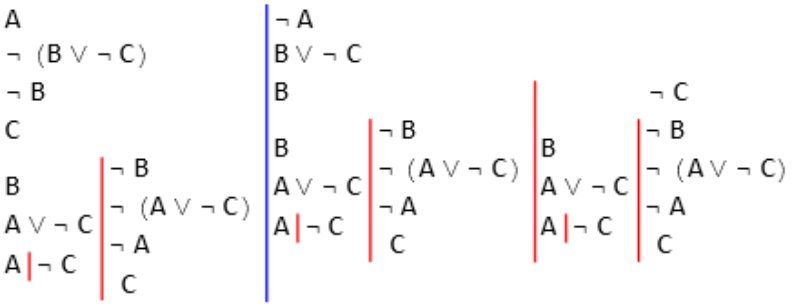
$A \veebar (\neg B \vee C)$
$B \Leftrightarrow \neg A \vee C$



$\neg A \wedge B \wedge C$

31.

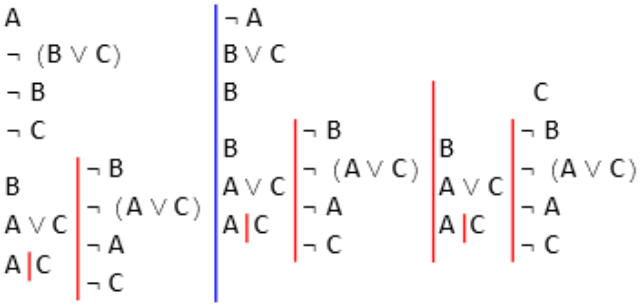
$A \veebar (B \vee \neg C)$
$B \Leftrightarrow A \vee \neg C$



$\neg A \wedge B \wedge \neg C$

32.

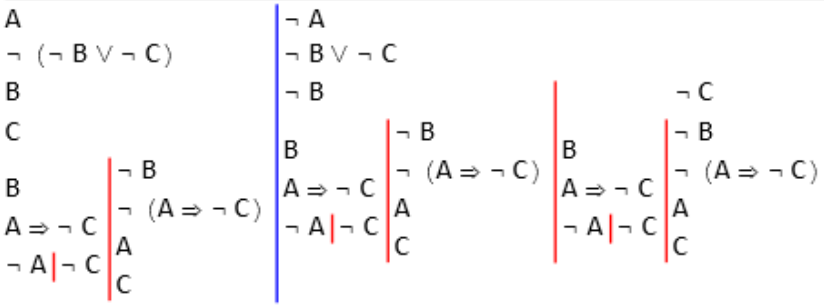
$A \veebar (B \vee C)$
$B \Leftrightarrow A \vee C$



$\neg A \wedge B \wedge C$

33.

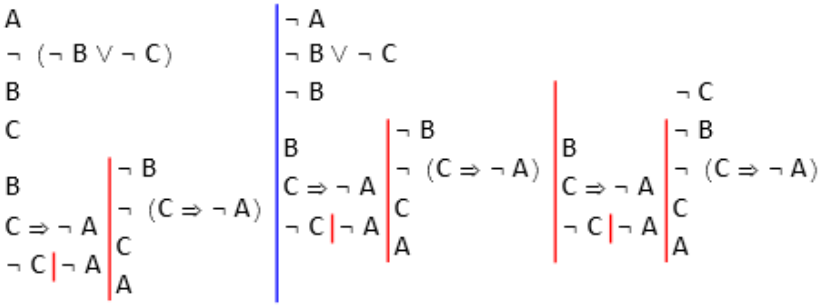
$A \veebar (\neg B \vee \neg C)$
$B \Leftrightarrow (A \Rightarrow \neg C)$



$\neg A \wedge B \wedge \neg C$

34.

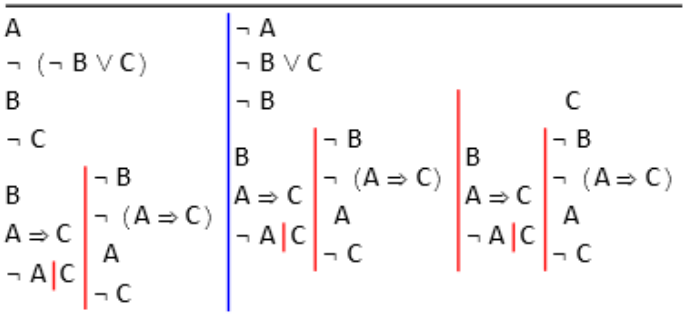
$A \veebar (\neg B \vee \neg C)$
$B \Leftrightarrow (C \Rightarrow \neg A)$



$\neg A \wedge B \wedge \neg C$

35.

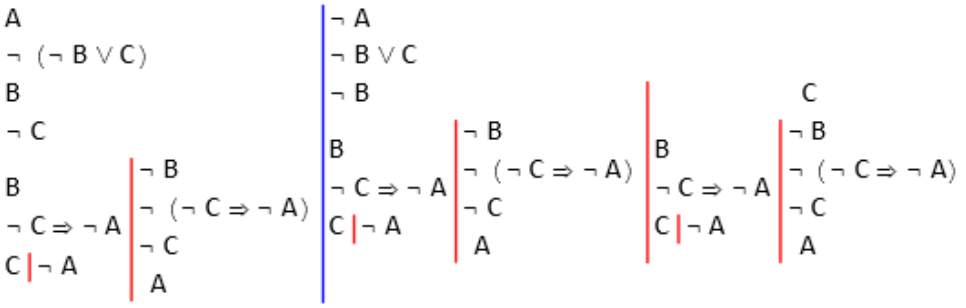
$A \veebar (\neg B \vee C)$
$B \Leftrightarrow (A \Rightarrow C)$



$\neg A \wedge B \wedge C$

36.

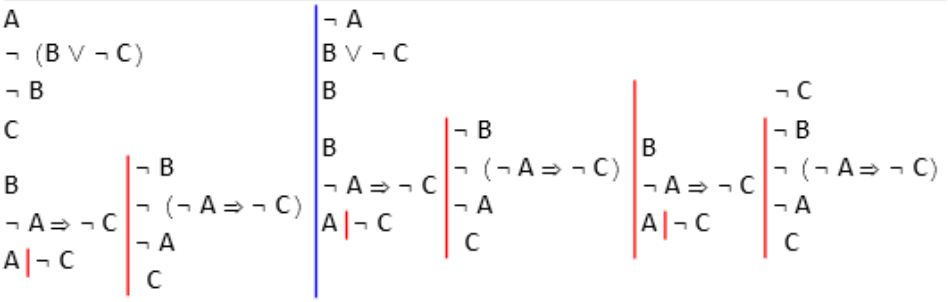
$A \veebar (\neg B \vee C)$
$B \Leftrightarrow (\neg C \Rightarrow \neg A)$



$\neg A \wedge B \wedge C$

37.

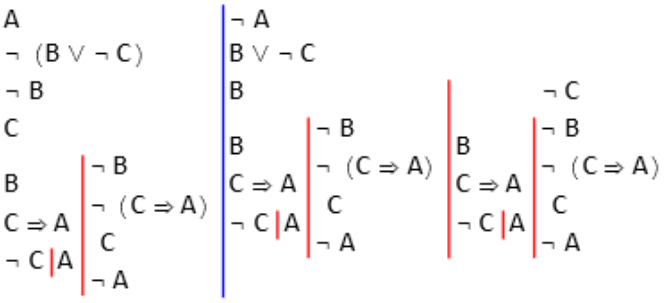
$A \veebar (B \vee \neg C)$
$B \Leftrightarrow (\neg A \Rightarrow \neg C)$



$\neg A \wedge B \wedge \neg C$

38.

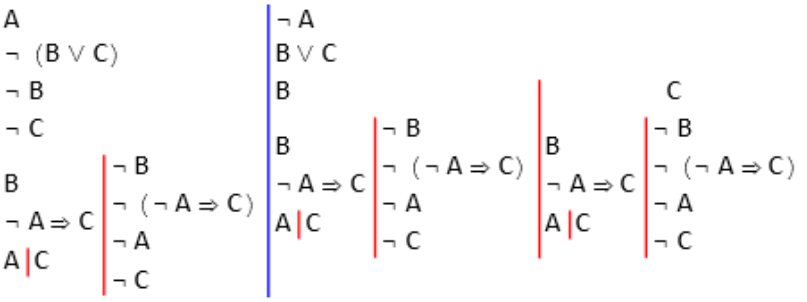
$A \veebar (B \vee \neg C)$
$B \Leftrightarrow (C \Rightarrow A)$



$\neg A \wedge B \wedge \neg C$

39.

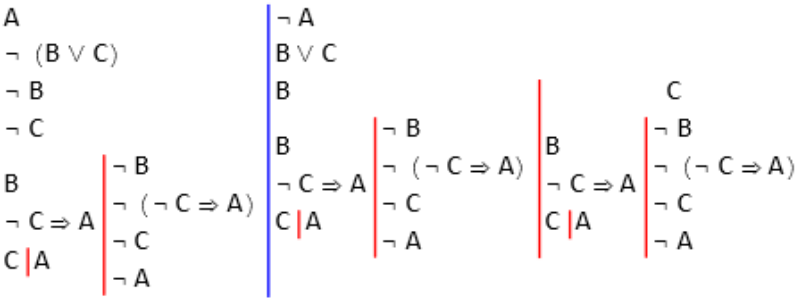
$A \veebar (B \vee C)$
$B \Leftrightarrow (\neg A \Rightarrow C)$



$\neg A \wedge B \wedge C$

40.

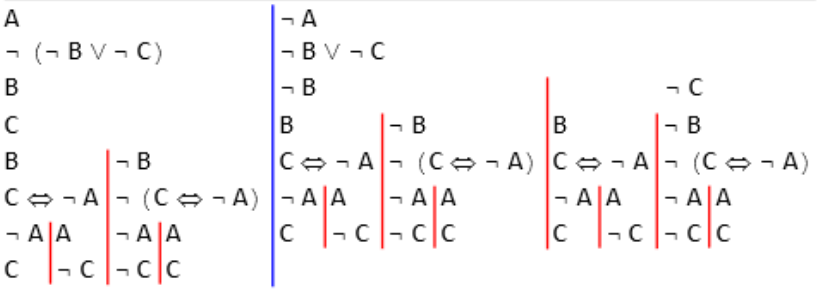
$A \veebar (B \vee C)$
$B \Leftrightarrow (\neg C \Rightarrow A)$



$\neg A \wedge B \wedge C$

41.

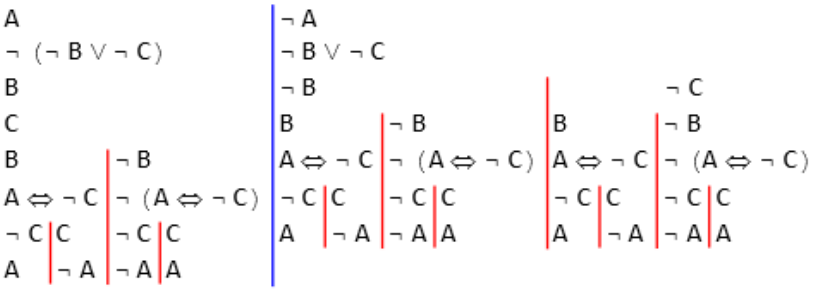
$A \veebar (\neg B \vee \neg C)$
$B \Leftrightarrow (C \Leftrightarrow \neg A)$



$\neg A \wedge \neg B \wedge \neg C$

42.

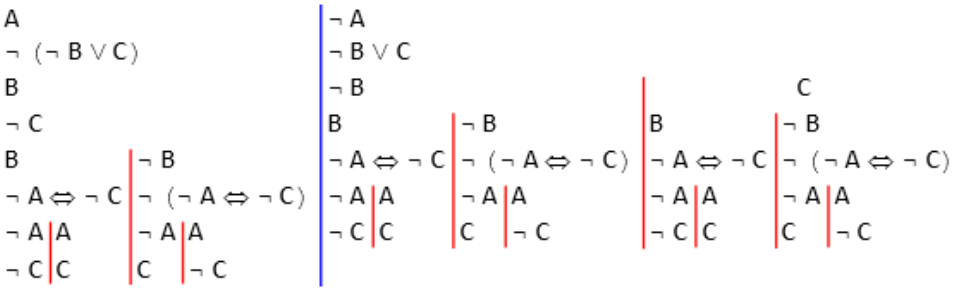
$A \veebar (\neg B \vee \neg C)$
$B \Leftrightarrow (A \Leftrightarrow \neg C)$



$\neg A \wedge \neg B \wedge \neg C$

43.

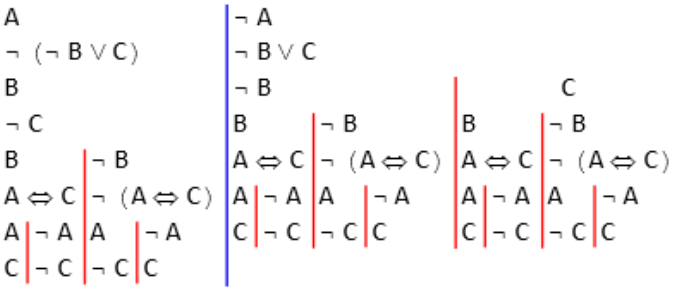
$A \veebar (\neg B \vee C)$
$B \Leftrightarrow (\neg A \Leftrightarrow \neg C)$



$\neg A \wedge \neg B \wedge C$

44.

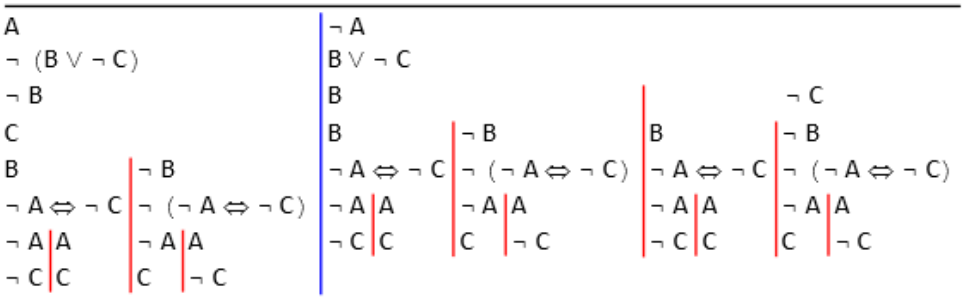
$A \veebar (\neg B \vee C)$
$B \Leftrightarrow (A \Leftrightarrow C)$



$\neg A \wedge \neg B \wedge C$

45.

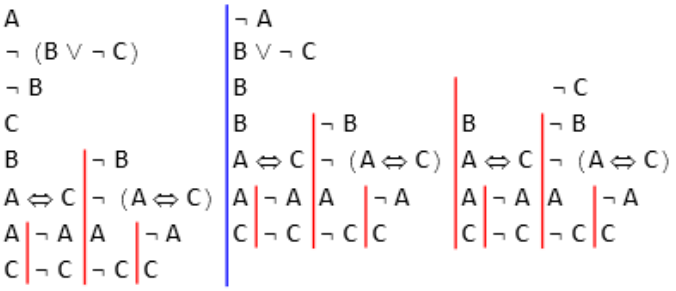
$$A \veebar (B \vee \neg C)$$
$$B \Leftrightarrow (\neg A \Leftrightarrow \neg C)$$



$\neg A \wedge B \wedge \neg C$

46.

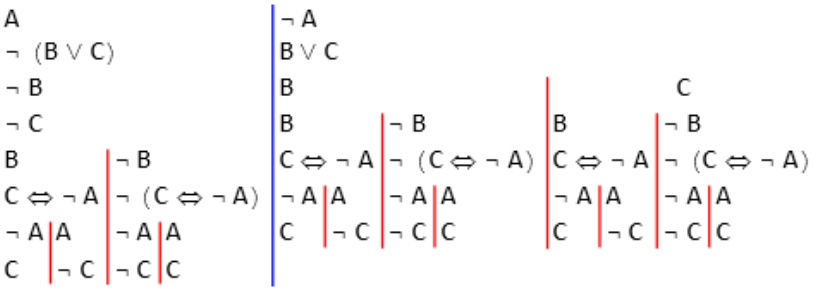
$$A \veebar (B \vee \neg C)$$
$$B \Leftrightarrow (A \Leftrightarrow C)$$



$\neg A \wedge B \wedge \neg C$

47.

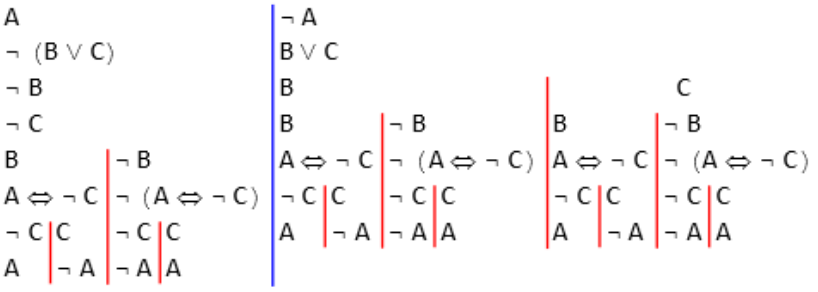
$$A \veebar (B \vee C)$$
$$B \Leftrightarrow (C \Leftrightarrow \neg A)$$



$\neg A \wedge B \wedge C$

48.

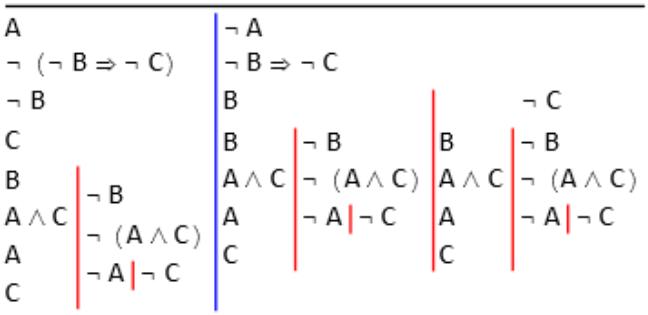
$$A \veebar (B \vee C)$$
$$B \Leftrightarrow (A \Leftrightarrow \neg C)$$



$\neg A \wedge B \wedge C$

49.

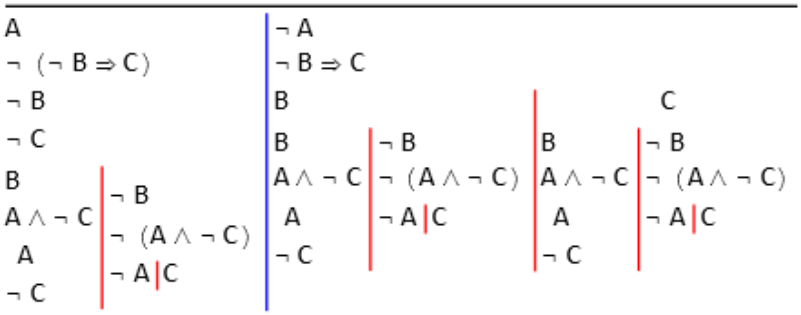
$A \veebar (\neg B \Rightarrow \neg C)$
$B \Leftrightarrow A \wedge C$



$\neg A \wedge \neg B \wedge \neg C$

50.

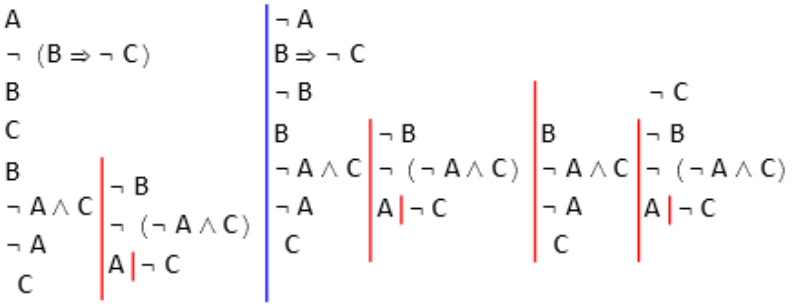
$A \veebar (\neg B \Rightarrow C)$
$B \Leftrightarrow A \wedge \neg C$



$\neg A \wedge \neg B \wedge C$

51.

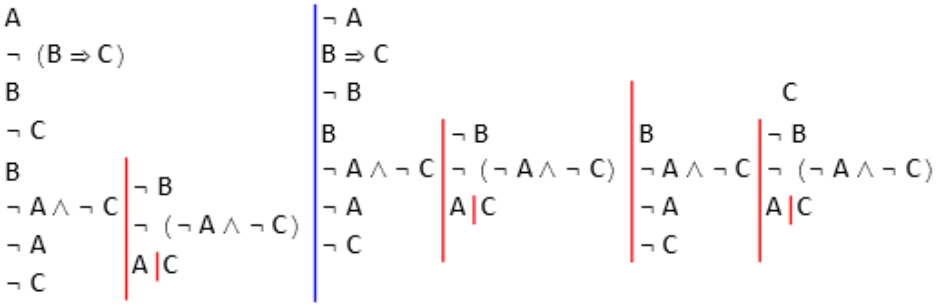
$A \veebar (B \Rightarrow \neg C)$
$B \Leftrightarrow \neg A \wedge C$



$\neg A \wedge \neg B \wedge \neg C$

52.

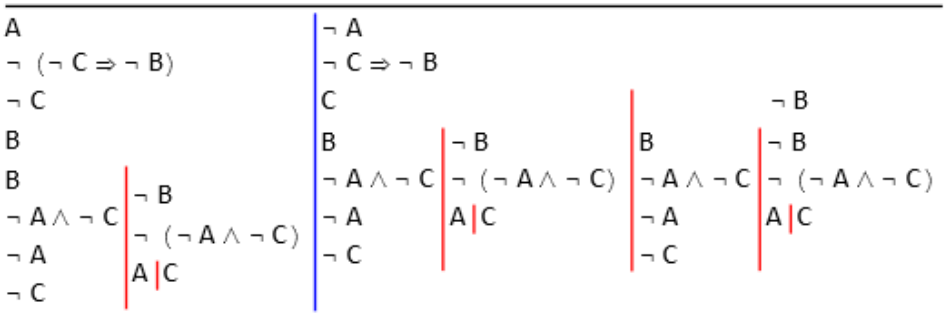
$A \veebar (B \Rightarrow C)$
$B \Leftrightarrow \neg A \wedge \neg C$



$\neg A \wedge \neg B \wedge C$

53.

