COLORED POLYOMINOES: IN PREPARATION

Last update September 29, 2023

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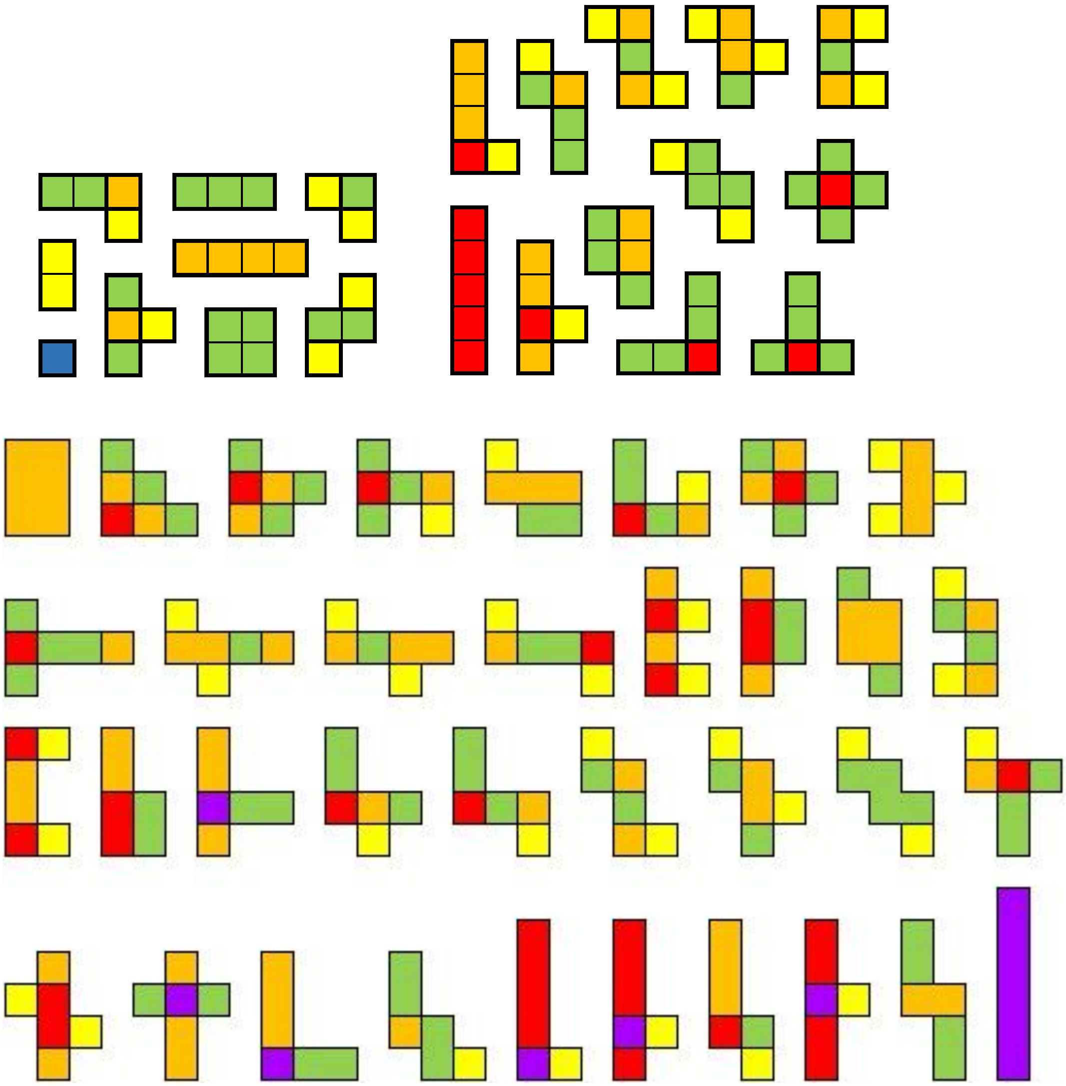
COLORED POLYOMINOES WITHOUT GAPS, images **by George Sicherman**



1}

https://oeis.org/draft/A365835

For every cell of a polyomino let b be the number of cells that are in the same row or in the same column (including itself). Cells beyond gaps do not count. a(n) is the sum of the b values of all cells of all free polyominoes with n cells.

1, 4, 16, 62, 204, 776, 2936, 12030, 48783, 202734, 839239, 3489810, 14462593

a(6)-a(9) from George Sicherman, Sep 20 2023

a(6)-a(9) corrected and a(10)-a(13) added by Pontus von Brömssen, Sep 21 2023

2}

https://oeis.org/draft/A365860

For every cell of a polyomino let c be the number of cells that are in the same row or in the same column (including itself). a(n) is the sum of the c values of all cells of all free polyominoes with n cells.

1, 4, 16, 62, 206, 790, 3042, 12648, 52181, 220372, 927333, 3917738, 16491489

a(7)-a(9) from George Sicherman, Sep 20 2023

a(10)-a(13) from Pontus von Brömssen, Sep 21 2023

3}

https://oeis.org/draft/A365906

Irregular triangle T(n,k) read by rows, n>=1, k>=1, in which row n lists in nonincreasing order the sum of the b values (described in A365835) of the cells of every free polyomino with n cells.

