ESTRUCTURA DE DATOS 1
Código ST0245

Laboratory practice No. 5: Graph implementations

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3) Practice for final project defense presentation

3.1 The city maph graph data structure is built using a linked list of “Vertex” structures, each one with its own linked list of “Edge” structures. The objective of this was to allow efficient loading from disk and lower memory consumption. One thing to notice is the fact that further changes could and should be made to the data structure depending on the operations that would be executed onto it. For instance, path-finding algorithms would perform sub-optimally under the current configuration.

3.2 Representing the map of Medellín with the current data structure would use around 30 Mb of memory. With an adjacency matrix based data structure, around 450 Gb of memory would be required.

3.3 To allow for the vertex index in the map data structure to not start from zero and not be in any particular order, we simply allowed said index to be a property inside the vertex itself, not necessarily correlated to its position within the list.

3.4 To solve the graph coloring problem, we used an adjacency matrix based data structure. The algorithm chooses an arbitrary point and attempts to color it. If it fails, it tries again with a second node that is neighbor to the first one. It determines the result based on those results.

3.5 The complexity for the solution to this problem is O(n).

3.6 n is the number of vertices in the graph.

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4) Practice for midterms

4.1

	0	1	2	3	4	5	6	7
0				1	1			
1	1		1			1		
2		1			1		1	
3								1
4			1					
5								
6			1					
7								

4.2 0 -> [3,4]
1 -> [0,2,5]
2 ->[1,4,6]
3 ->[7]
4 ->[2]
5 ->[]
6 ->[2]
7 ->[]

4.3 *b) O(n^2)*

4.4

4.4.1 ii
4.4.2 i

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