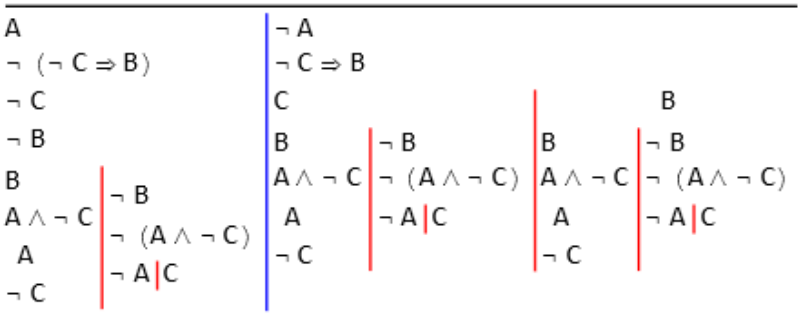
$A \veebar (\neg C \Rightarrow \neg B)$
$B \Leftrightarrow \neg A \wedge \neg C$



$\neg A \wedge \neg B \wedge C$

54.

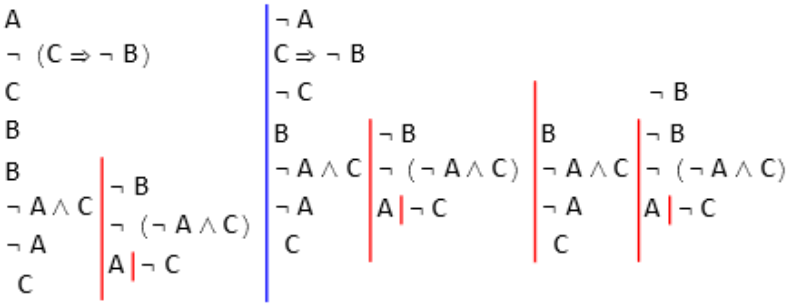
$A \veebar (\neg C \Rightarrow B)$
$B \Leftrightarrow A \wedge \neg C$



$\neg A \wedge \neg B \wedge C$

55.

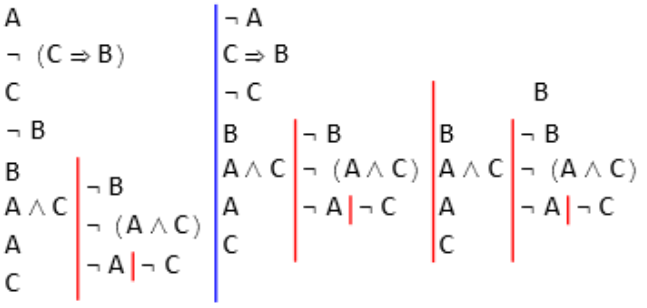
$A \veebar (C \Rightarrow \neg B)$
$B \Leftrightarrow \neg A \wedge C$



$\neg A \wedge \neg B \wedge \neg C$

56.

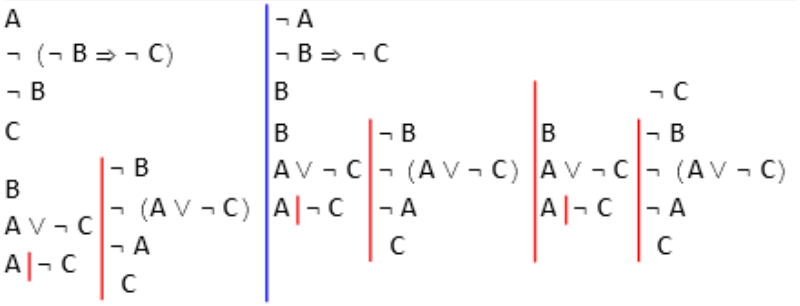
$A \veebar (C \Rightarrow B)$
$B \Leftrightarrow A \wedge C$



$\neg A \wedge \neg B \wedge \neg C$

57.

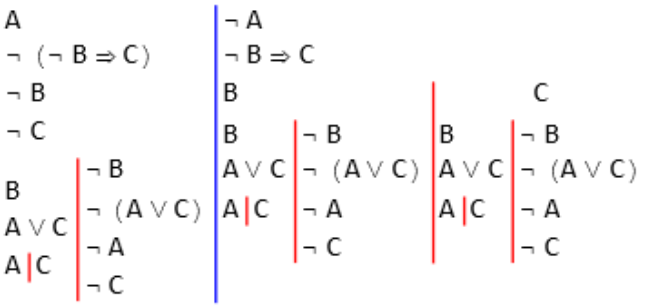
$A \veebar (\neg B \Rightarrow \neg C)$
$B \Leftrightarrow A \vee \neg C$



$\neg A \wedge B \wedge \neg C$

58.

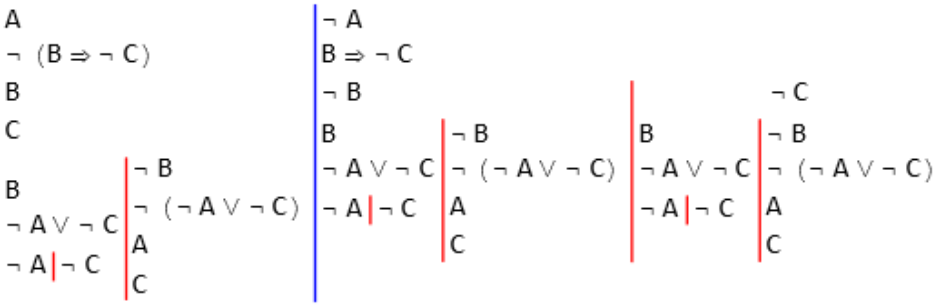
$A \veebar (\neg B \Rightarrow C)$
$B \Leftrightarrow A \vee C$



$\neg A \wedge B \wedge C$

59.

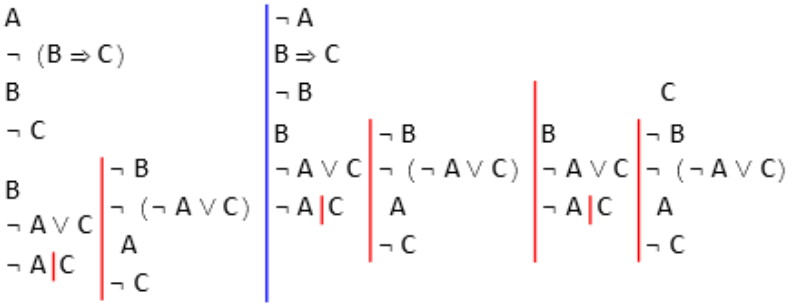
$A \veebar (B \Rightarrow \neg C)$
$B \Leftrightarrow \neg A \vee \neg C$



$\neg A \wedge B \wedge \neg C$

60.

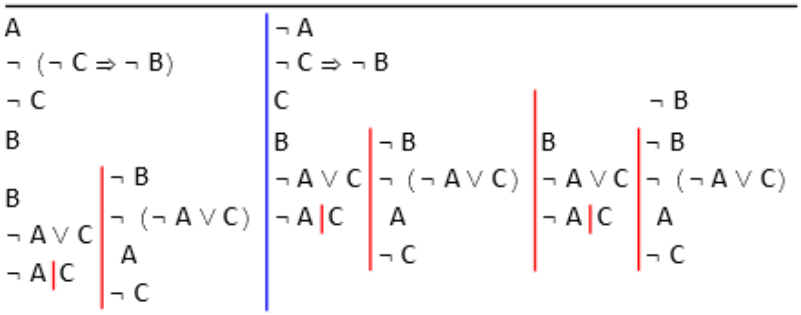
$A \veebar (B \Rightarrow C)$
$B \Leftrightarrow \neg A \vee C$



$\neg A \wedge B \wedge C$

61.

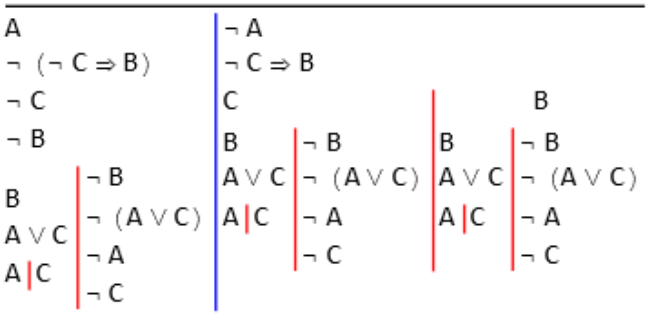
$A \veebar (\neg C \Rightarrow \neg B)$
$B \Leftrightarrow \neg A \vee C$



$\neg A \wedge B \wedge C$

62.

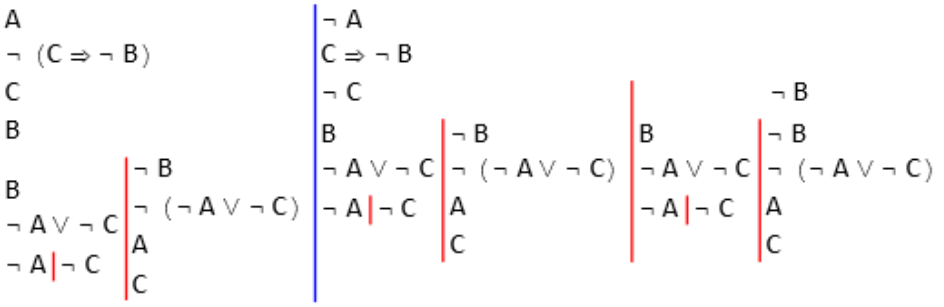
$A \veebar (\neg C \Rightarrow B)$
$B \Leftrightarrow A \vee C$



$\neg A \wedge B \wedge C$

63.

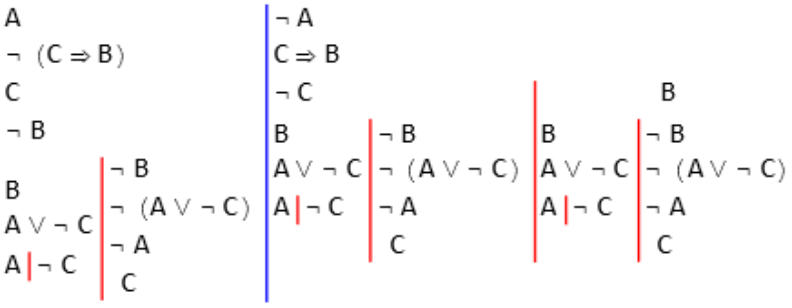
$A \veebar (C \Rightarrow \neg B)$
$B \Leftrightarrow \neg A \vee \neg C$



$\neg A \wedge B \wedge \neg C$

64.

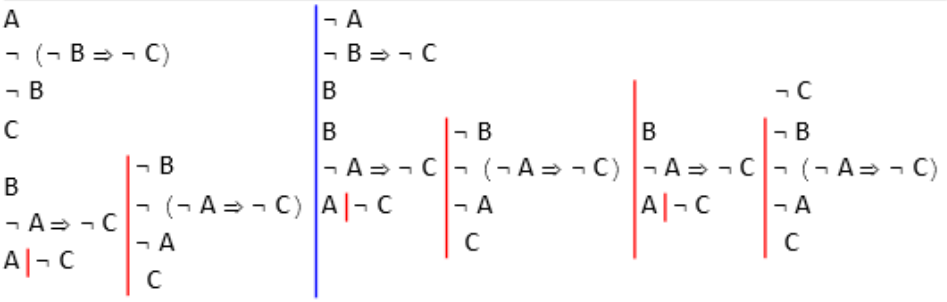
$A \veebar (C \Rightarrow B)$
$B \Leftrightarrow A \vee \neg C$



$\neg A \wedge B \wedge \neg C$

65.

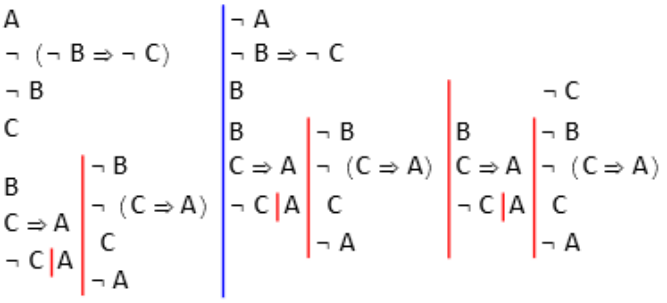
$A \veebar (\neg B \Rightarrow \neg C)$
$B \Leftrightarrow (\neg A \Rightarrow \neg C)$



$\neg A \wedge B \wedge \neg C$

66.

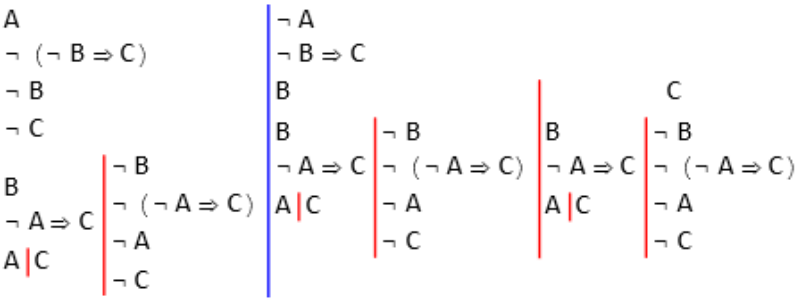
$A \veebar (\neg B \Rightarrow \neg C)$
$B \Leftrightarrow (C \Rightarrow A)$



$\neg A \wedge B \wedge \neg C$

67.

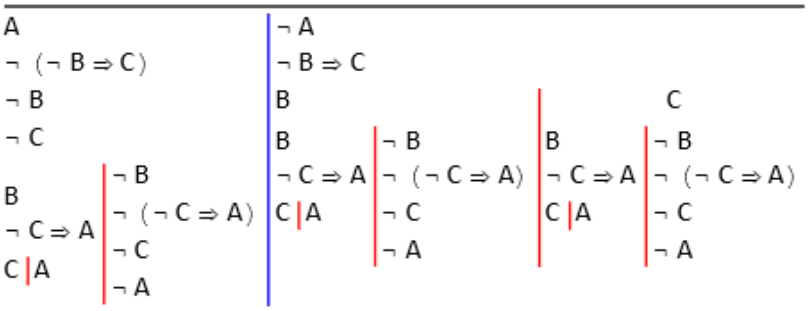
$A \veebar (\neg B \Rightarrow C)$
$B \Leftrightarrow (\neg A \Rightarrow C)$



$\neg A \wedge B \wedge C$

68.

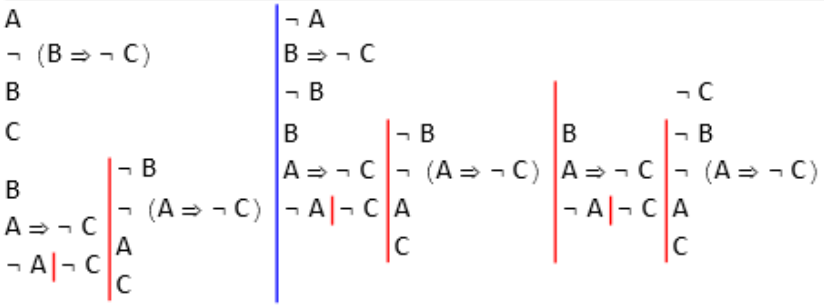
$A \veebar (\neg B \Rightarrow C)$
$B \Leftrightarrow (\neg C \Rightarrow A)$



$\neg A \wedge B \wedge C$

69.

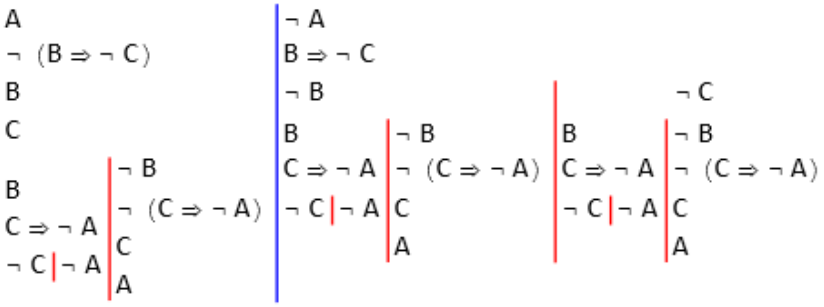
$$A \veebar (B \Rightarrow \neg C)$$
$$B \Leftrightarrow (A \Rightarrow \neg C)$$



$\neg A \wedge B \wedge \neg C$

70.

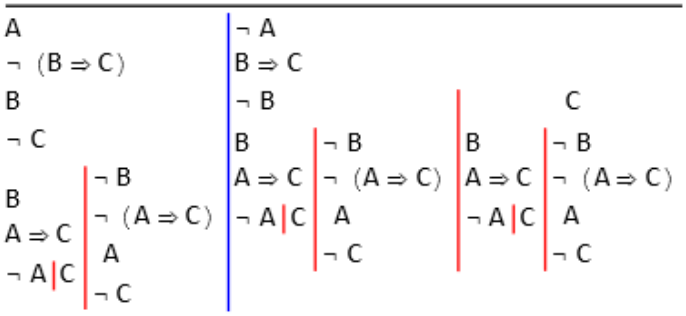
$$A \veebar (B \Rightarrow \neg C)$$
$$B \Leftrightarrow (C \Rightarrow \neg A)$$



$\neg A \wedge B \wedge \neg C$

71.

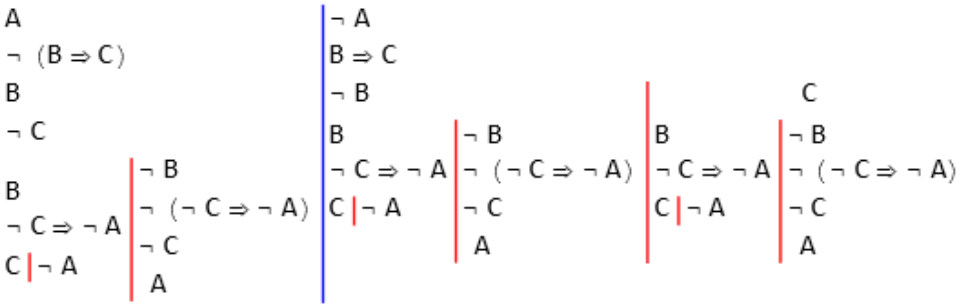
$$A \veebar (B \Rightarrow C)$$
$$B \Leftrightarrow (A \Rightarrow C)$$



$\neg A \wedge B \wedge C$

72.

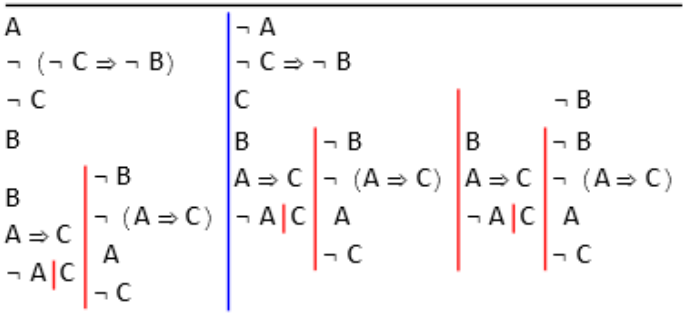
$$A \veebar (B \Rightarrow C)$$
$$B \Leftrightarrow (\neg C \Rightarrow \neg A)$$



$\neg A \wedge B \wedge C$

73.

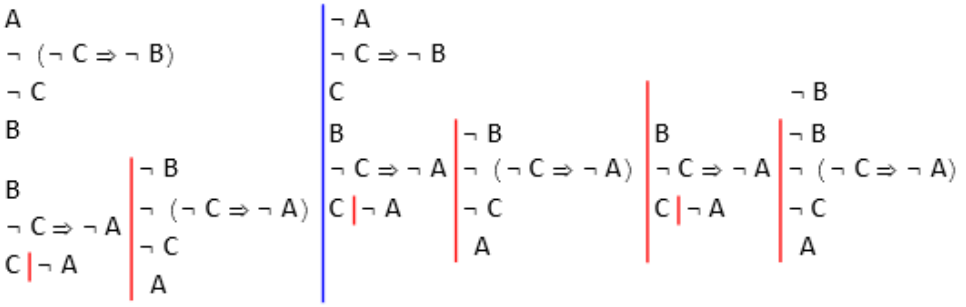
$A \veebar (\neg C \Rightarrow \neg B)$
$B \Leftrightarrow (A \Rightarrow C)$



$\neg A \wedge B \wedge C$

74.

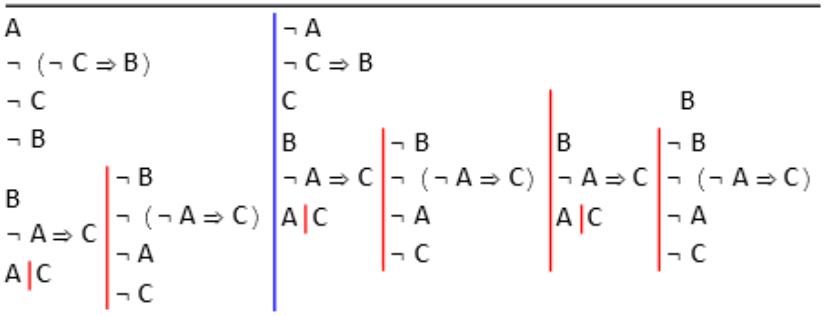
$A \veebar (\neg C \Rightarrow \neg B)$
$B \Leftrightarrow (\neg C \Rightarrow \neg A)$



$\neg A \wedge B \wedge C$

75.

