

Killer Problems and Solutions.

For an understanding of killer candidates, see the Subpattern Analysis textbook. The section on Killer Candidates, starting on page 2, is followed by the section on Killer Solutions on page 10.

Killer Problem No. 1

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

Killer Problem No. 2

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

Killer Problem No. 3

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

Killer Problem No. 4

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

Killer Problem No. 5

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

Killer Problem No. 6

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

Killer Problem No. 7

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

Killer Problem No. 8

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

Killer Problem No. 9

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

Killer Problem No. 10

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

Killer Problem No. 11

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

Killer Problem No. 12

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

Killer Problem No. 13

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

Killer Problem No. 14

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

Killer Problem No. 15

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

Killer Problem No. 16

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

Killer Problem No. 17

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

Killer Problem No. 18

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

Killer Problem No. 19

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

Killer Problem No. 20

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

Killer Problem No. 21

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

Killer Problem No. 22

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

Killer Problem No. 23

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

Killer Problem No. 24

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

Killer Problem No. 25

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

Killer Problem No. 26

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

Killer Problem No. 27

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

Killer Problem No. 28

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

Killer Problem No. 29

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

Killer Problem No. 30

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

Killer Problem No. 31

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

Killer Problem No. 32

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

Killer Problem No. 33

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

Killer Problem No. 34

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

Killer Problem No. 35

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

Killer Problem No. 36

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

Killer Problem No. 37

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

Killer Problem No. 38

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

Killer Problem No. 39

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

Killer Problem No. 40

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

Killer Problem No. 41

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

Killer Problem No. 42

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

Killer Problem No. 43

Killer Problem No. 44

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

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

Killer Problem No. 45

Killer Problem No. 46

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

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

Killer Problem No. 47

Killer Problem No. 48

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

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

Killer Solution No. 1 (2 killers)

		1_1	1_2		1_K			
	1_2							
					1_2			
		1_2	1_1		1_K			

Killer Solution No. 2 (3 killers)

					1_1		1_K	1_2
			1_2					1_1
			1_1		1_2			1_K
			1_K				1_{12}	

Killer Solution No. 3 (1 killer)

2_{12}								2_3
		2_3				2_{12}		
2_K		2_1				2_3		2_2
2_3		2_2						2_1

Killer Solution No. 4 (1 killer)

				2_1			2_{23}	
			2_{23}				2_1	
			2_1	2_2		2_3	2_K	
				2_3		2_{12}		

Killer Solution No. 5 (1 killer)

		3_{12}				3_3		
3_3								3_{12}
				3_1	3_{23}			
		3_K			3_1	3_2		3_3
		3_3		3_2		3_1		
3_{12}				3_3				

Killer Solution No. 6 (1 killer)

			3_3	3_4	3_{12}			
3_1			3_4	3_{23}				
		3_{234}		3_1				
3_{234}			3_1	3_K				
		3_1	3_2		3_{34}			

Killer Solution No. 7 (1 killer)

				9_{34}	9_{12}			
		9_{234}	9_1		9_K			
9_1			9_4	9_2	9_3			
		9_1	9_{23}		9_4			
9_{234}				9_1				

Killer Solution No. 8 (1 killer)

5_1							5_{234}	
	5_{234}					5_1		
5_{23}	5_1				5_4		5_K	
5_4					5_{12}	5_3		
					5_3	5_{24}	5_1	

Killer Solution No. 9 (1 killer)

	4 ₁	4 _K	4 ₃	4 ₂				
	4 ₂	4 ₃		4 ₁				
	4 ₃		4 ₁₂					
				4 ₃				4 ₁₂
		4 ₁₂						4 ₃

Killer Solution No. 10 (1 killer)

				4 ₁				4 ₂₃₄₅
			4 ₂₃₄	4 ₅		4 ₁		
				4 ₂		4 ₃₄₅		4 ₁
	4 ₁₄₅			4 ₃		4 ₂		4 _K
	4 ₂₃		4 ₁₅	4 ₄				

Killer Solution No. 11 (1 killer)

	9_{12}	9_{34}	9_5					
9_K	9_5				9_{1234}			
9_{13}	9_4	9_{25}						
9_{245}			9_{13}					
	9_3		9_{24}		9_5			9_1
		9_1						9_{2345}

Killer Solution No. 12 (1 killer)

