ESTRUCTURA DE DATOS 1
Código ST0245

Laboratory practice No. 5: Graphs

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3) Practice for final project defense presentation

3.1 For exercise number 1, we used an array list that contains triplets with the origin node, the destination node and the distance between them. This way it is easier to look into each space of the array list and it is also a more memory-efficient method in comparison with others like the adjacency matrices.
3.2 If we were to use an adjacency matrix to show this graph. We need to understand that they occupy n^2 * 1 bit space, which in this case since we have 300 000 different entries, it would occupy 90 000 000 000 bits which in Megabytes is the same as 11 250 Mb. Also, it is to consider that the complexity of an adjacency matrix is $O(n^2)$.
3.3 In order to solve the problem of the identifiers not starting at 0. We used a hash map that contains each node with its respective id. This way, we just need to use the key which would be the node's id to enter the node. Making it easier to look node after node in an organized manner.
3.4 We made a version of the BFS algorithm (Breadth First Search) to determine if a graph is or isn't bicolorable. It consists in assigning values to the nodes to divide them in two groups. If two nodes are adjacent, they are given different values and it goes like that for all the nodes in the graph. At the end, if two adjacent nodes have the same value, the graph is not bicolorable.
3.5 O(V + L)
3.6 V is the number of vertices and L is the number of edges in a graph.

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								

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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) 1, 4, 5, 0, 2, 3
4.4.2 i) 1, 4, 5, 0, 2, 3

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