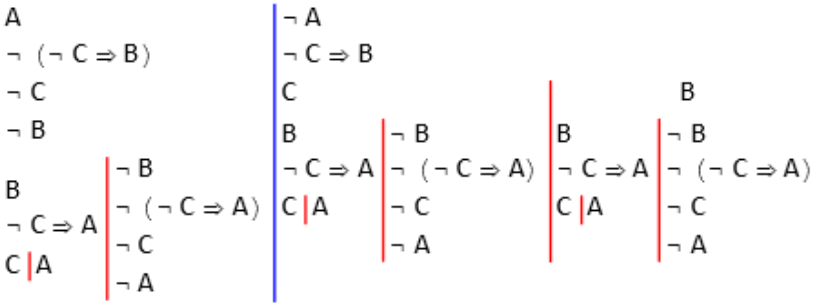
$A \veebar (\neg C \Rightarrow B)$
$B \Leftrightarrow (\neg A \Rightarrow C)$



$\neg A \wedge B \wedge C$

76.

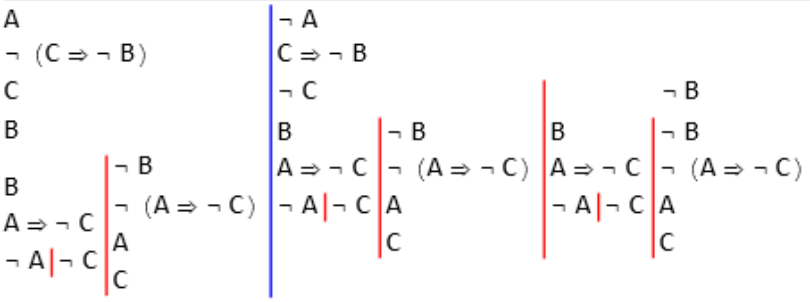
$A \veebar (\neg C \Rightarrow B)$
$B \Leftrightarrow (\neg C \Rightarrow A)$



$\neg A \wedge B \wedge C$

77.

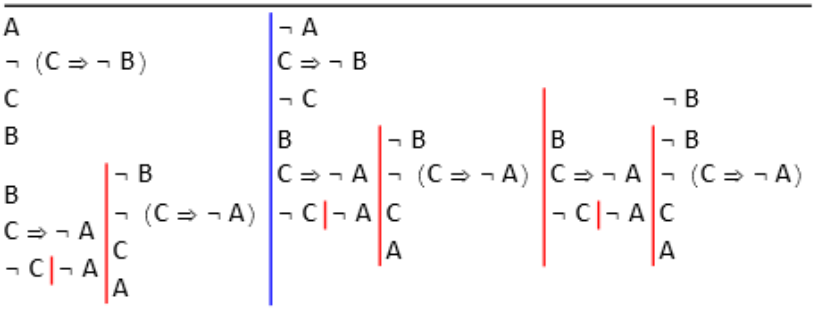
$A \veebar (C \Rightarrow \neg B)$
$B \Leftrightarrow (A \Rightarrow \neg C)$



$\neg A \wedge B \wedge \neg C$

78.

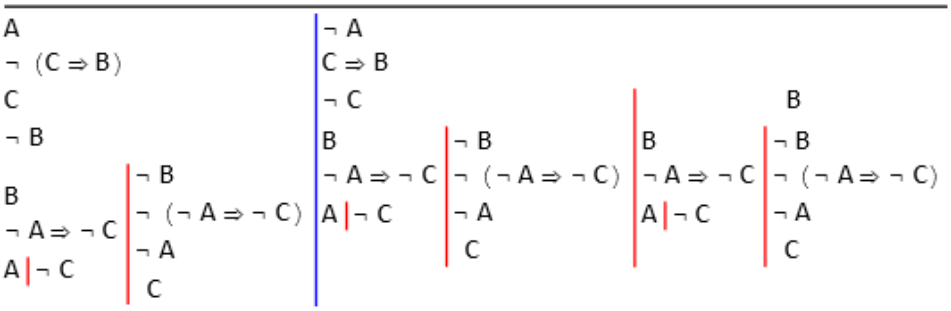
$A \veebar (C \Rightarrow \neg B)$
$B \Leftrightarrow (C \Rightarrow \neg A)$



$\neg A \wedge B \wedge \neg C$

79.

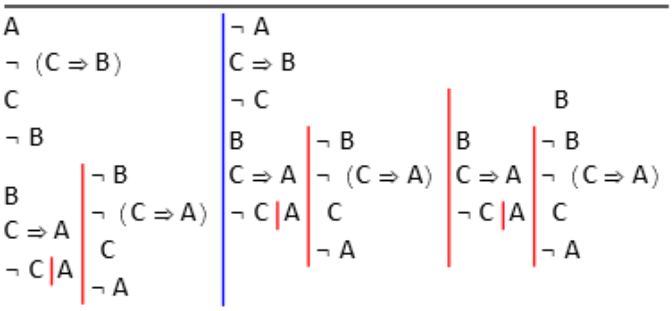
$A \veebar (C \Rightarrow B)$
$B \Leftrightarrow (\neg A \Rightarrow \neg C)$



$\neg A \wedge B \wedge \neg C$

80.

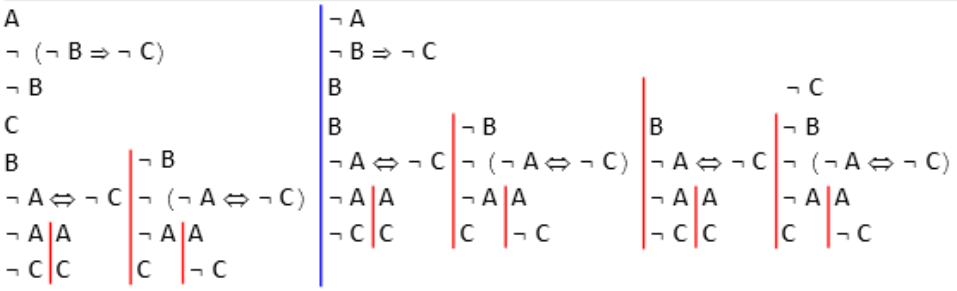
$A \veebar (C \Rightarrow B)$
$B \Leftrightarrow (C \Rightarrow A)$



$\neg A \wedge B \wedge \neg C$

81.

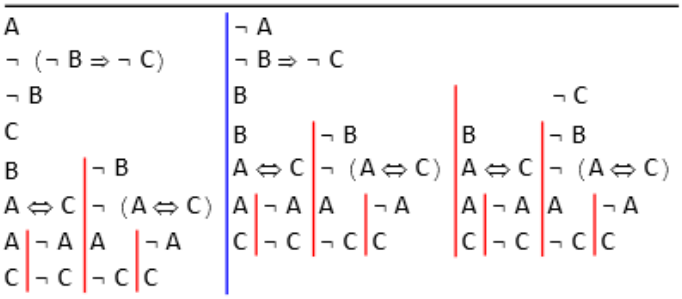
$$A \veebar (\neg B \Rightarrow \neg C)$$
$$B \Leftrightarrow (\neg A \Leftrightarrow \neg C)$$



$\neg A \wedge B \wedge \neg C$

82.

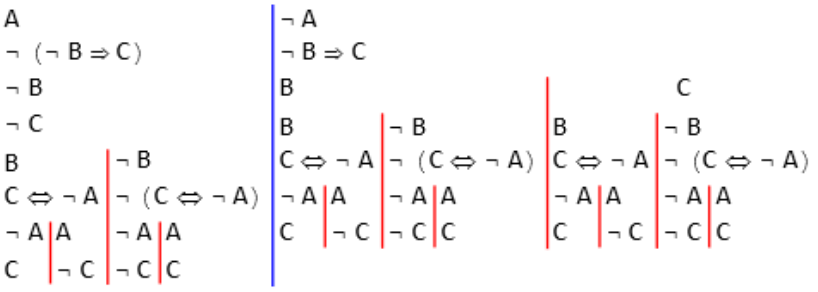
$$A \veebar (\neg B \Rightarrow \neg C)$$
$$B \Leftrightarrow (A \Leftrightarrow C)$$



$\neg A \wedge B \wedge \neg C$

83.

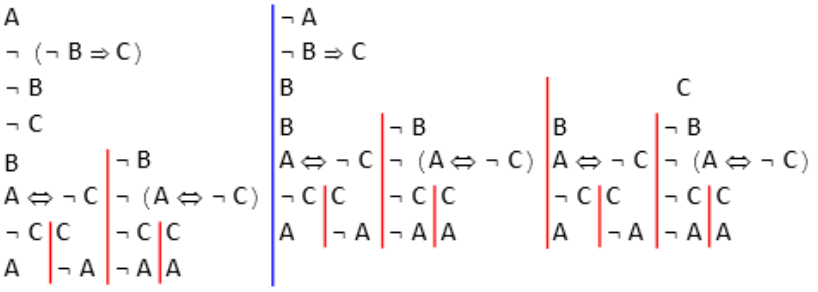
$$A \veebar (\neg B \Rightarrow C)$$
$$B \Leftrightarrow (C \Leftrightarrow \neg A)$$



$\neg A \wedge B \wedge C$

84.

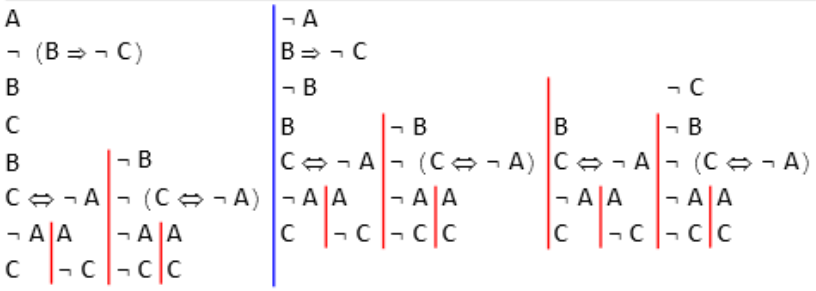
$$A \veebar (\neg B \Rightarrow C)$$
$$B \Leftrightarrow (A \Leftrightarrow \neg C)$$



$\neg A \wedge B \wedge C$

85.

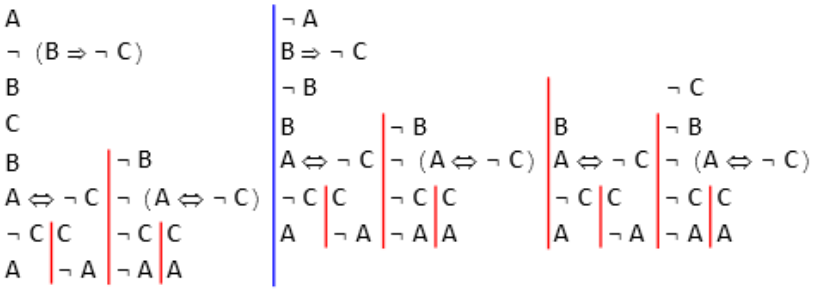
$A \veebar (B \Rightarrow \neg C)$
$B \Leftrightarrow (C \Leftrightarrow \neg A)$



$\neg A \wedge \neg B \wedge \neg C$

86.

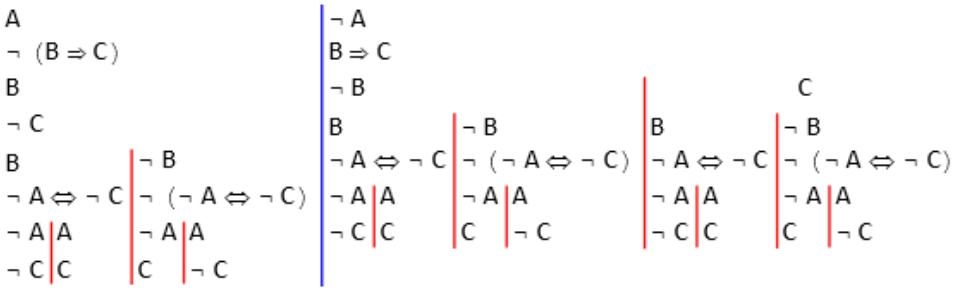
$A \veebar (B \Rightarrow \neg C)$
$B \Leftrightarrow (A \Leftrightarrow \neg C)$



$\neg A \wedge \neg B \wedge \neg C$

87.

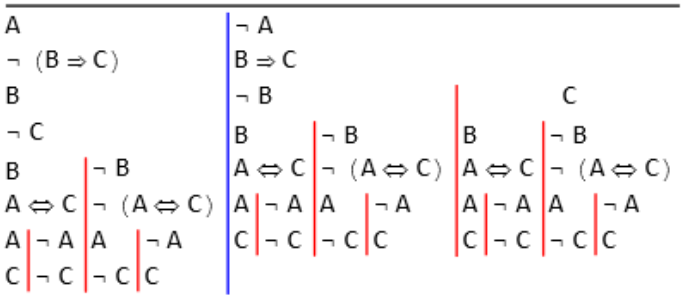
$A \veebar (B \Rightarrow C)$
$B \Leftrightarrow (\neg A \Leftrightarrow \neg C)$



$\neg A \wedge \neg B \wedge C$

88.

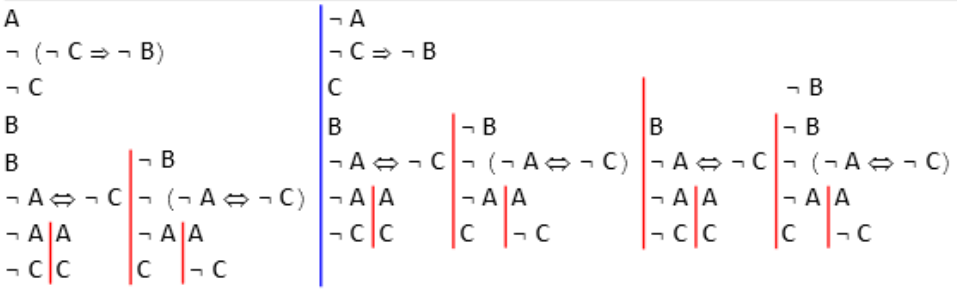
$A \veebar (B \Rightarrow C)$
$B \Leftrightarrow (A \Leftrightarrow C)$



$\neg A \wedge \neg B \wedge C$

89.

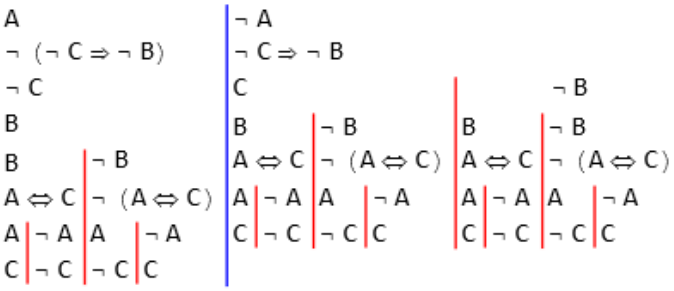
$$A \veebar (\neg C \Rightarrow \neg B)$$
$$B \Leftrightarrow (\neg A \Leftrightarrow \neg C)$$



$\neg A \wedge \neg B \wedge C$

90.

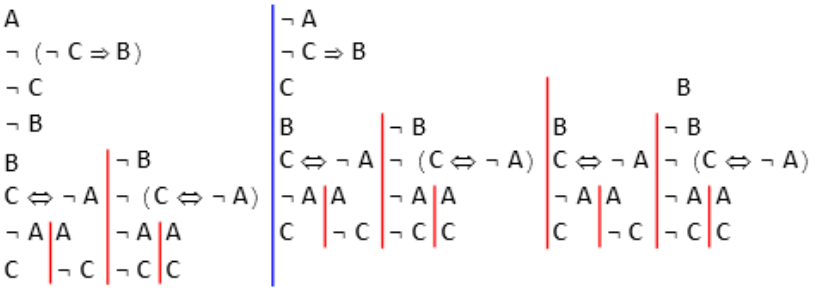
$$A \veebar (\neg C \Rightarrow \neg B)$$
$$B \Leftrightarrow (A \Leftrightarrow C)$$



$\neg A \wedge \neg B \wedge C$

91.

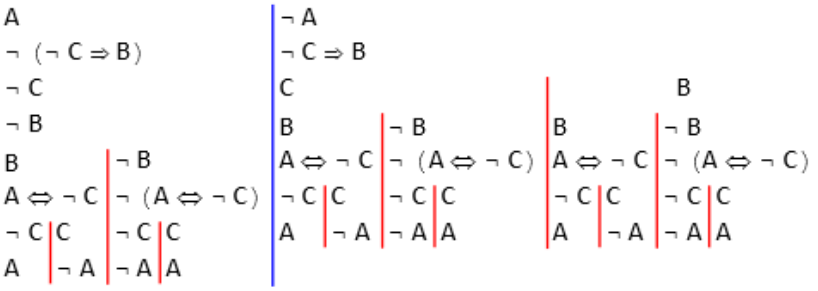
$$A \veebar (\neg C \Rightarrow B)$$
$$B \Leftrightarrow (C \Leftrightarrow \neg A)$$



$\neg A \wedge B \wedge C$

92.

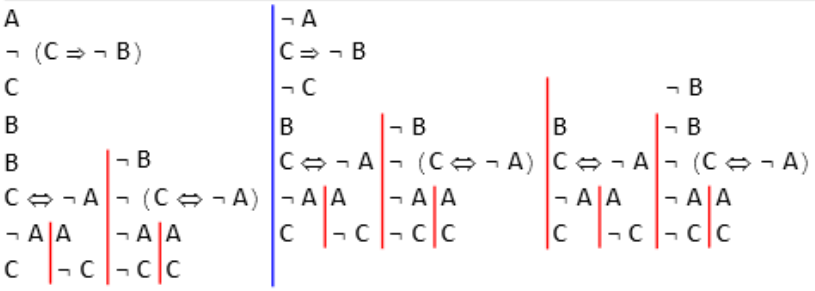
$$A \veebar (\neg C \Rightarrow B)$$
$$B \Leftrightarrow (A \Leftrightarrow \neg C)$$



$\neg A \wedge B \wedge C$

93.

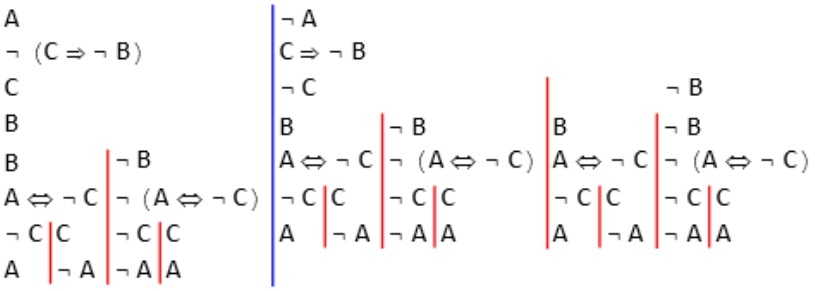
$A \veebar (C \Rightarrow \neg B)$
$B \Leftrightarrow (C \Leftrightarrow \neg A)$



$\neg A \wedge \neg B \wedge \neg C$

94.

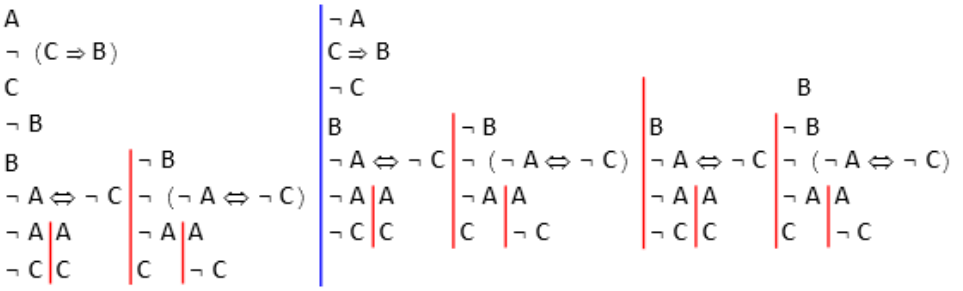
$A \veebar (C \Rightarrow \neg B)$
$B \Leftrightarrow (A \Leftrightarrow \neg C)$



$\neg A \wedge \neg B \wedge \neg C$

95.

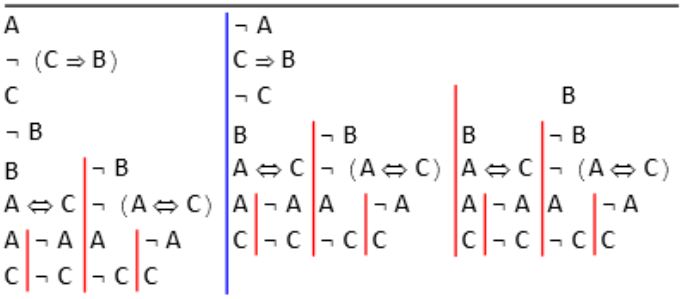
$A \veebar (C \Rightarrow B)$
$B \Leftrightarrow (\neg A \Leftrightarrow \neg C)$



$\neg A \wedge B \wedge \neg C$

96.

$A \veebar (C \Rightarrow B)$
$B \Leftrightarrow (A \Leftrightarrow C)$

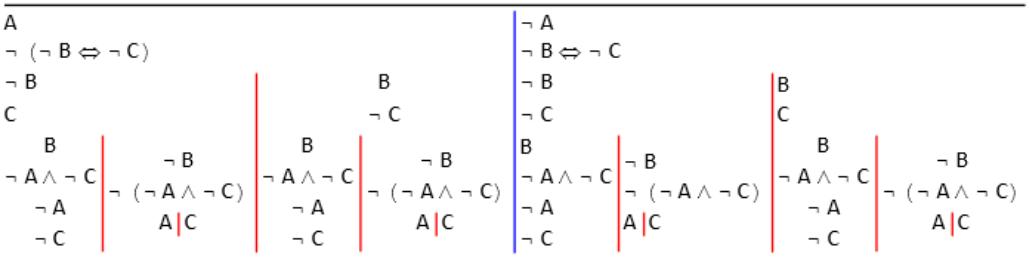


$\neg A \wedge B \wedge \neg C$

97.

