Algorithmics	Student information	Date	Number of session
	UO: UO300535	13-03-2025	4
	Surname: Cabo Stroup		
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Activity 1. Graph Coloring Algorithm

- Implement the module graph_colouring.py, so that we can calculate a solution and visualize it with the provided Python module.
  Explain the time complexity of the implemented algorithm.

It's linear, roughly O(8n). It first sets every node's color to red, and then it loops through them, removing the colors of their neighbors from a list of possible colors, and then setting their own as the first remaining entry in that list.

```
def greedy(map):
    print(map)

    colors = ["red", "blue", "green", "yellow", "orange", "purple", "cyan", "magenta", "lime"]
    node_colours = {}
    for node in map.keys():
        node_colours[node] = "red"
    for node in map.keys():
        possible_colors = colors.copy()
        for neigh in map[node]:
            print("node = " + node + ", neighbor = " + str(neigh) + ", node_colours[node] = " + node_colours[node])
            neigh_color = node_colours[str(neigh)]
            if neigh_color in possible_colors:
                possible_colors.remove(neigh_color)
        node_colours[node] = possible_colors[0]

    return node_colours
```

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- Implement a module greedy_times.py, using the graphs contained in sols and calculating the time it takes for the algorithm done in the previous section to solve the problem, so that the following table can be filled in.

	Time (ms)
n	graph_colouring.py
4	LoR
8	LoR
16	LoR
32	LoR
64	LoR
128	41
256	91
512	191
1024	367
2048	721
4096	1504
8192	3000
16384	6064
32768	12224
65536	24605

- Does the previously calculated complexity follow the times in the table?

It does; the times exhibit linear growth. Each time the number of nodes (n) doubles, the time doubles with it.