Algorithmics	Student information	Date	Number of session
	UO:300717	27/02/2025	3
	Surname: Almoina Iglesias		
	Name: Martín		

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Activity 1.

n	t1(ms)	t2(ms)	t3(ms)
8	6,6	7,3	6,9
16	3,7	4,1	3,4
32	6,7	6,8	5,2
64	9,7	8,8	9
128	16,8	19,8	17,7
256	47	43,6	50,4
512	110,7	118,4	122,1
1024	406,2	361,3	367,1
2048	1730,3	2376,5	1152,1
4096	4565,4	4993,5	5606,7
8192	20810,3	21080,4	20597

The algorithm iterates through every node (O(n) complexity), then for every node it cycles through all 9 available colors until it finds a suitable one, it does this by checking the list of this nodes neighbors and checking if they are in the list of nodes using that specific color, since a node can only have a maximum of 8 neighbors and any number of nodes could theoretically share a color this process could have up to O(n) complexity in the worst case the algorithms final complexity would be : (n * 9 * 8 * n) = (n^2) in the worst case but in the best case it could be O(n).

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The measurements seem to line up with the theoretical complexity, although there is a lot of variation in how much the execution time grows, notably the first execution takes longer than some of the executions with larger graphs in all three attempts, this could be because the execution time also grows depending on the number of connections between nodes, and all the executions of the same number of nodes used the same graph.