				3_1	3_K			3_{23}
			3_{23}					3_1
3_{13}				3_2				
		3_2			3_{13}			
		3_{13}			3_2			
3_2			3_1	3_3				

Killer Solution No. 13 (2 killers)

					2_2	2_1		
			2_1		2_K		2_2	
					2_1	2_2		
			2_2			2_K	2_1	

Killer Solution No. 14 (2 killers)

	8_1	8_K			8_2			
	8_2			8_1				
		8_1		8_2				
	8_K	8_2			8_1			

Killer Solution No. 15 (2 killers)

3_{12}		3_3						
		3_{12}					3_3	
3_3						3_{12}		
	3_2	3_K				3_3	3_1	
3_K	3_{13}						3_2	

Killer Solution No. 16 (2 killers)

				8_K		8_1	8_{2345}	
			8_{123}	8_{45}				8_K
						8_{24}		8_{135}
			8_{45}	8_{23}			8_1	
				8_1		8_{35}		8_{24}

Killer Solution No. 17 (2 killers)

		5_{2345}				5_1		
5_1								5_{2345}
5_{234}				5_5				5_1
		5_1	5_K			5_2	5_{345}	
5_5			5_{123}	5_4				
			5_{45}			5_3	5_{12}	5_K
				5_{123}		5_{45}		

Killer Solution No. 18 (2 killers)

						9_1		9_{234}
				9_{234}			9_1	
			9_1			9_{234}		
	9_{13}		9_2				9_4	
			9_{34}				9_2	9_1
	9_{24}			9_1		9_K	9_3	9_K

Killer Solution No. 19 (3 killers)

			2_1	2_K	2_2			
				2_1		2_2		
			2_2				2_1	
			2_K	2_2		2_1		
				2_K	2_1		2_2	

Killer Solution No. 20 (3 killers)

	2_{23}	2_1		2_K				
		2_K	2_1					
		2_3						
	2_1	2_2	2_K	2_3				

Killer Solution No. 21 (3 killers)

	4_1	4_2						
				4_2				4_1
		4_1				4_2		
	4_2			4_K	4_1			4_K
					4_2	4_1		4_K
				4_1				4_2

Killer Solution No. 22 (3 killers)

4_1		4_2						
4_2							4_1	
4_K	4_1					4_2		
		4_1					4_2	
	4_2	4_K				4_1	4_K	

Killer Solution No. 23 (3 killers)

				2_3			2_{12}	
			2_{12}				2_K	2_3
2_2			2_3	2_K				2_1
				2_{12}			2_3	
2_{13}				2_K			2_K	2_2

Killer Solution No. 24 (3 killers)

	5 ₁		5 ₂₃					
	5 _K	5 ₂₃		5 ₁				
	5 ₂₃		5 ₁					
	5 _K		5 _K	5 ₂				5 ₁₃
		5 ₁		5 ₃				5 ₂

Killer Solution No. 25 (3 killers)

3_{12}				3_{345}				
3_3	3_{45}		3_{12}					
3_4	3_{123}				3_K			3_5
					3_{12345}	3_K		
3_5								3_{1234}
				3_1		3_{2345}		
			3_{345}	3_2		3_1		3_K

Killer Solution No. 26 (3 killers)

							2_{135}	2_{24}
		2_1					2_{24}	2_{35}
2_{23}		2_{45}				2_1		2_K
		2_K		2_{12345}				
		2_{2345}						2_1
2_1				2_K		2_{2345}		

Killer Solution No. 27 (4 killers)

			8_1					8_2
			8_K		8_2		8_1	
8_1			8_2				8_{24}	8_{35}
8_K	8_2				8_1			
8_2								8_1
8_K	8_1						8_2	8_K

Killer Solution No. 28 (4 killers)

					9_{13}	9_{24}		
9_{12}			9_4		9_K			9_3
9_{34}			9_2		9_K	9_K		9_1
					9_{24}	9_{13}		
			9_{13}		9_K			9_{24}

Killer Solution No. 29 (5 killers)

3_1						3_2		
		3_2				3_K	3_1	
3_K		3_1		3_K	3_2			
3_2				3_1				
				3_K	3_1	3_K	3_2	
				3_2		3_1		

Killer Solution No. 30 (5 killers)

			2_{235}	2_K	2_{146}			
		2_{12}		2_{34}			2_{56}	
2_{3456}			2_1	2_K	2_2		2_K	
				2_{56}			2_{1234}	
2_{12}		2_K	2_{46}	2_K	2_{35}			
		2_{3456}		2_{12}				