$A \veebar (\neg B \Leftrightarrow \neg C)$

$B \Leftrightarrow \neg A \wedge \neg C$

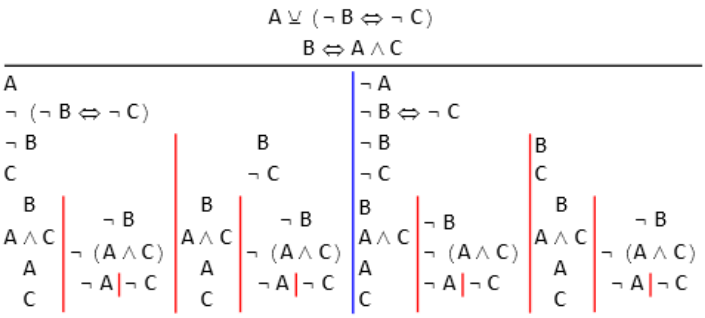


$A \wedge \neg B \wedge C$

98.

$A \veebar (\neg B \Leftrightarrow \neg C)$

$B \Leftrightarrow A \wedge C$

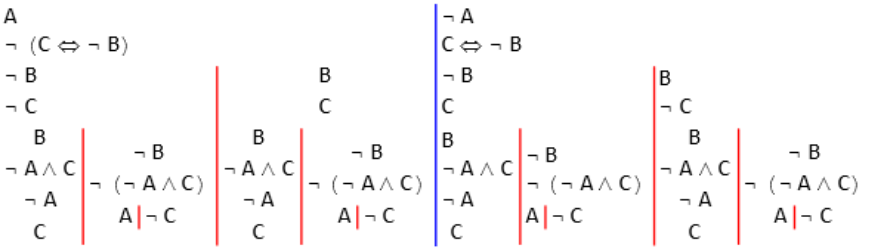


$\neg A \wedge \neg B \wedge \neg C$

99.

$A \veebar (C \Leftrightarrow \neg B)$

$B \Leftrightarrow \neg A \wedge C$

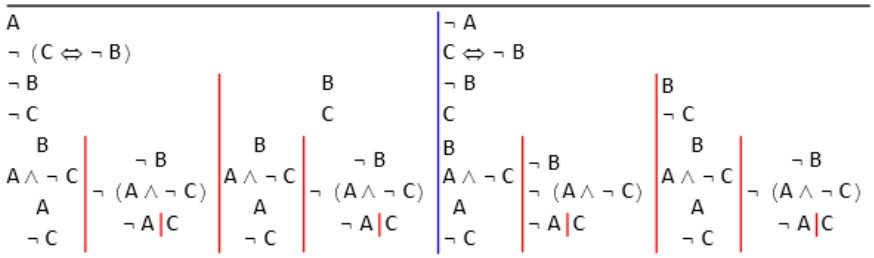


$A \wedge \neg B \wedge \neg C$

100.

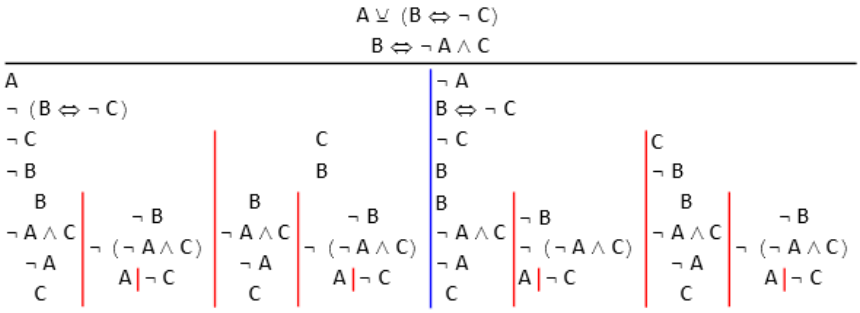
$A \veebar (C \Leftrightarrow \neg B)$

$B \Leftrightarrow A \wedge \neg C$



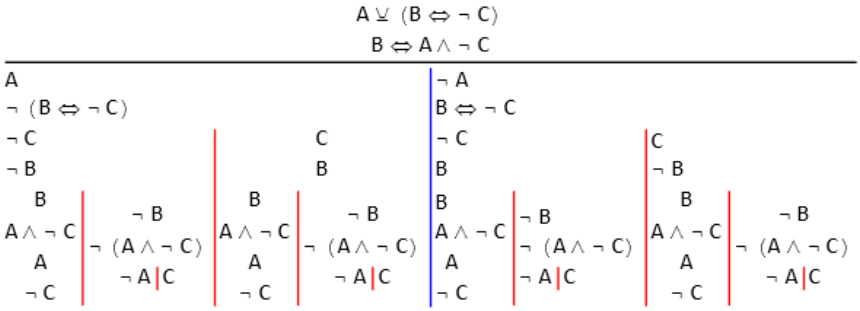
$\neg A \wedge \neg B \wedge C$

101.



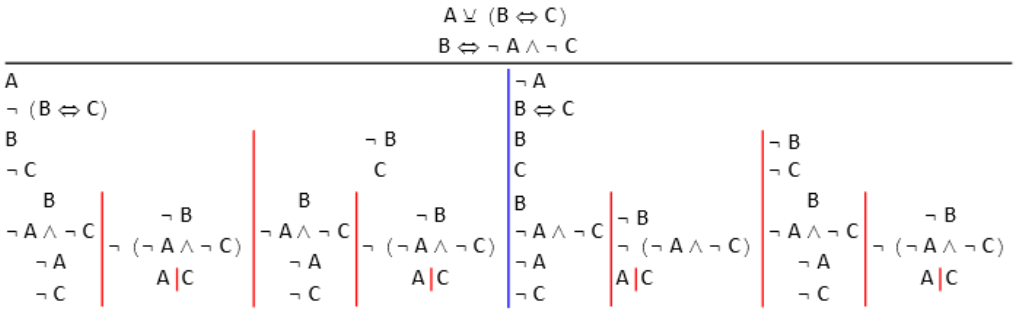
$A \wedge \neg B \wedge \neg C$

102.



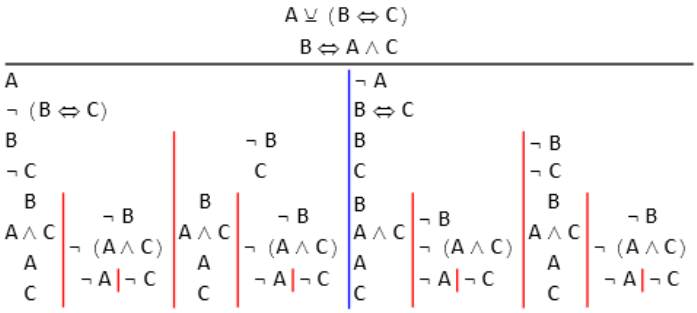
$\neg A \wedge \neg B \wedge C$

103.



$A \wedge \neg B \wedge C$

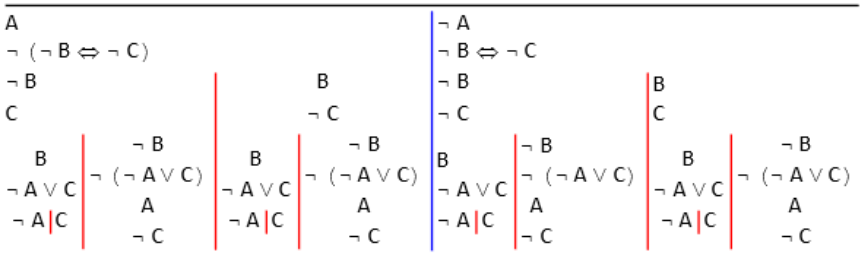
104.



$\neg A \wedge \neg B \wedge \neg C$

105.

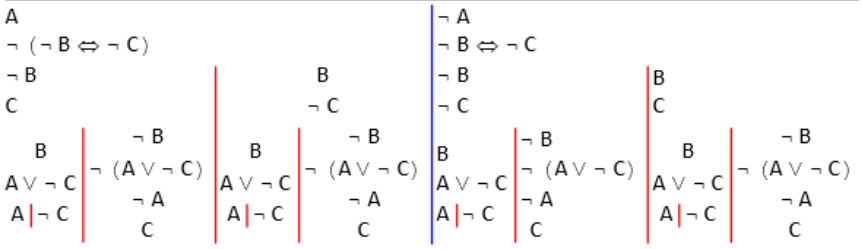
$A \veebar (\neg B \Leftrightarrow \neg C)$
$B \Leftrightarrow \neg A \vee C$



$\neg A \wedge B \wedge C$

106.

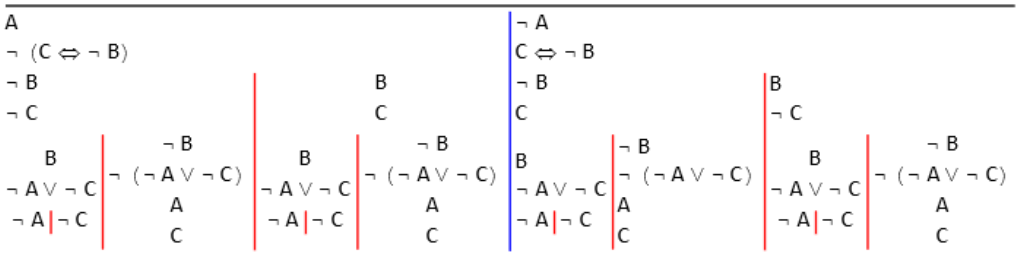
$A \veebar (\neg B \Leftrightarrow \neg C)$
$B \Leftrightarrow A \vee \neg C$



$A \wedge B \wedge \neg C$

107.

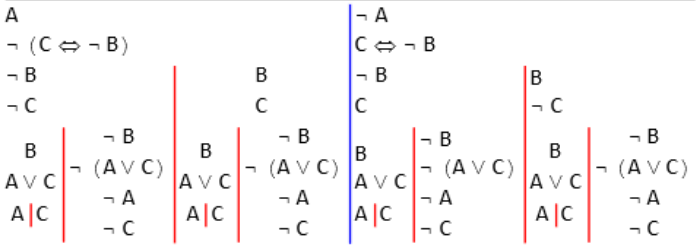
$A \veebar (C \Leftrightarrow \neg B)$
$B \Leftrightarrow \neg A \vee \neg C$



$\neg A \wedge B \wedge \neg C$

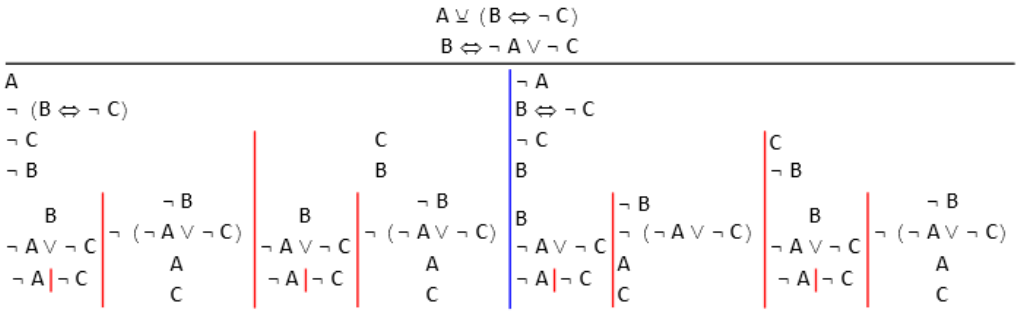
108.

$A \veebar (C \Leftrightarrow \neg B)$
$B \Leftrightarrow A \vee C$



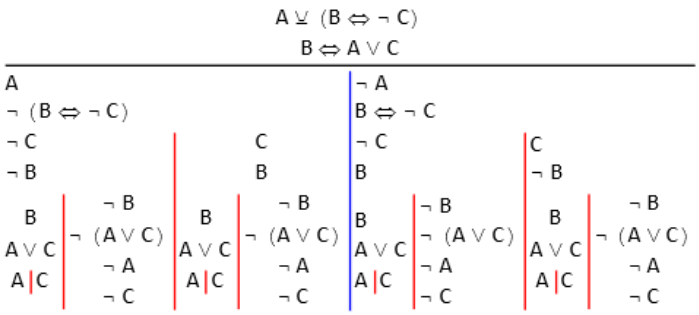
$A \wedge B \wedge C$

109.



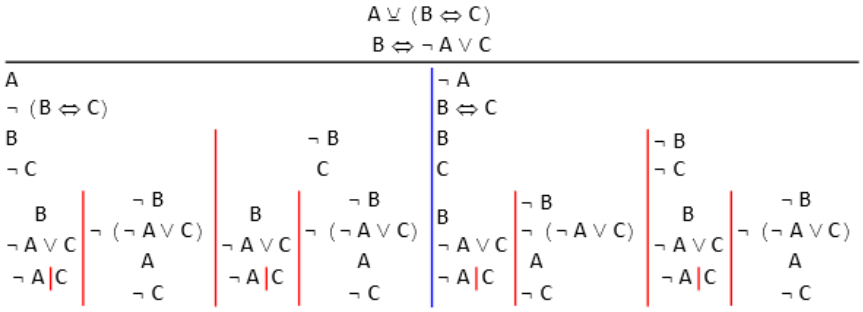
¬ A ∧ B ∧ ¬ C

110.



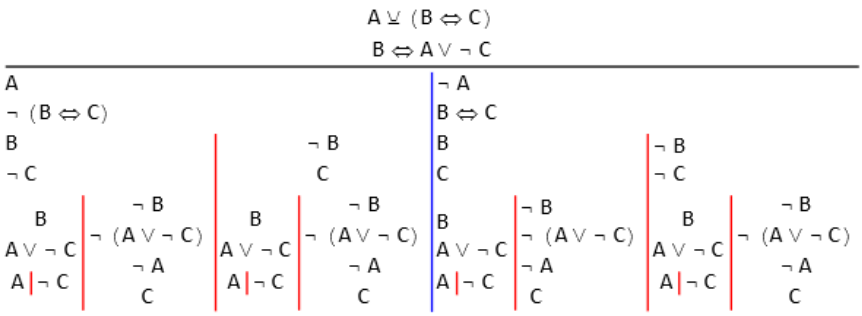
A ∧ B ∧ C

111.



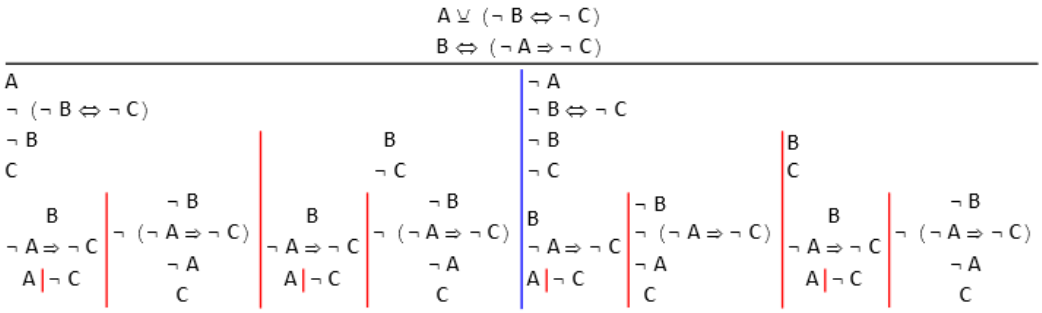
¬ A ∧ B ∧ C

112.



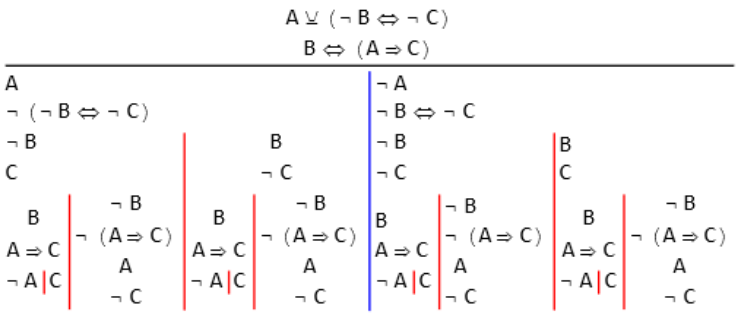
A ∧ B ∧ ¬ C

113.



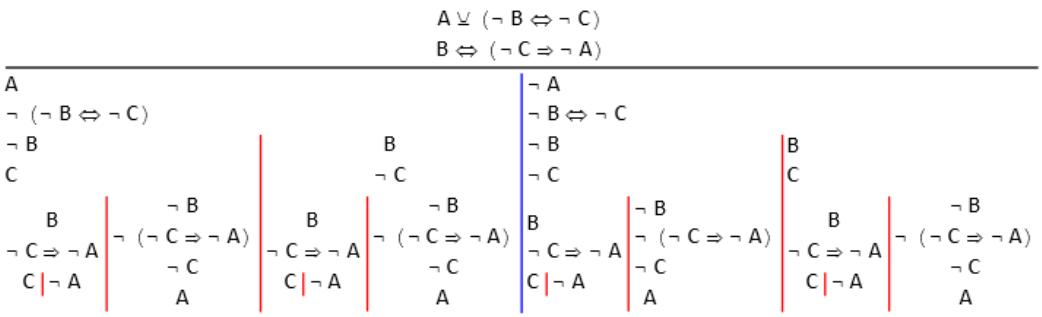
$A \wedge B \wedge \neg C$

114.



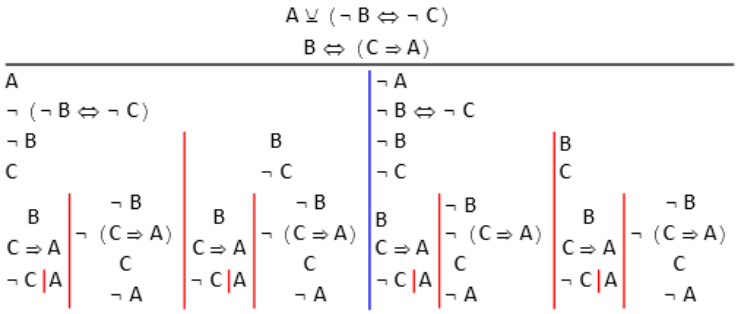
$\neg A \wedge B \wedge C$

115.



$\neg A \wedge B \wedge C$

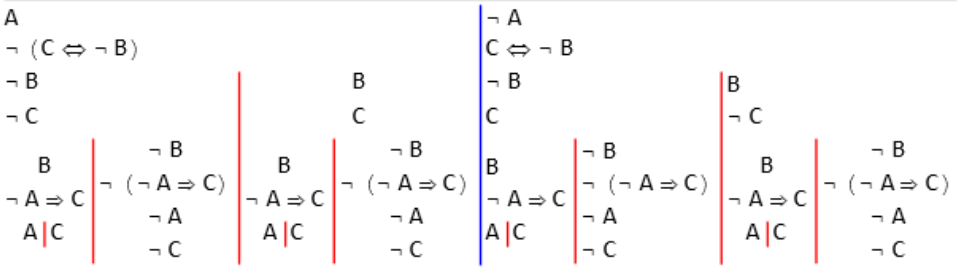
116.



$A \wedge B \wedge \neg C$

117.

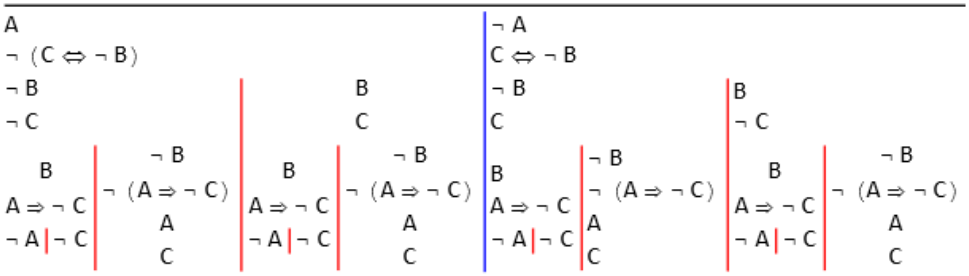
$A \veebar (C \Leftrightarrow \neg B)$
$B \Leftrightarrow (\neg A \Rightarrow C)$



$A \wedge B \wedge C$

118.

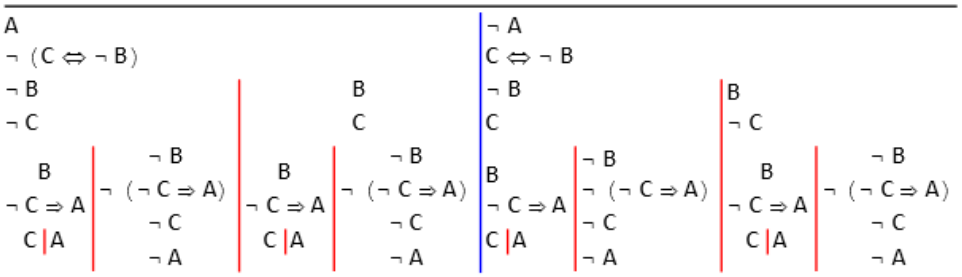
$A \veebar (C \Leftrightarrow \neg B)$
$B \Leftrightarrow (A \Rightarrow \neg C)$



$\neg A \wedge B \wedge \neg C$

119.

