

## Laboratory practice No. 1: Graphs implementation

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### 3) Practice for final project defense presentation

**3.1** The objective of our data structure was focused on time complexity, in order to optimize the data of the routes. That's why the algorithm implements an adjacency matrix.

**3.2** The memory consumption will be  $O(n^2)$

**3.3** A conditional operator that change the identifier

**3.4** The objective of the algorithm is to visit each node using graphs by the method DFS, for that reason each node will be assign a color, and the algorithm will compare the previous one to determinate if it has the same or a different color.

**3.5**

```
Public static Boolean biColoring (Grafo g, int n, int [] array, int m) {
```

```
    If (n > array.length) { // c1
```

```
        return true;
```

```
    }
```

```
    else {
```

```
        for (int i = 0; i < m; i++) { // O(n)
```

```
            if (isSafe (g,n,array,i)) { // c2
```

```
                array [n-1]=i; // c3
```

```
                return biColoring (g, n+1,array, m);
```

```
            }
```

```
        return false;
```

```
    }
```

```
}
```

```
private static boolean isSafe(Grafo g, int v, int[] colors, int c) {
```

```
    for (int i=1;i<v;i++) { //O(n)
```

```
        ArrayList<Integer> sucesores= g.getSuccessors(i);
```

```
        if(sucesores.contains(v)&&colors[i-1]==c) { // c4
```

```
            return false;
```

```
        }
```

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**ESTRUCTURA DE DATOS 2**  
**Código ST0247**

```
return true;
}
```

The algorithm has a complexity of  $O(n)$

**3.6** the variable (n) represents the among of vertex that have he graph and can represent the number of successors that have each vertex

#### 4) Practice for midterms

##### 4.1 A

	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. $O(n^2)$

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