

## Laboratory practice No. 5: Graphs.

**Jose Manuel Fonseca Palacio**  
Universidad Eafit  
Medellín, Colombia  
jmfonsecap@eafit.edu.co

**Santiago Puerta Florez**  
Universidad Eafit  
Medellín, Colombia  
spuerta@eafit.edu.co

**3.2)** Due to is a directed graph, and we are trying to represent it with an adjacency matrix, the memory complexity for the algorithm would be  $O(n^2)$ . Supposing that we are handling around 300,000 vertices the algorithm would take around 90000,00 memory units.

**3.4)** For approaching a solution in 2.1 exercise we use a graph, and we are told that is a connected graph. To find out if a given graph is bipartite (it can be colored with two colors) we thought first to assign RED color to the source vertex, then color all the neighbors with BLUE color, afterwards color all neighbor's neighbor with RED color. While assigning colors, if we find a neighbor which is colored with the same color as current vertex, then the graph is not bipartite.

**3.5)** In the worst-case scenario the time complexity for 2.1 exercise would be  $O(V^2)$ .

**3.6)** As said before in the worst-case scenario the complexity for 2.1 exercise would be  $O(V^2)$ , where  $V$  is the number of vertices that we got to check.

**4)**

**4.1)**

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

**PhD. Mauricio Toro Bermúdez**  
Professor | School of Engineering | Informatics and Systems  
Email: mtorobe@eafit.edu.co | Office: Building 19 – 627  
Phone: (+57) (4) 261 95 00 Ext. 9473



## ESTRUCTURA DE DATOS 1

### Código ST0245

#### 4.2)

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

#### 4.3) $O(n)$

#### 4.4)

##### 4.4.1) ii

##### 4.4.2) i

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