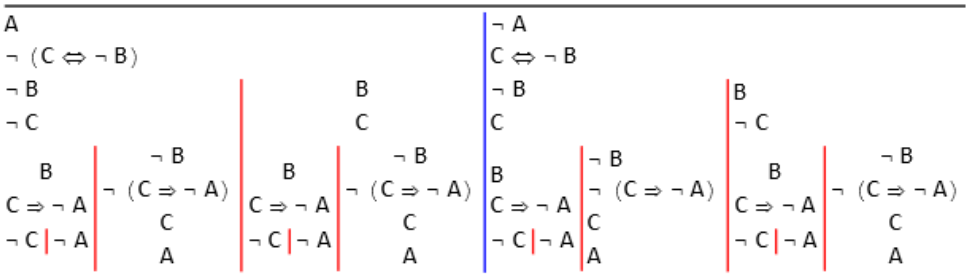
$A \veebar (C \Leftrightarrow \neg B)$
$B \Leftrightarrow (\neg C \Rightarrow A)$



$A \wedge B \wedge C$

120.

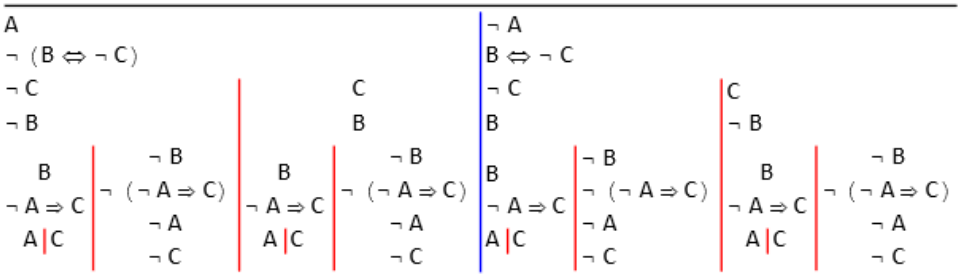
$A \veebar (C \Leftrightarrow \neg B)$
$B \Leftrightarrow (C \Rightarrow \neg A)$



$\neg A \wedge B \wedge \neg C$

121.

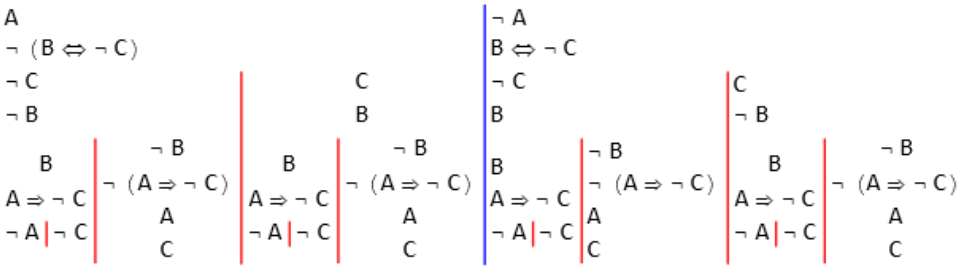
$A \veebar (B \Leftrightarrow \neg C)$
$B \Leftrightarrow (\neg A \Rightarrow C)$



$A \wedge B \wedge C$

122.

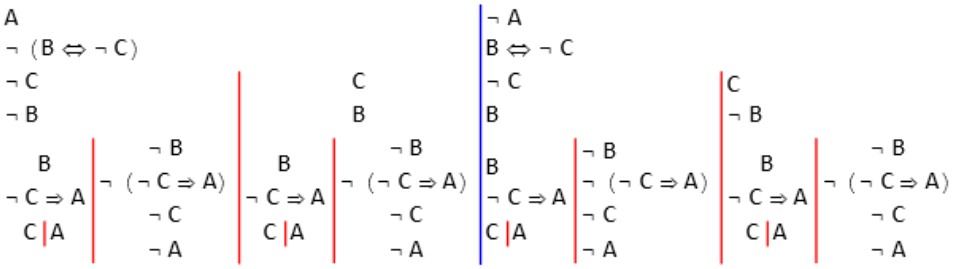
$A \veebar (B \Leftrightarrow \neg C)$
$B \Leftrightarrow (A \Rightarrow \neg C)$



$\neg A \wedge B \wedge \neg C$

123.

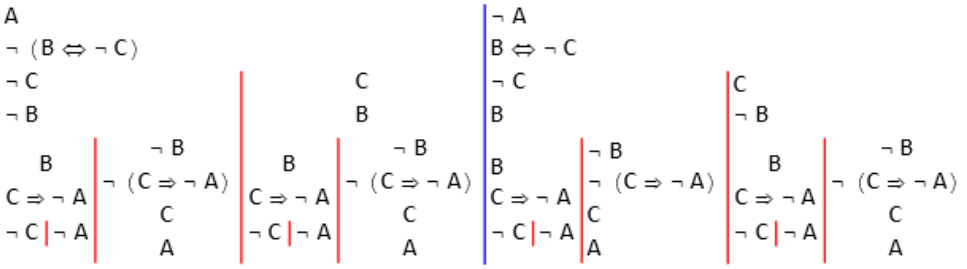
$A \veebar (B \Leftrightarrow \neg C)$
$B \Leftrightarrow (\neg C \Rightarrow A)$



$A \wedge B \wedge C$

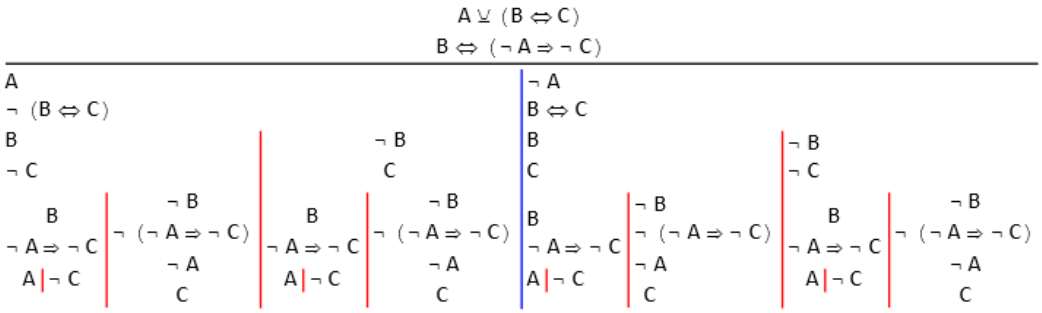
124.

$A \veebar (B \Leftrightarrow \neg C)$
$B \Leftrightarrow (C \Rightarrow \neg A)$



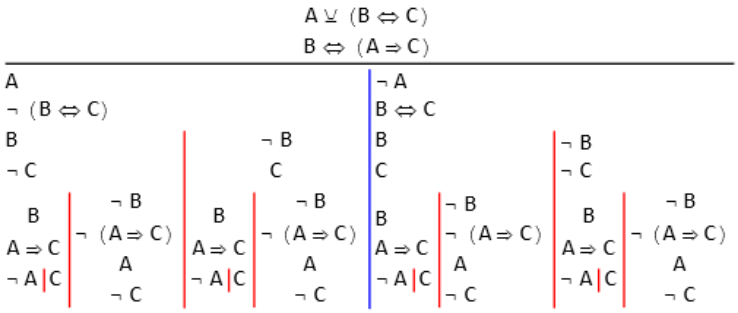
$\neg A \wedge B \wedge \neg C$

125.



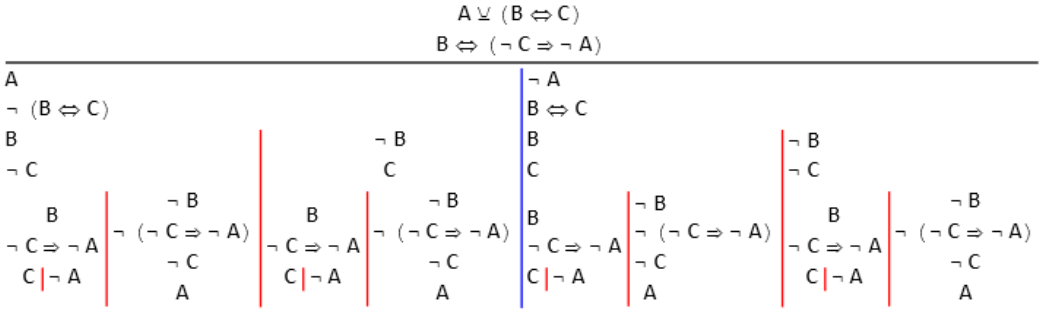
$A \wedge B \wedge \neg C$

126.



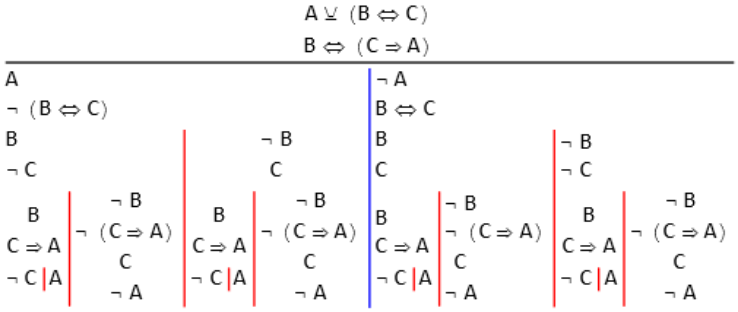
$\neg A \wedge B \wedge C$

127.



$\neg A \wedge B \wedge C$

128.



$A \wedge B \wedge \neg C$

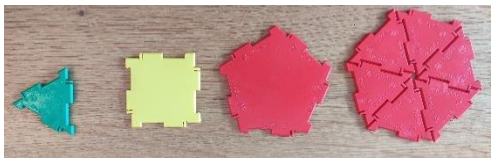
Preko igre s sistemom JOVO do boljše prostorske predstave pri petletniku

V Slovarju slovenskega knjižnega jezika je igra otroška dejavnost, navadno skupinska, za razvedrilo, zabavo (izmišljali so si različne igre; čas so si preganjali z igrami/igrali so se gnilo jajce in druge igre).

Že grški in rimski misleci (Platon in Kvintilian) so se zavzemali za to, da bi učenje organizirali tako, da bi ga otroci vzljubili in bi si pri tem pomagali skozi igro.
V zgodovini so nekateri psihologi ločevali igro in delo – učenje ter nasprotovali mešanju igre in učenja pri pouku, Furlan pa poudarja, da se igra in učenje ne izključujeta, pač pa ravno obratno. Pravi, da je lahko učenje z igro, zlasti za mlajšega otroka, najbolj uspešno (Ugotavljanje matematičnega znanja, str. 104).

Poznamo več vrst didaktičnih iger (simbolne, igre s pravili, konstrukcijske igre). Konstrukcijske igre imajo zmeraj konkretno gradivo, ki ga otrok oblikuje po svoje. Vedno imajo končni izdelek, ki je lahko pripomoček v igri. Ni vedno nujno, da bo izdelek uporaben, lahko je samo učencu, ki ga je naredil, v veselje. Zlasti bo učenec vesel, če bo deležen priznanja, potem ko ga pokaže odraslim ali sošolcem (Plot, 2013, str. 12).

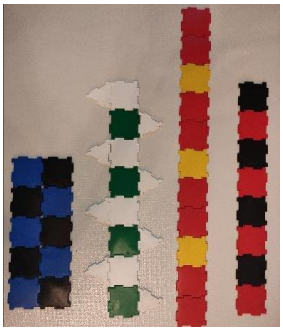
Sistem Jovo spada med konstrukcijske igre, s katerimi razvijamo prostorsko predstavljivost, domišljijo, ročne spretnosti, ustvarjalne sposobnosti in logično mišljenje ter kombinatoriko. Sistem sestavljajo enakostranični trikotniki, kvadrati in pravilni petkotniki v šestih barvah. Od drugih podobnih sistemov se odlikuje po sorazmerni čvrstosti spoja, kar omogoča izdelavo modelov tudi z več elementi (Sistem Jovo, b. d.). Omogoča sestavljanje geometrijskih teles iz likov, torej iz dveh dimenzij v tri dimenzije.
Za igro s petletnikom sem izbrala osnovni sistem JOVO SISTEM I, ker pri svojem poklicu opažam, da ima kar nekaj otrok težave s poimenovanjem likov in teles, ločevanjem med liki in telesi, prepoznavanjem osnovnih gradnikov geometrijskih teles (kateri in koliko likov) in na sploh s prostorsko predstavo.
Za začetek sem si postavila cilj, da se petletnik spozna z osnovnimi gradniki in jih prepozna ter jih zna poimenovati.

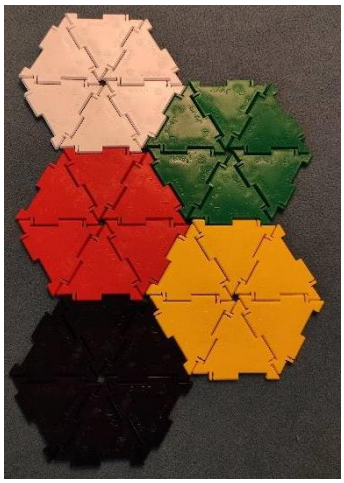


Z razvrščanjem likov iz škatle sva utrdila tudi štetje ter razvrščanje ploščic po barvi in obliki.



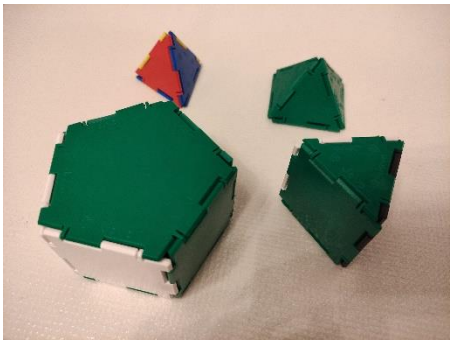
Ko je usvojil poimenovanje osnovnih likov, sva se lotila tlakovanja in sestavljanja vzorcev. Petletniki na začetku lažje sestavljajo tako, da dve ploščici pritisnejo ob površino, ker imajo manj moči in ročnih spretnosti. Sčasoma, ko se spoznajo s ploščicami, sestavljajo tudi v zraku.
Za začetek sem vzorec sestavila, otrok pa ga je moral nadaljevati. Težavnost sem sproti stopnjevala. Zanimiva nadgradnja igre je, da sva zamenjala vlogi.



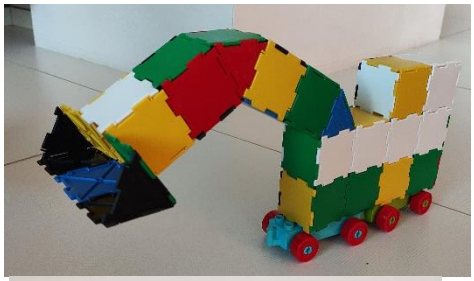
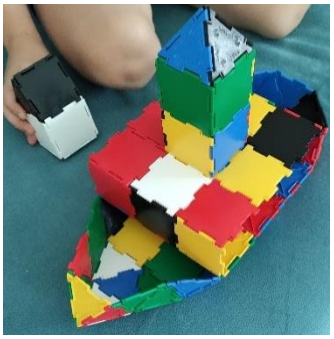


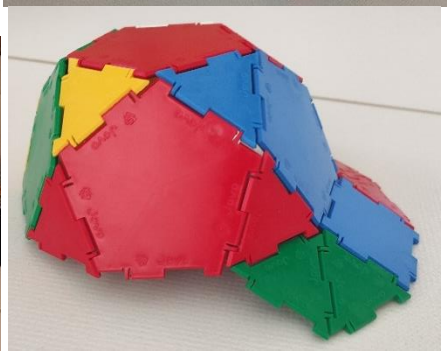
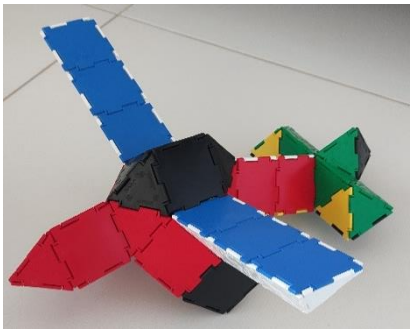

Otrokom pri tej starosti lažje nadaljevati vzorec, če opazujejo, kako se gradi. Kadar dobijo že narejen vzorec, potrebujejo več časa (sploh pri težjih zaporedjih), da prepoznajo osnovni gradnik in nadaljujejo.

Na koncu sva prešla v sestavljanje geometrijskih teles. Za začetek sva sestavila kocko. Otroci so zelo navdušeni, ko jim uspe samostojno sestaviti geometrijsko telo. Ploskve teles so lahko različnih ali enakih barv. Zanimivo je, kako hitro si petletnik skozi igro zapomni poimenovanja osnovnih geometrijskih teles. Opazila sem tudi, da po večkratnem igranju otrok točno ve, koliko likov in katere si mora pripraviti, da sestavi na primer kocko, četverec in dvanajsterec.

Otroci pa se seveda navdušujejo tudi nad zahtevnejšimi konstrukcijami, ki so naslikane na škatli sistema Jovo in v navodilih, ki jih prejmeš v paketu. Veliko zanimivih idej pa lahko najdeš tudi na spletnih straneh. Te konstrukcije so za petletnike še prezahtevne, zato sva jih sestavljala skupaj.

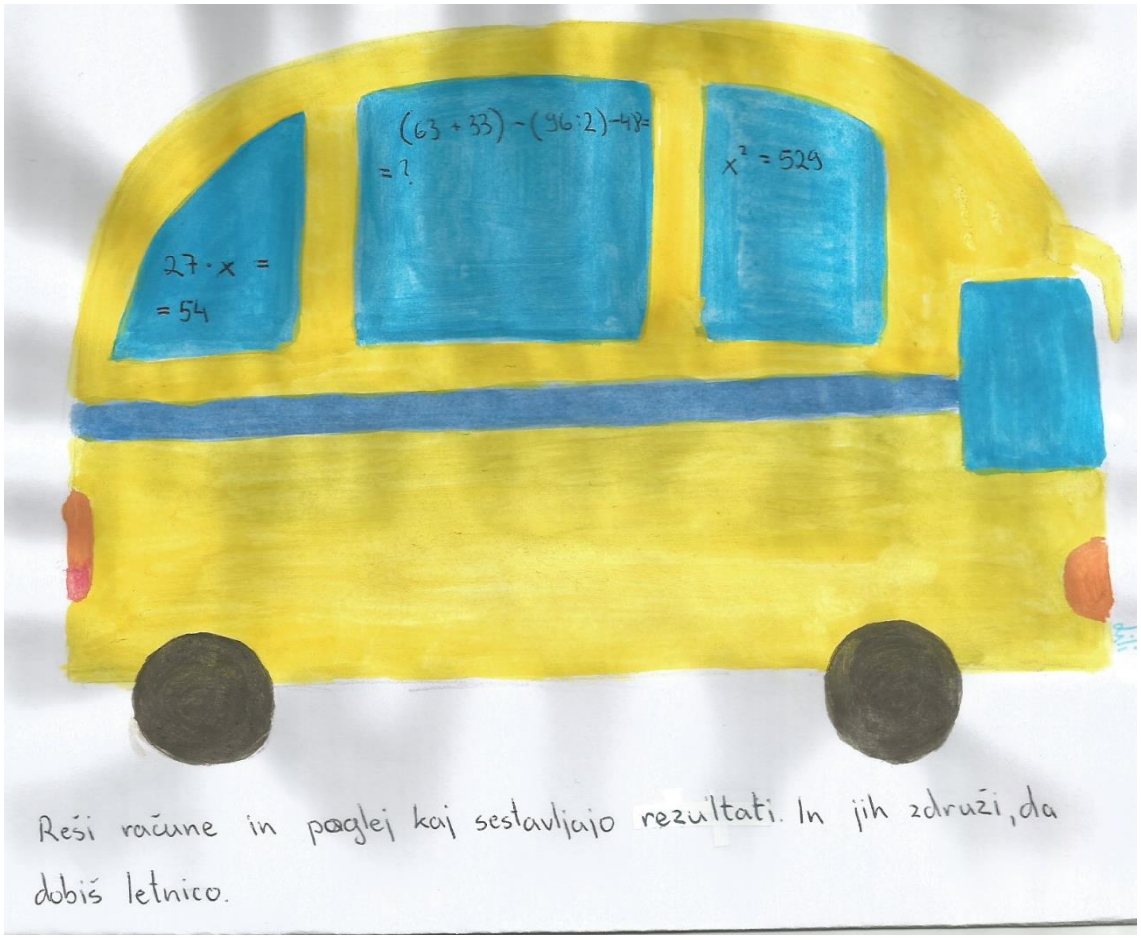
Nad Jovo sistemom I sva bila navdušena. Otroci se nevede učijo tudi vztrajnosti in potrpežljivosti. Vsekakor bova sestavljala tudi v bodoče, verjetno še kompleksnejša telesa, zato ga bova nadgradila z Jovo sistemom II, ki vsebuje še šestkotnike, rombe in enakokrake trikotnike dveh vrst.