1, 4, 9, 7, 16, 12, 12, 12, 10, 25, 19, 19, 17, 17, 17, 17, 15, 15, 15, 15, 13, 36, 28, 28, 28, 24, 24, 24, 24, 24, 24, 24, 22, 22, 22, 22, 22, 22, 22, 22, 22, 22, 22, 20, 20, 20, 20, 20, 20, 20, 18, 18, 18, 18, 18, 16, 49, 39, 39, 39

1,

4,

9, 7,

16, 12, 12, 12, 10,

25, 19, 19, 17, 17, 17, 17, 15, 15, 15, 15, 13,

36, 28, 28, 28, 24, 24, 24, 24, 24, 24, 24, 22, 22, 22, 22, 22, 22, 22, 22, 22, 22, 22, 20, 20, 20, 20, 20, 20, 20, 18, 18, 18, 18, 18, 16,

49, 39, 39, 39 ….

3a} number of different terms that appear in each row n of A365906.

Irregular triangle T(n,k) read by rows, n>=1, k>=1, in which row n lists in nonincreasing order the sum of the b values (described in A365835) of the cells of every free polyomino with n cells.

1, 1, 2, 3, 5, 7, 10, 14, 19, 25, 32, 40, 49, ….

To confirm

formula next term a(n} = a(n-1} + (n-3} for a(n} > 3

4}

Quantity of polyominoes of each value (up to pentominoes}

1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
1	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**1**	**1**
11	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
0	**3**	**1**	**0**	**4**	**1**	**4**	**0**	**2**	
21	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
				1					
31	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**

5}

In what term DOES THE FIRST NUMBER OF EACH VALUE APPEAR?

Will all the numbers appear?

0	1	2	3	4	5	6	7	8	9	10
2	1	16	12	15						
11	12	13	14	15	16	17	18	19	20	
21	22	23	24	25	26	27	28	29	30	
31	32	33	34	35	36	37	38	39	40	

6}

SUM OF THE QUANTITY OF DIFFERENT COLORS THAT EACH PIECE HAS PER POLYOMINO

1	2	3	4	5	6	7	8	9	10
1	1	3	10	29	102				

7}

NUMBER OF DIFFERENT COLORS THAT EACH PIECE HAS PER POLIOMINO IN TRIANGULAR SHAPE SHOWING ALL THE PIECES

1,

1,

1, 2,

1, 1, 2, 3, 3

1, 2, 2, 2, 2, 2, 3, 3, 3, 3, 3, 3

8}

MAXIMUM NUMBER OF COLORS THAT EACH POLYOMINO HAS

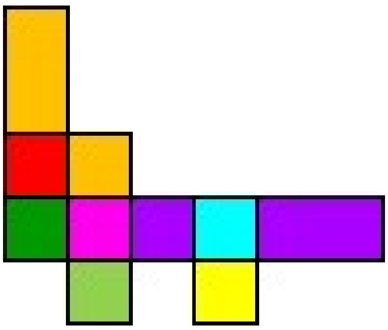
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
1	**1**	**2**	**3**	**3**	**4**	**5**	**5**	**6**	**6**
11	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
7	**8**	**8**	**9**	**9**	**10**				

solutions from a(8) to a(16) by George Sicherman

Example of heptomino with 5 different number

	4	
3	6	3
	4	
	5	2

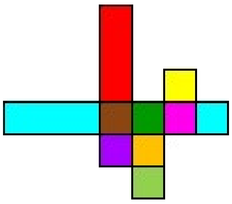
Example of 12-omino with 8 different colors/numbers by George Sicherman



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

Example of 14-omino with 9 different colors/numbers

	4					
	4					
4	6	5				
8	10	9	7	8	7	7
		3		2		



Example of 12-omino with 8 different colors/numbers by George Sicherman

		4					
		4					
5	5	7	6				
9	9	11	10	8	9	8	8
			3		2		

Is it true that cannot be an increase of more than 1 from 1 n-omino to n+1-omino?

9}

NUMBER OF DIFFERENT POLYOMINOES WITH MAXIMUM NUMBER OF COLORS FOR EACH POLYOMINO

1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
1	**1**	**1**	**2**	**6**	**7**	**12**	**99**	**83**	**692**

11	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
332	**56**	**3.356**	**840**	**10.060**	**1983**				

solutions from a(7) to a(16) by George Sicherman

n	name	free			one-sided	fixed
		total	with holes	without holes		
1	monomino	1	0	1	1	1
2	domino	1	0	1	1	2
3	tromino	2	0	2	2	6
4	tetromino	5	0	5	7	19
5	pentomino	12	0	12	18	63
6	hexomino	35	0	35	60	216
7	heptomino	108	1	107	196	760
8	octomino	369	6	363	704	2,725
9	nonomino	1,285	37	1,248	2,500	9,910
10	decomino	4,655	195	4,460	9,189	36,446
11	undecomino	17,073	979	16,094	33,896	135,268
12	dodecomino	63,600	4,663	58,937	126,759	505,861
OEIS sequence		A000105	A001419	A000104	A000988	A001168