ESTRUCTURA DE DATOS 1
Código ST0245

Laboratory practice No. 4: Trees

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3) Practice for final project defense presentation

3.1 For this exercise we used an adjacency list graph to represent the streets and a hash map to organize the nodes. This code reads the nodes and edges of the graph from two separate files and sorts the nodes into a hash map, while using the edges to create tuples of length 3. The it takes both the information inside the hash map and the list of triplets and uses is to create an adjacency list graph. We chose to do it this way in order to optimize memory, since this amount of information could end up taking up much more space than what we necessarily want it to.

3.2 When n is the number of nodes, the amount of space we need to reserve for an adjacency matrix graph would be $O(n^2)$. But because of our particular problem it is clear that the graph is not dense, and therefore many unnecesary spaces will be taken up, a problem that would be avoided by using the adjacency list method.

3.3 By noting that the smallest index is 60175732, we can use this value to indexate the other nodes.

3.4 For this exercise we used Adjacency matrices to represent the graphs. The algorithm used to determine whether the graph can be colored with 2 colors or not traverses the graph with BFS algorithm. The key is to determine if the vertices adjacent to a node can have the same color. If this is not true, then the graph cannot be colored with only two colors.
3.5 $O(n^2)$
3.6 N is the number of vertices.

4) Practice for midterms

4.1

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	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								

*Since there is no arrow head on the line joining 1 and 2, it was assumed that 1->2 and 2->1

4.2

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

4.3 b

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