Viri:

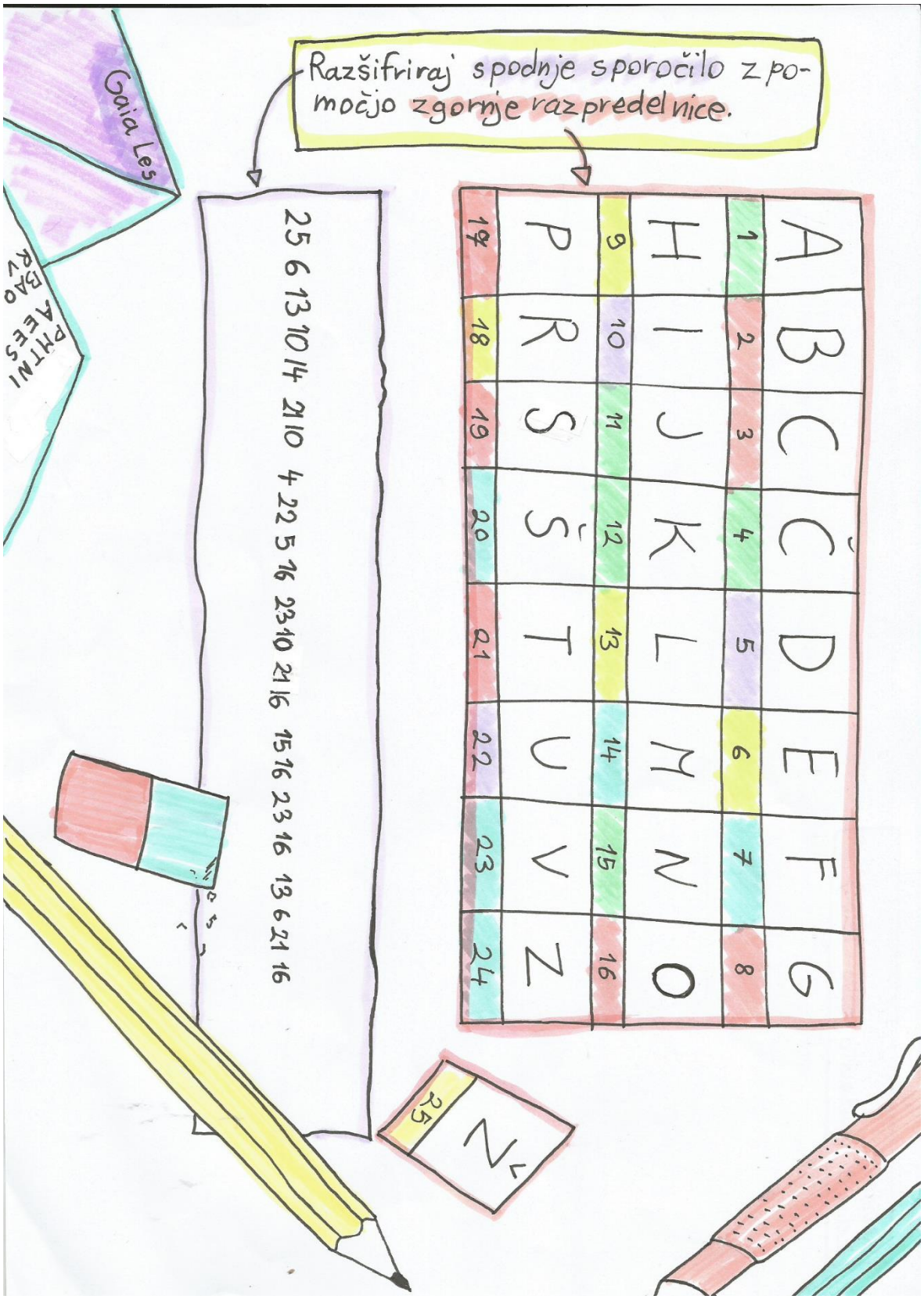
Sistem Jovo (b. d.). Pridobljeno s http://www.logika.si/jovo/index.htm
Predlog učnega načrta za vsebino Poliedri v vrtcu in nižjih razredih OŠ (z uporabo sistema Jovo) (b. d.). Pridobljeno s http://www.logika.si/jovo/unacrtvrtec.htm
Suban, M. e (2022) *Ugotavljanje matematičnega znanja*. Ljubljana: ZRSŠ. Pridobljeno s UgotavljanjeMatematicnegaZnanja (1).pdf
Plot, P. (2013, maj). *Uporaba didaktičnih iger pri začetnem opismenjevanju v prvem in drugem razredu devetletne osnovne šole* (Diplomsko delo, Pedagoška fakulteta). Pridobljeno s http://pefprints.pef.unilj.si/1527/1/Diplomsko_delo_-_Petra_Plot_.pdf

Rebusi učencev Waldorfske šole Savinja

Učiteljica Tjaša Černoša je pomislila na svoje devetošolce, med katerimi je nekaj zelo ustvarjalnih učencev in jim predlagala, da sestavijo nekaj ugank. Pri rednih urah matematike je povabila k sodelovanju učence, da ustvarijo zanimivo uganko na dano temo. Učenci so se z veseljem povabilu odzvali in nastalo je nekaj zanimivih in izvirnih izdelkov, ki jih objavljamo.



Avtorica: Lili



Avtorica: Gaia



Avtorica: Elina

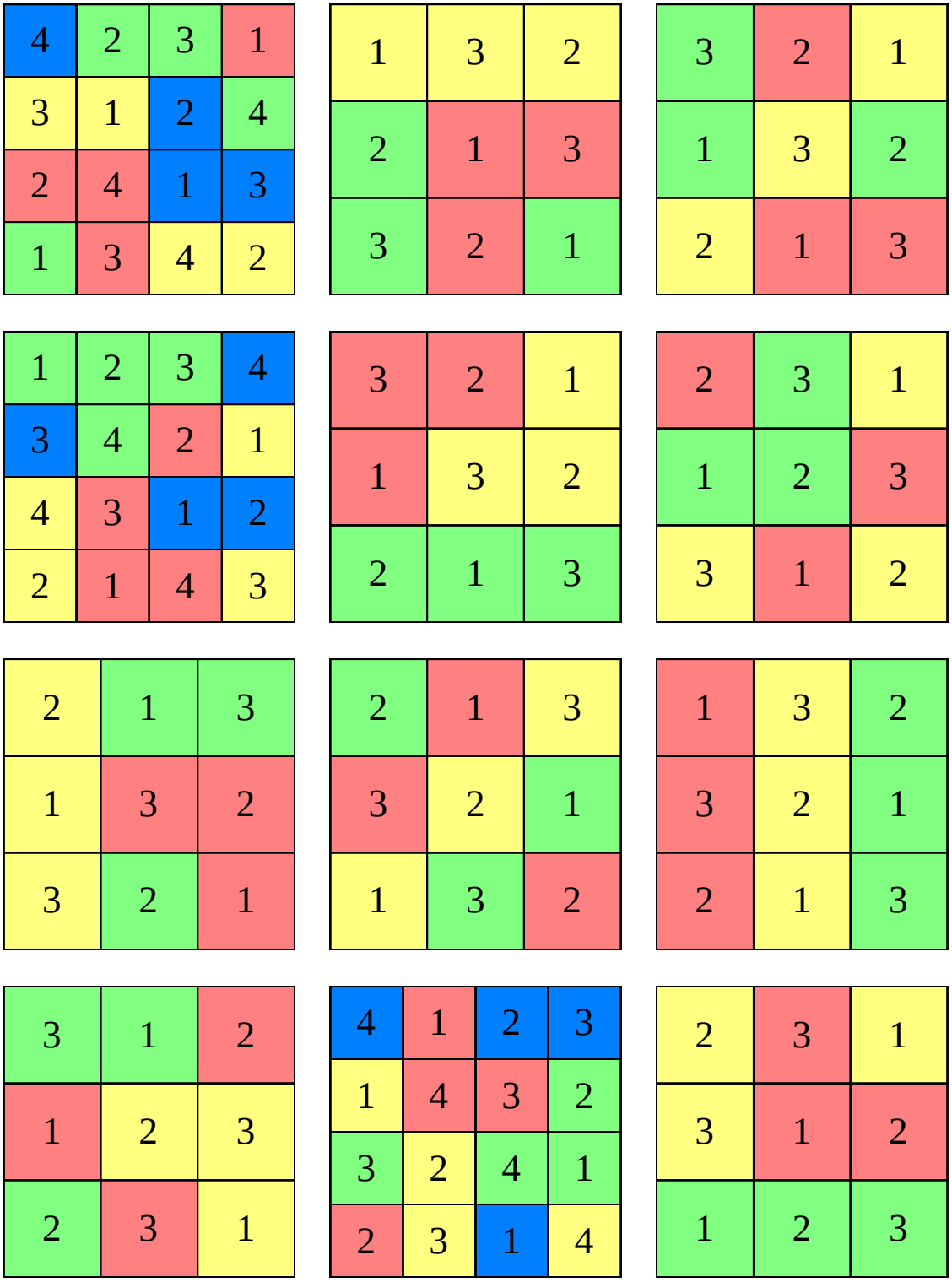


Avtorica: Keira

Rešitve

Barvni sudoku

1.



2.

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

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

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

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

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

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

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

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

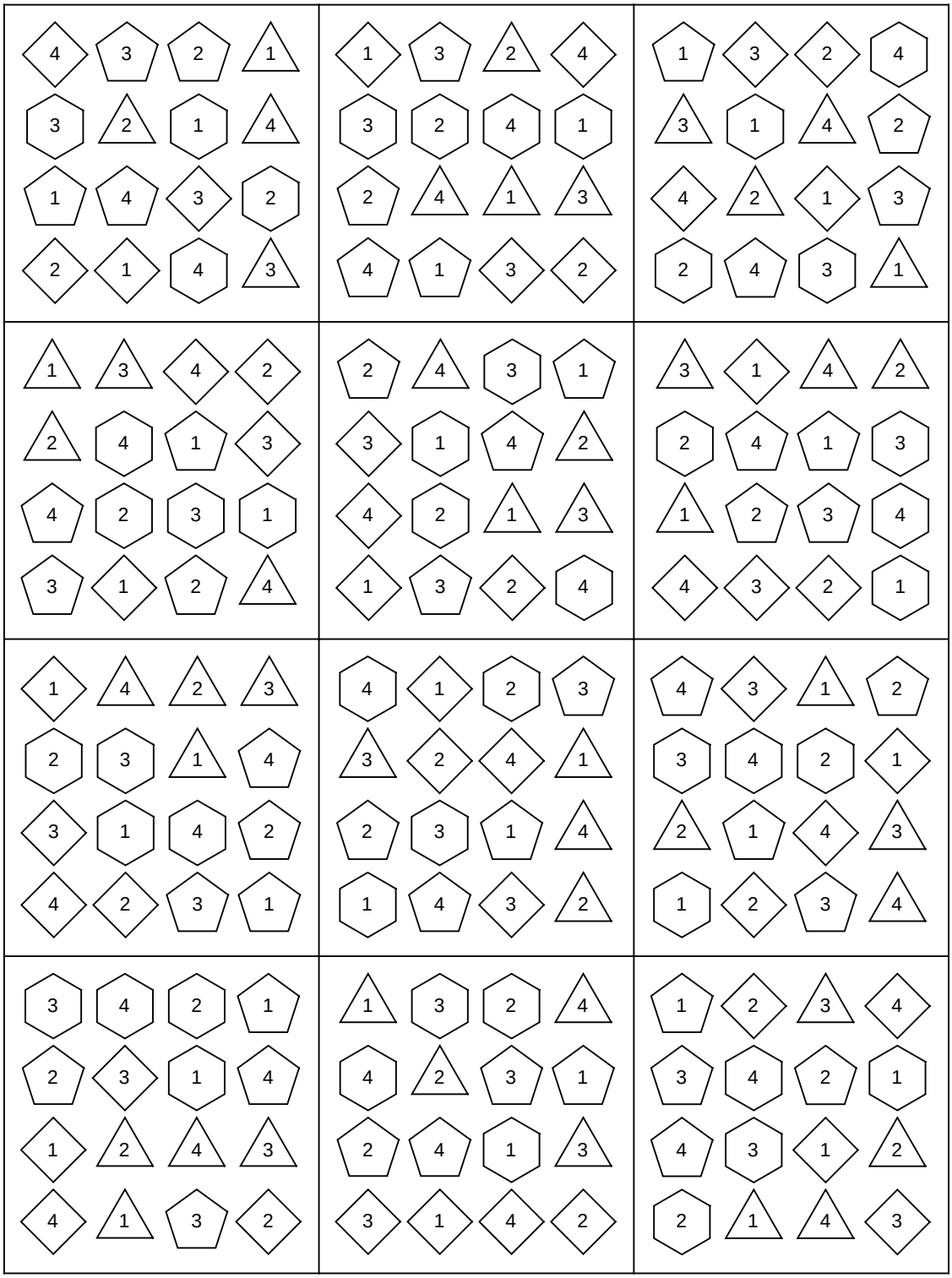
2	5	4	1	3
4	1	2	3	5
3	2	5	4	1
5	3	1	2	4
1	4	3	5	2

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

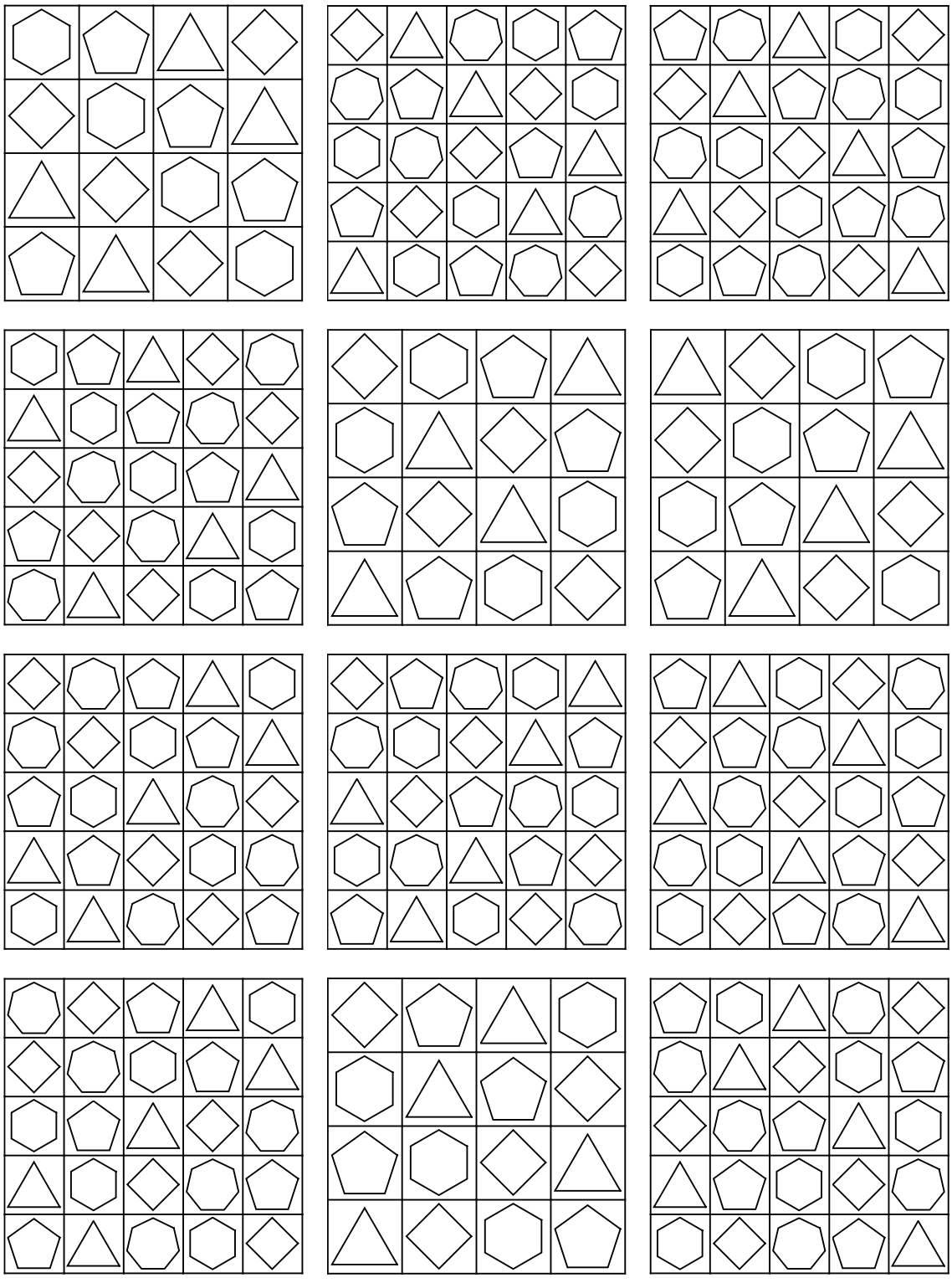
5	1	3	4	2
3	4	1	2	5
4	5	2	3	1
1	2	4	5	3
2	3	5	1	4

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

Sudoku z večkotniki



Latinski kvadrati



Sudoku s črkami

E 5	C 4	B 2	E 3	A 1
E 2	C 5	C 3	B 1	A 4
B 4	E 1	A 5	A 2	B 3
C 1	D 3	E 4	B 5	C 2
A 3	D 2	D 1	D 4	D 5

B 3	C 5	B 1	D 4	E 2
A 1	B 4	E 3	A 2	B 5
B 2	A 3	D 5	D 1	A 4
E 4	E 1	D 2	E 5	C 3
A 5	C 2	C 4	D 3	C 1

A 3	C 1	D 2	A 4	C 5
D 5	D 3	E 1	C 2	D 4
A 2	A 5	C 4	B 1	C 3
A 1	E 4	B 5	E 3	E 2
B 4	B 2	B 3	E 5	D 1

A 1	C 5	D 4	D 3	C 2
D 5	E 2	B 1	B 4	A 3
C 3	E 1	D 2	E 5	C 4
E 4	E 3	A 5	B 2	C 1
A 2	A 4	B 3	D 1	B 5

B 4	E 5	C 1	D 3	D 2
E 3	C 4	B 5	C 2	A 1
B 1	C 3	B 2	A 5	D 4
E 2	E 1	A 3	A 4	C 5
D 5	A 2	E 4	D 1	B 3

D 2	A 1	E 3	C 4	B 5
E 1	C 2	D 5	A 3	B 4
D 3	C 5	E 4	C 1	B 2
A 4	B 3	A 2	A 5	D 1
E 5	D 4	B 1	E 2	C 3

E 2	C 4	A 3	A 5	E 1
C 3	B 1	B 5	A 2	B 4
E 4	C 2	C 1	B 3	D 5
D 1	E 5	D 2	D 4	D 3
C 5	E 3	A 4	A 1	B 2

A 4	B 3	B 2	E 1	A 5
A 1	E 2	D 4	B 5	C 3
C 5	E 4	D 3	D 2	D 1
A 2	D 5	B 1	A 3	B 4
E 3	C 1	E 5	C 4	C 2

E 1	B 3	A 5	C 4	C 2
E 2	A 4	A 3	C 1	E 5
C 3	A 1	A 2	C 5	E 4
D 5	D 2	B 4	E 3	D 1
D 4	B 5	B 1	B 2	D 3

D 2	D 1	B 3	B 5	D 4
D 5	E 4	A 2	C 1	E 3
D 3	B 2	C 5	B 4	B 1
C 4	A 5	E 1	A 3	C 2
A 1	C 3	A 4	E 2	E 5

E 1	E 2	B 4	D 3	C 5
A 3	D 5	B 2	D 4	A 1
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D 2	C 4	B 5	C 1	E 3
A 5	B 1	C 3	A 2	A 4

A 5	B 2	B 1	B 3	D 4
E 3	C 1	E 4	D 2	E 5
C 2	A 4	A 3	B 5	D 1
E 1	C 5	A 2	B 4	C 3
C 4	D 3	D 5	A 1	E 2

Futoshiki

1.

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1	3	4	2

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2	1	4	3

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1	3	2
3	2	1

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1	2	3

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2.

