Laboratory practice No. 5 Graphs

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3) Practice for final project defense presentation

3.1 The behavior of this algorithm begins by reading two files, one corresponds to the vertices.txt file, this data is saved in the HashMap data structure, where it is of type <Long, Node>, here an ID and the node are stored. The other file corresponds to arcos.txt, this data is saved in the Arraylist data structure where it is of type <Long, Long, Double>, here the origin, destination and distance are saved. Then there is a graph of type <source node, destination node, weight> and this is filled with the data of the vertices and arcs that had already been read. There are 2 important methods, getSuccessors () that receive the vertex ID, returns the successors of a node AND getWeight () that receives the source ID and the destination ID, which returns the weight or length between two nodes, i.e. , between an arch

3.2 An adjacency matrix is a square matrix with n number of rows and n columns (where n is the number of vertices of the graph). If the adjacency matrix has 300,000 vertices, it would be 300,000 rows by 300,000 columns, giving a total of 90,000,000,000 vertices as the matrix size. This would make a huge memory consumption and make the algorithm very inefficient.

3.3 The solution is to use hash tables since when creating a node, it is assigned an identification corresponding to the vertex, which means that no data is available at zero

3.4 To solve the problem, an adjacency matrix is used to store the connections of each node. Then to solve the problem an algorithm is used to determine if a node can be colored or not, (this is a deep search algorithm (DFS) that was taken from the internet and was referenced within the code). Finally print the result.

3.5 The complexity of the exercise is O (n2).

3.6 n is the number of vertices of 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			1					
6								
7								

4.2

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

4.3 a) O(n)

4.4 ii) 1, 4, 5, 0, 2, 3

4.5 *i*) 1, 4, 5, 0, 2, 3

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