Killer Solution No. 31 (4 killers)

						3	3 _K	
3 ₁				3 ₂				
		3 ₂			3 ₁	3 _K		
				3			3	
3 _K		3 ₁		3 _K	3 ₂			
3 ₂				3 ₁				

Killer Solution No. 32 (3 killers)

				8_1		8_2		
			8_2	8_K				8_1
		8_1		8_K				8_2
		8_2	8_1			8_K		
				8_2		8_1		

Killer Solution No. 33 (4 killers)

8_1			8_2					
8_K		8_2	8_K		8_1			
		8_1					8_K	8_2
8_2							8_1	
			8_1				8_2	
					8_2		8_K	8_1

Killer Solution No. 34 (2 killers)

			8_{1346}		8_K	8_{25}		
					8_{25}			8_{1346}
8_{456}						8_1	8_{23}	
8_{123}						8_4	8_{56}	
					8_{1346}			8_{25}
			8_{25}		8_K	8_{36}	8_{14}	

Killer Solution No. 35 (4 killers)

	4_1						4_2	
4_2	4_K						4_K	4_1
	4_2				4_1			
4_1	4_K			4_2	4_K			
				4_1				4_2
					4_2		4_1	

Killer Solution No. 36 (4 killers)

2_1	2_K					2_2		
	2_2							2_1
	2_1				2_2			
2_2	2_K		2_1					
			2_2		2_K	2_1		2_K
					2_1			2_2

Killer Solution No. 37 (3 killers)

	6_{123}			6_K				
		6_K	6_{12}	6_3				
		6_{23}		6_1				
	6_K	6_1	6_3	6_2				

Killer Solution No. 38 (2 killers)

5 ₂			5 ₁		5 _K			
	5 ₁				5 ₂			
	5 ₂						5 ₁	
5 ₁						5 ₂	5 _K	
			5 ₂		5 _K	5 ₁		
					5 ₁		5 ₂	

Killer Solution No. 39 (3 killers)

	col 1	col 2	col 3	col 4	col 5	col 6	col 7	col 8	col 9
row1		1 ₃₄₅₆₇		1 _K			1 ₁	1 ₂	
row2		1 ₁₂		1 _K	1 ₇			1 ₃	1 ₄₅₆
row3					1 ₁₂₃₄₅₆		1 ₇		
row4				1 ₄₅	1 _K			1 ₆	1 ₁₂₃₇
row5				1 ₁₂₃₆₇			1 ₄	1 ₅	
row6									
row7									
row8									
row9							1 ₂₃₅₆	1 ₁₄₇	

Killer Solution No. 40 (4 killers)

	col 1	col 2	col 3	col 4	col 5	col 6	col 7	col 8	col 9
row1	2 ₁							2 ₂	
row2									
row3			2 ₂					2 _K	2 ₁
row4									
row5	2 _K		2 ₁	2 ₂		2 _K			
row6	2 ₂					2 ₁			
row7						2 ₂		2 ₁	
row8									
row9				2 ₁				2 _K	2 ₂

Killer Solution No. 41 (3 killers)

	col 1	col 2	col 3	col 4	col 5	col 6	col 7	col 8	col 9
row1	8 ₁						8 ₂	8 _K	
row2									
row3		8 ₂						8 ₁	
row4		8 ₁				8 ₂			
row5	8 ₂			8 ₁		8 _K			
row6									
row7									
row8				8 ₂		8 _K	8 ₁		
row9						8 ₁		8 ₂	

Killer Solution No. 42 (4 killers)

	col 1	col 2	col 3	col 4	col 5	col 6	col 7	col 8	col 9
row1			3_1			3_2		3_K	
row2	3_K						3_{12}		
row3	3_2					3_1		3_K	
row4									
row5									
row6									
row7	3_1							3_2	
row8									
row9			3_2				3_K	3_1	

Killer Solution No. 43 (3 killers)

	col 1	col 2	col 3	col 4	col 5	col 6	col 7	col 8	col 9
row1									
row2	5 ₁					5 ₂			
row3	5 _K	5 ₂			5 ₁				
row4		5 ₁					5 _K	5 ₂	
row5	5 ₂						5 ₁		
row6									
row7									
row8						5 ₁	5 ₂		
row9					5 ₂		5 _K	5 ₁	