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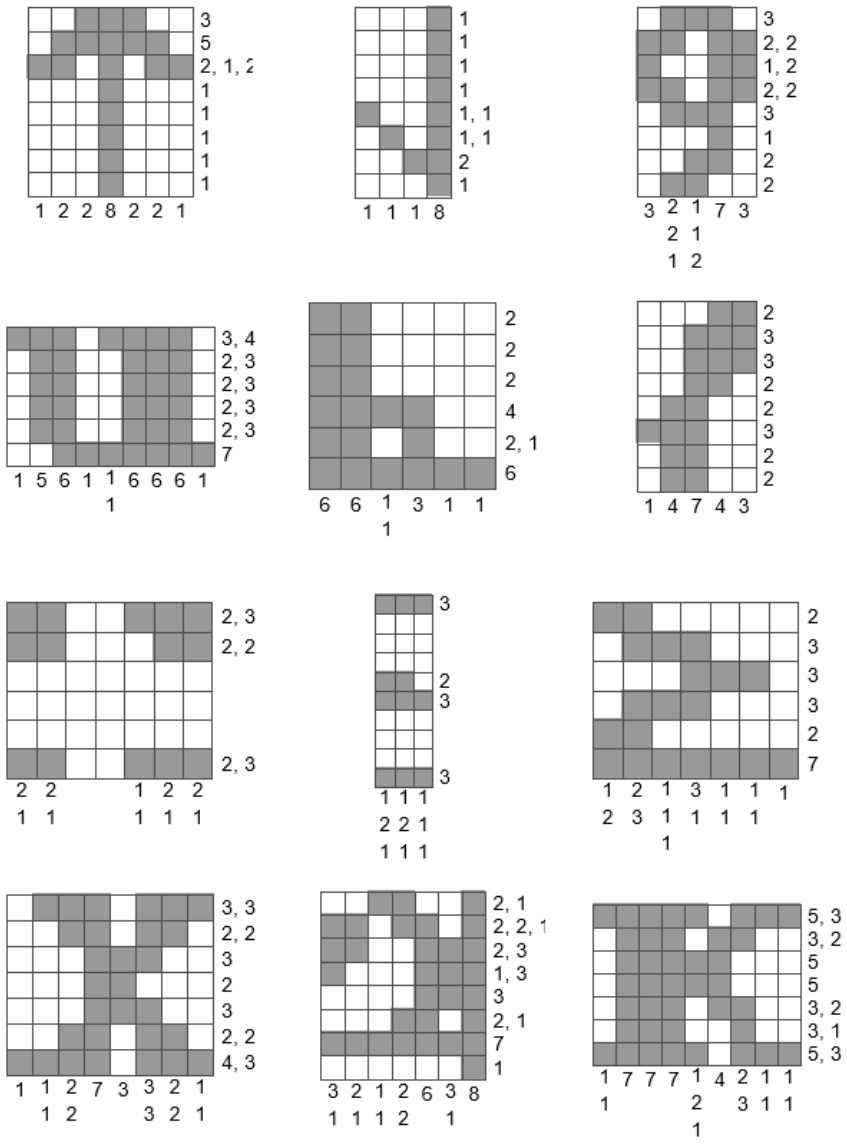
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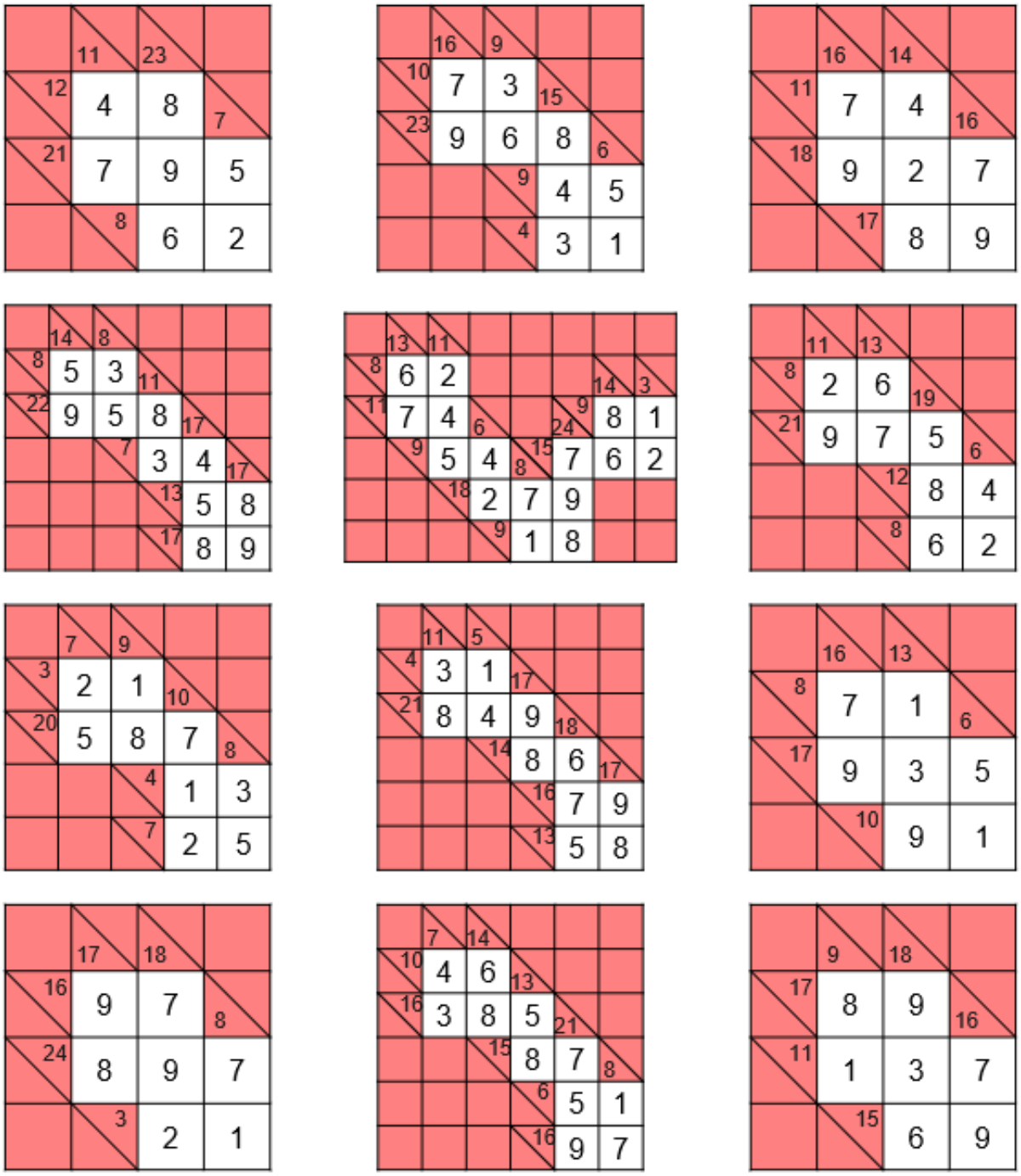
Razpored znakov

A C B	A B C
D C A B	C A D B
B D A E C	C B D A E
E C D A B	E A D B C

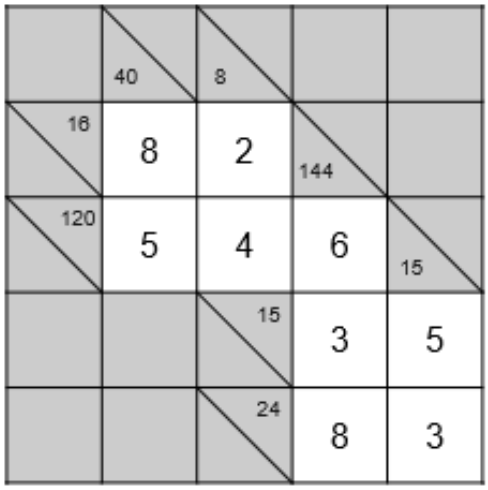
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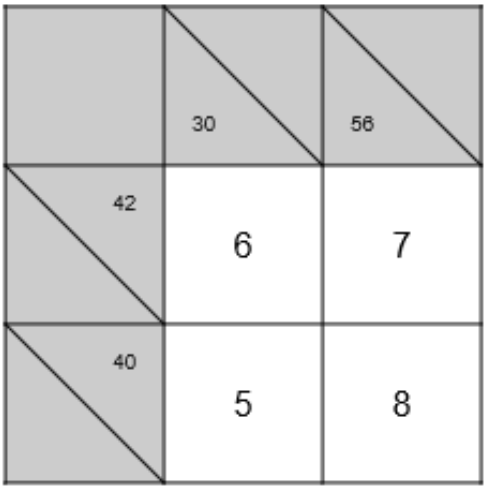


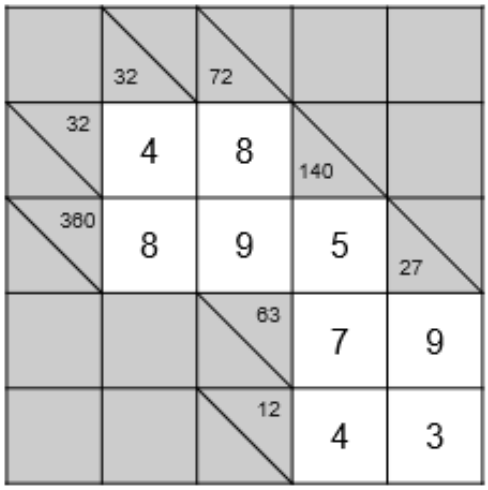
Križne vsote

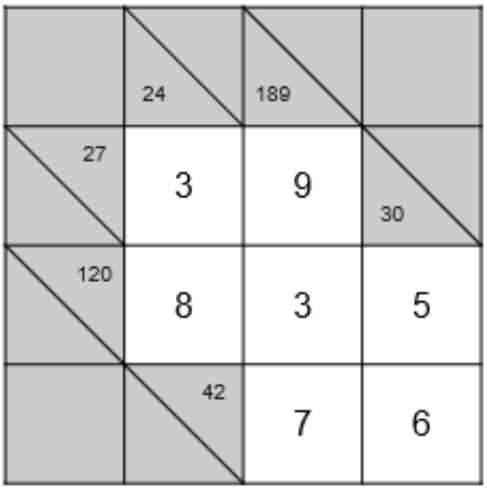


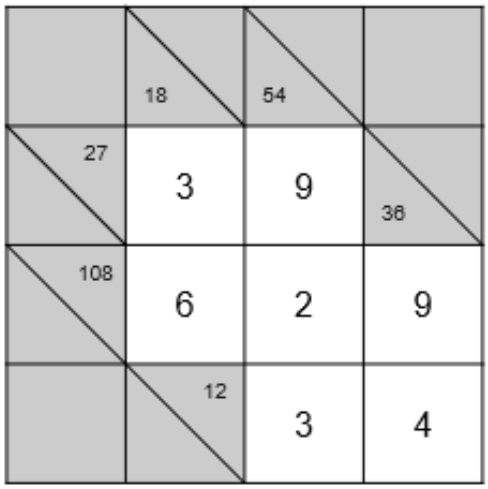
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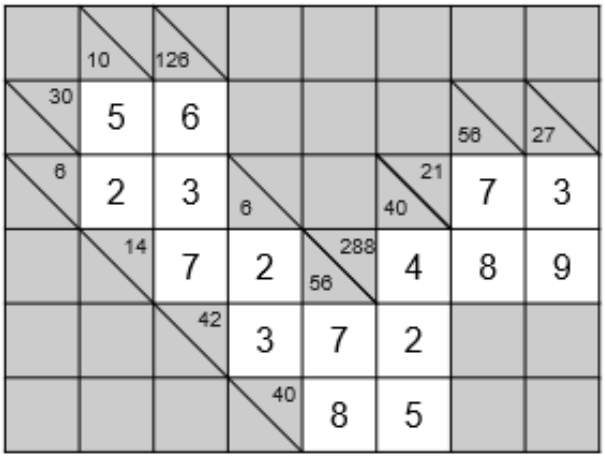




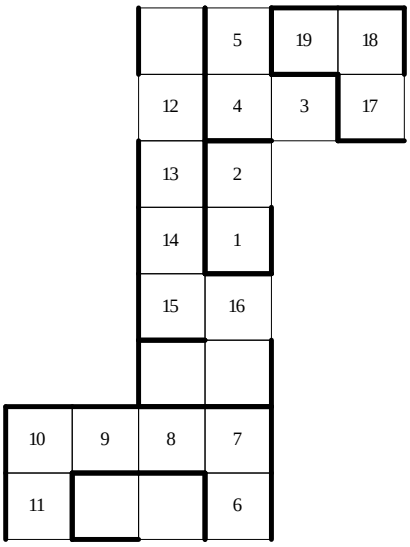


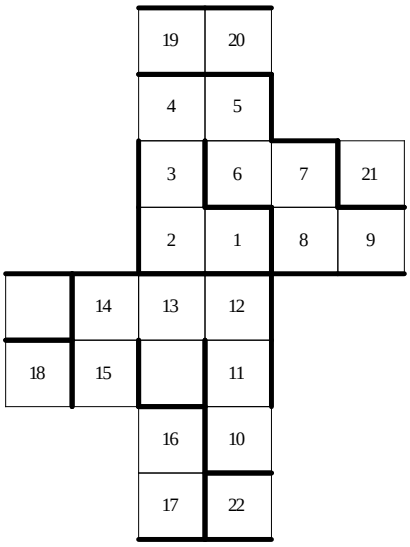


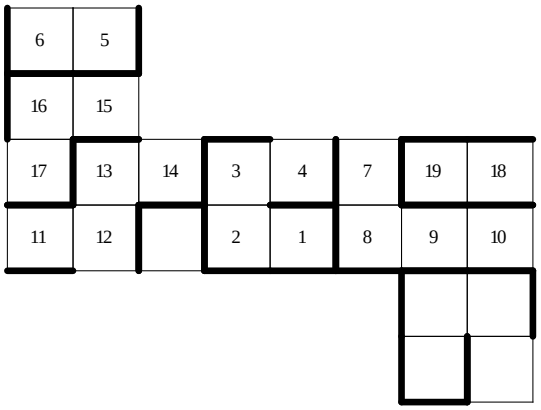


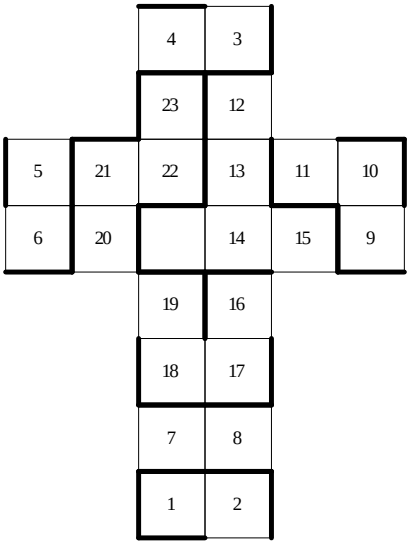


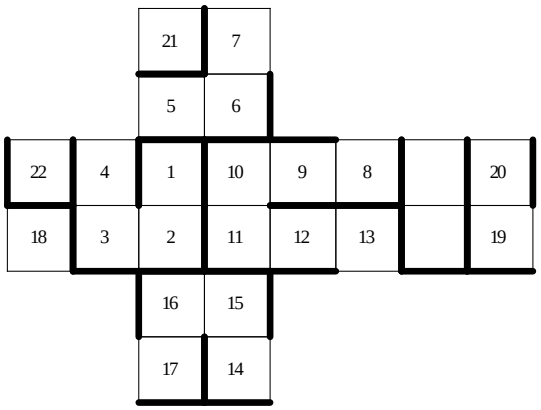
Labirint na kocki

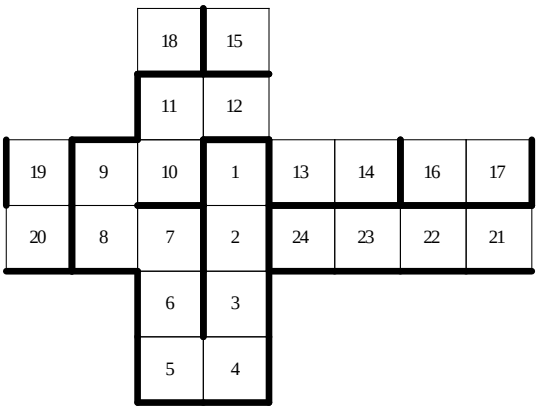




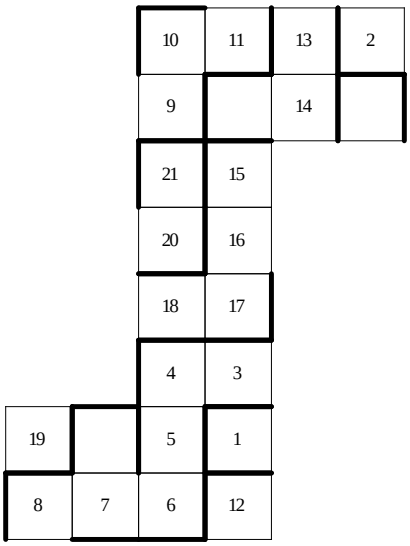


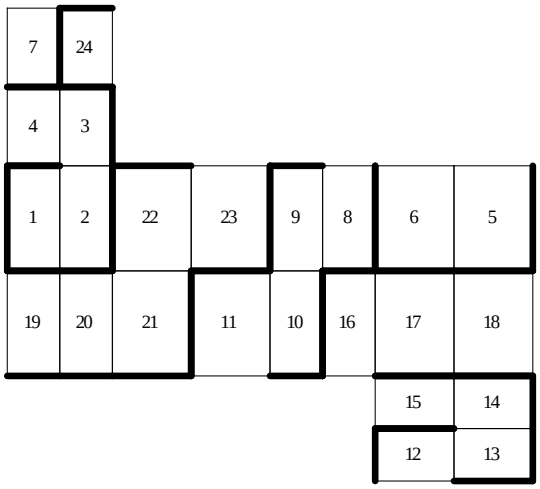


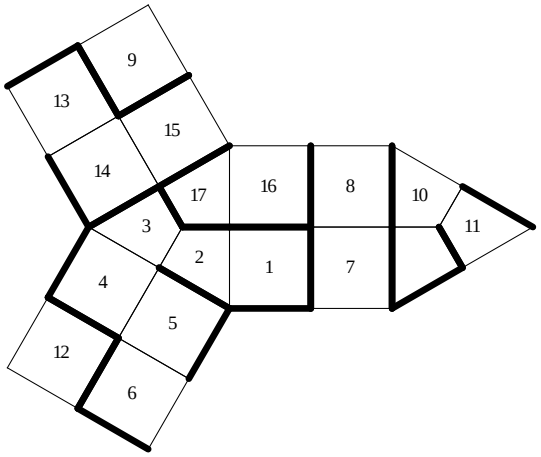


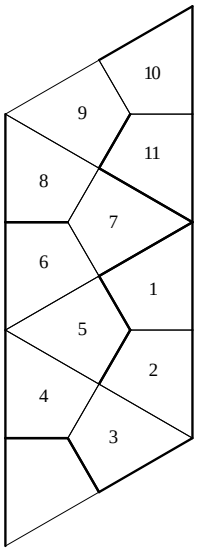


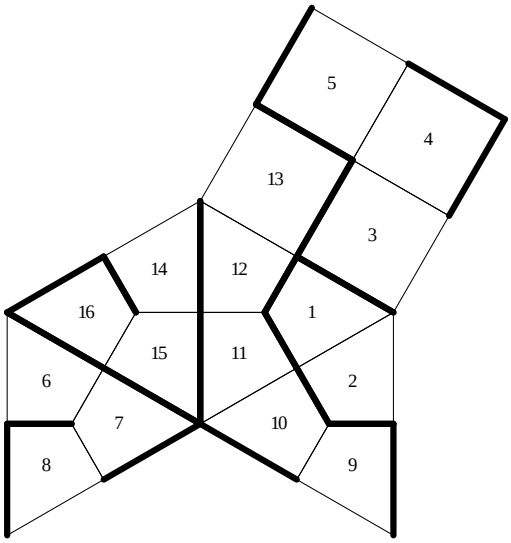
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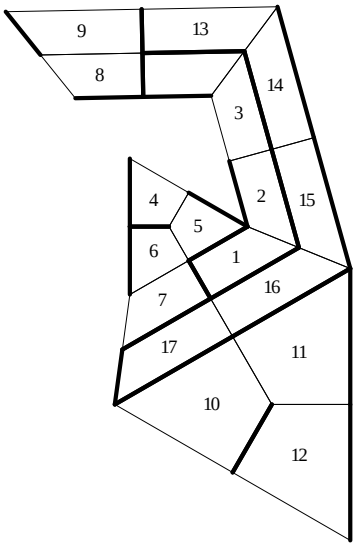






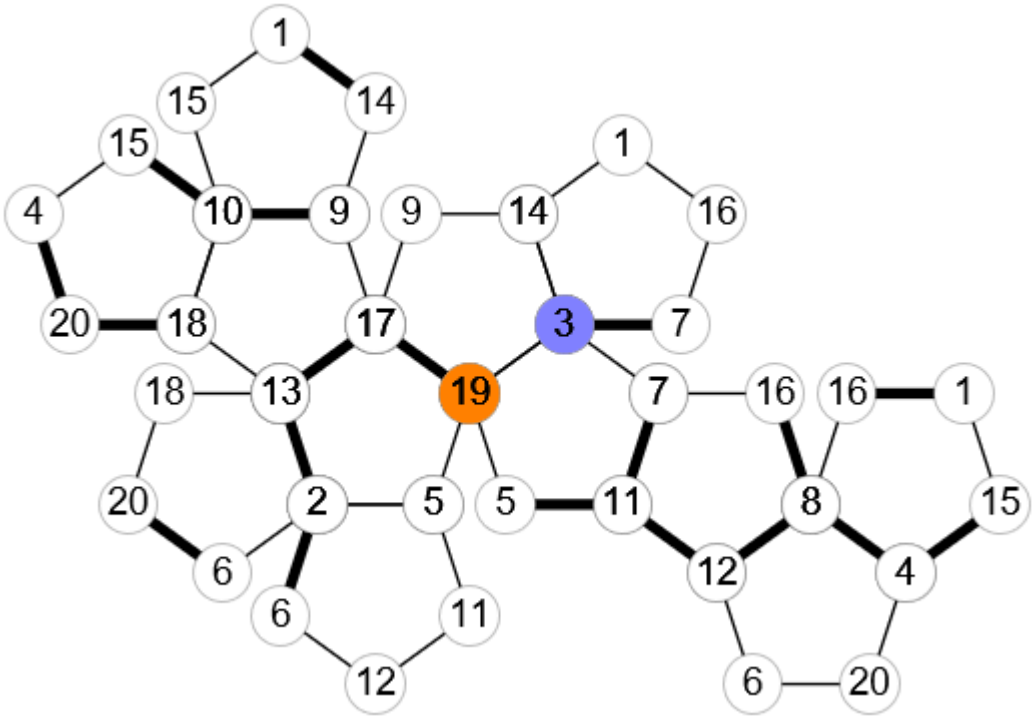






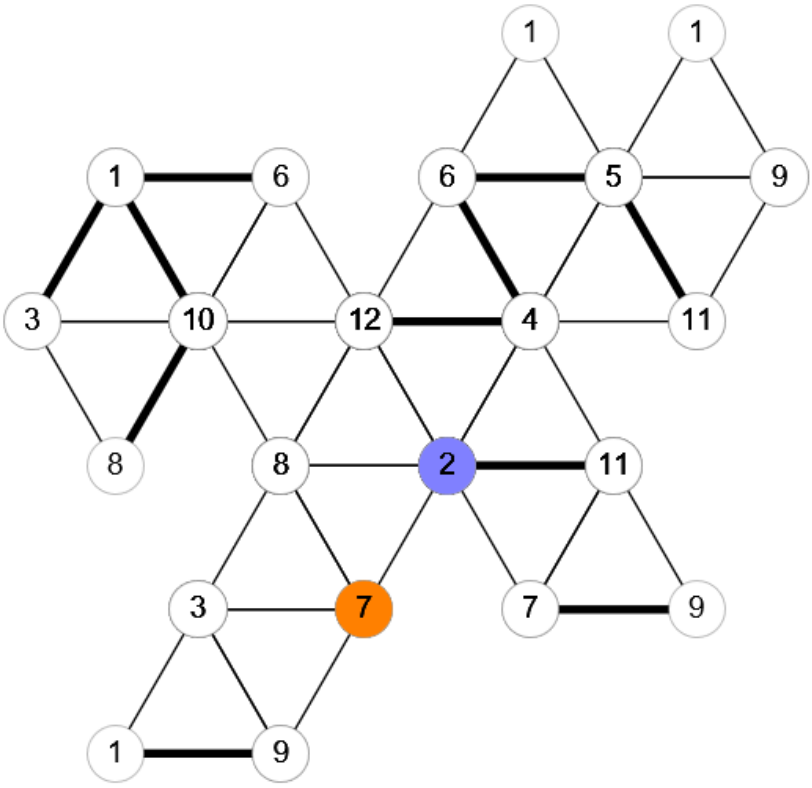
Labirinti na robovih poliedra

1.



{19,17,13,2,6,20,4,8,12,11,7,3}

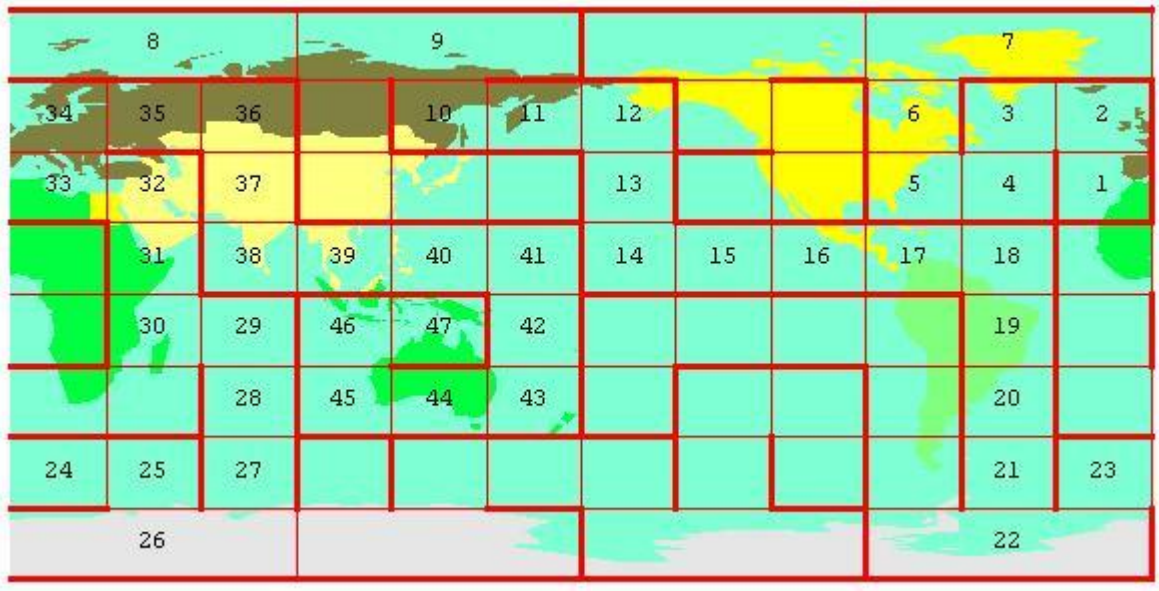
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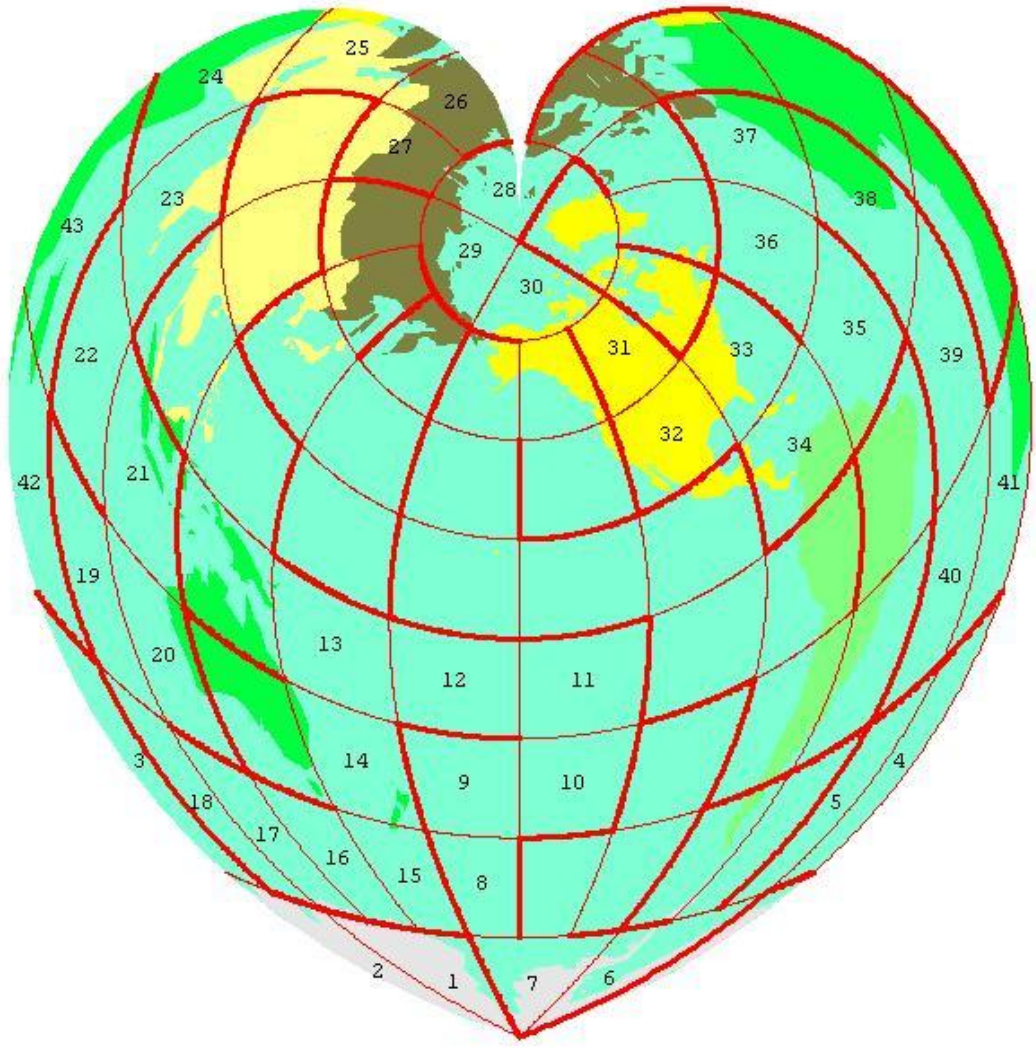
{7,9,1,6,5,11,2}

Labirint na zemljevidu

1.



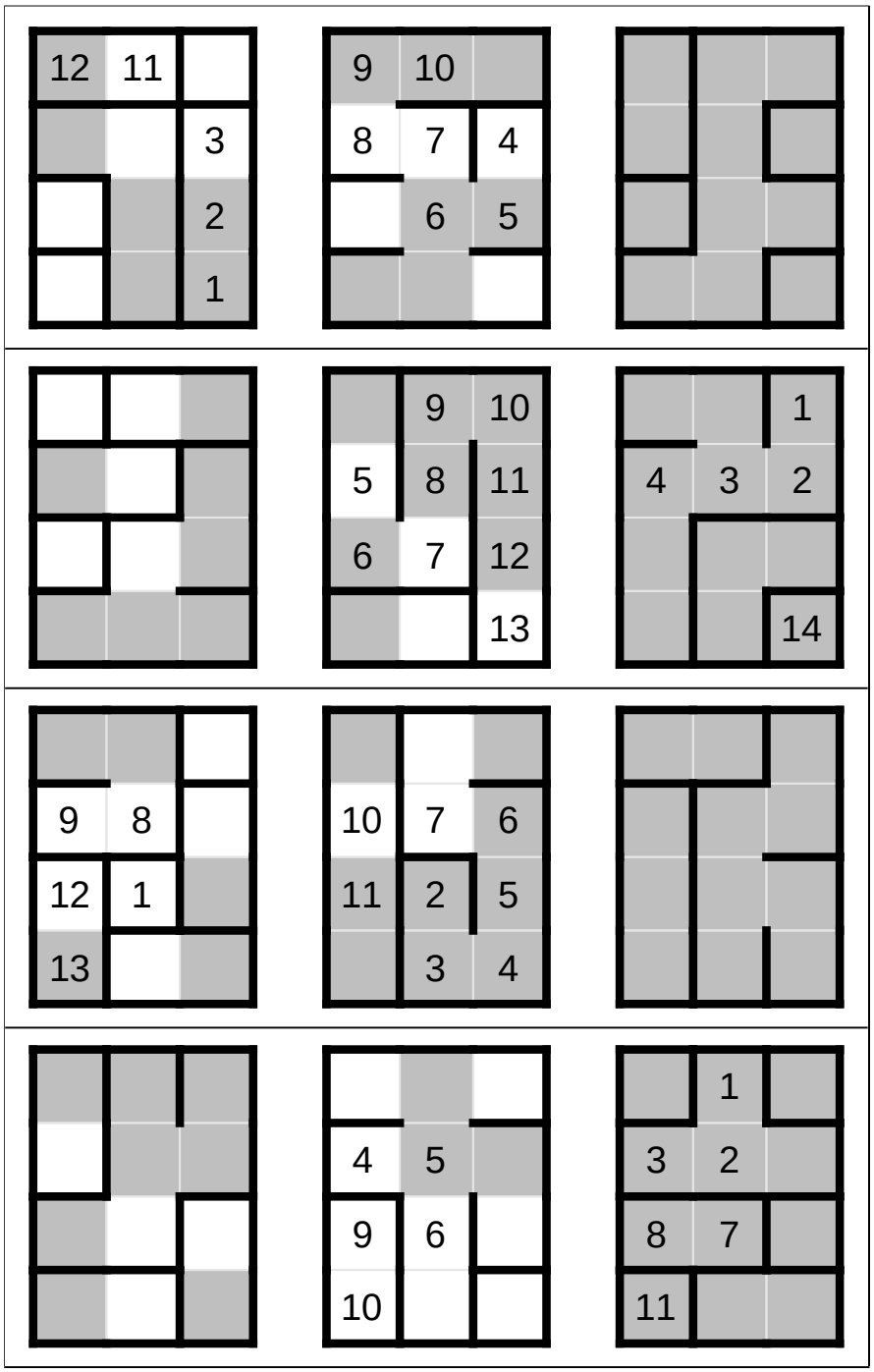
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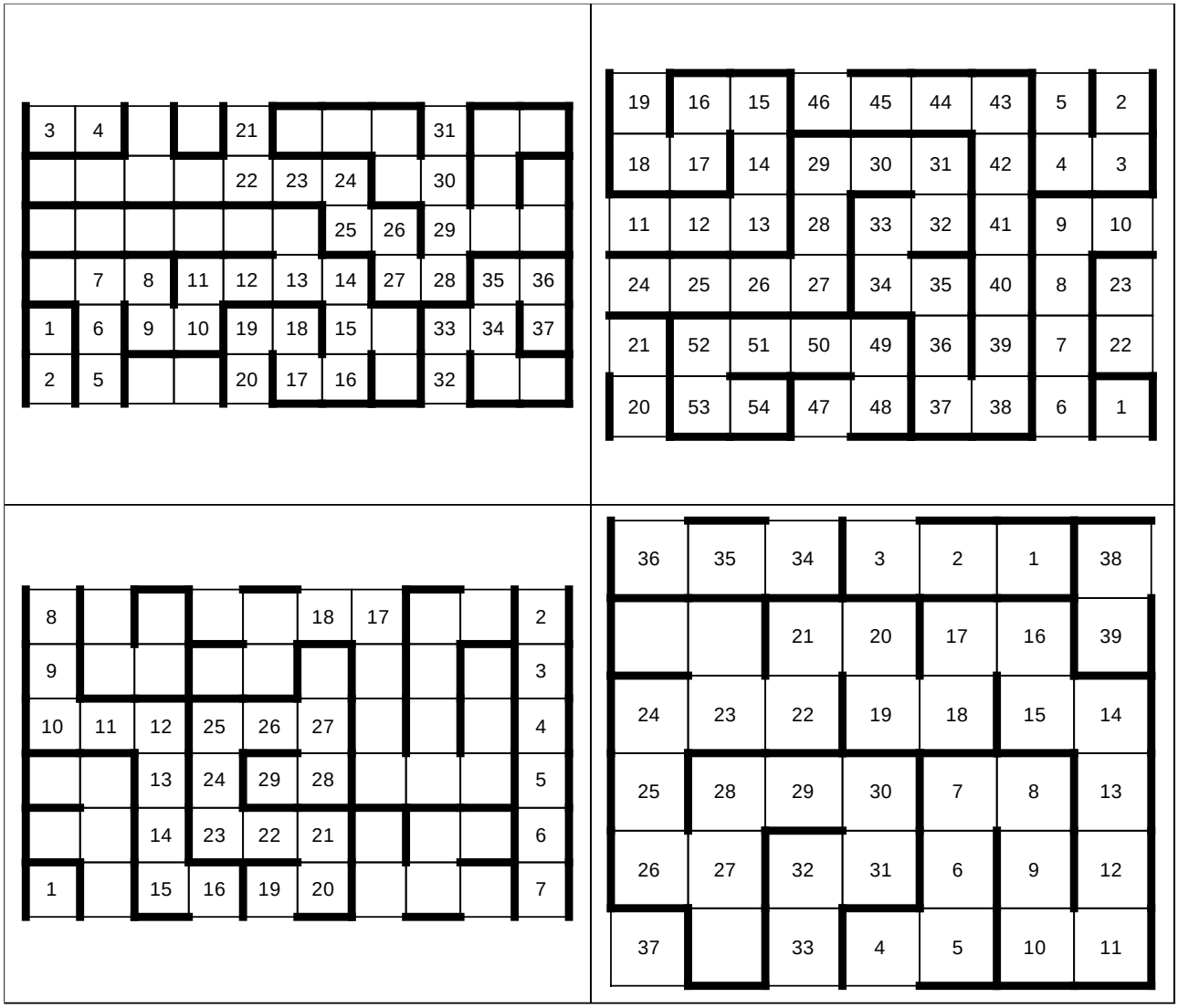
Odstranjene kocke

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64 100 116
61  65  80
60  64  56
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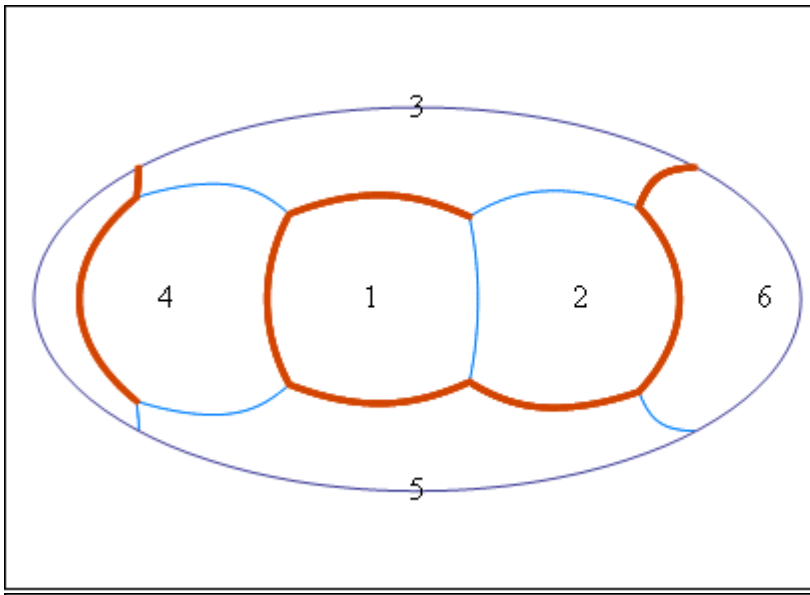
Labirint v kvadru

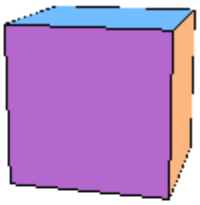


Labirint na ploskvah

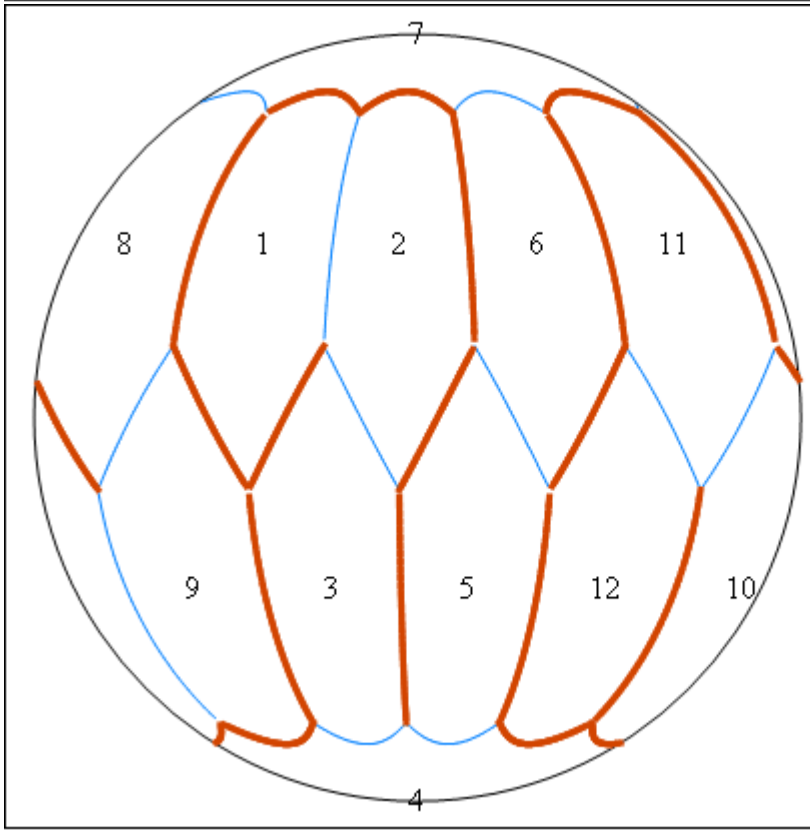


Labirint na projekcijah teles





število mejnih ploskev	6
število robov	12
število oglišč	8
tip rotacijske simetrije	Oh

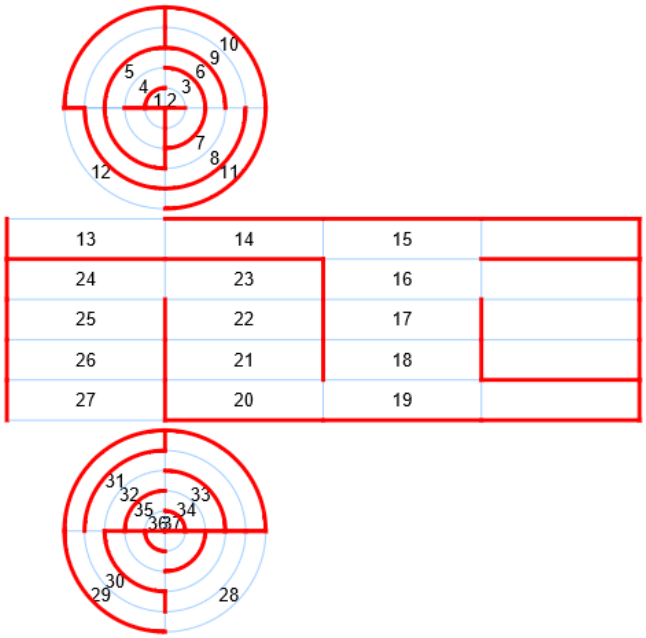




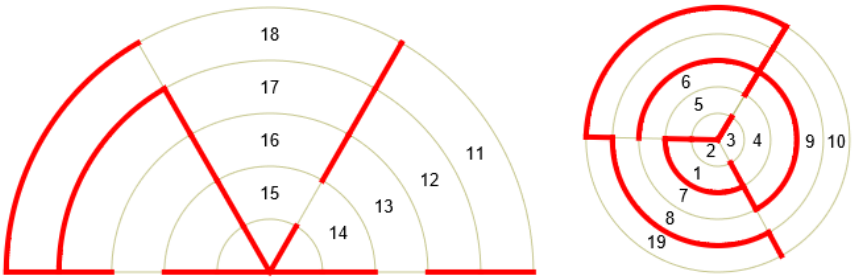
število mejnih ploskev	12
število robov	30
število oglišč	20
tip rotacijske simetrije	Ih

Labirinti na mreži valja in stožca

1.

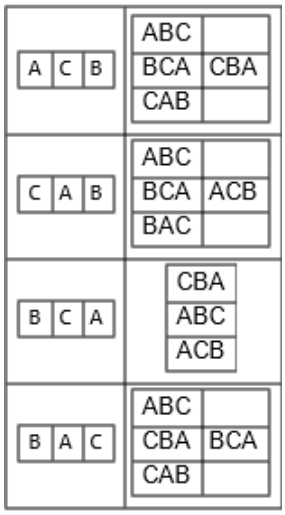


2.



Analiziraj pogoje nalog

B C A	CBA ACB CAB BAC
A C B	ABC BCA CBA BAC CAB
B C A	BAC CBA ACB ABC
B A C	ABC ACB CBA BCA CAB



Logična naloga

Iva, Reno, arabec, Ljubljana
Jana, Blisk, lipicanec, Medvode
Nina, King, lisjak, Maribor
Dora, Tornado, poni, Lendava

Naloga v esperantu

Jana, Reno, poneo
Ella, Floberto, arabo
Maja, Tornado, vulpo
Ada, Sxtormo, islandano

Rešitve rebusov

2023, ŽELIM TI ČUDOVITO LETO, Rešitev: dva ti soč tri in dvajset (2023), 2023.

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E-mail: **info @ logika.si**
Spletna stran: http://www.logika.si
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Član časopisnega sveta: *prof. dr. Tomaž Pisanski*
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Jezikovni pregled: *Besana*
Naslovnica: *Maša Bratkovič*

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