

## Laboratory Nro. 4: Greedy algorithm

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### 3) Practice for final project defense presentation

**3.1** The solution was possible by using an adjacency matrix to represent the graph, an array list to find the successors from a specific node, and an array to indicate the visited nodes. The main idea of this greedy algorithm consists in traversing the graph by choosing the closest node which hasn't been visited yet from the actual node, and at filling the visited array, the algorithm goes back to the starter node.

**3.2** The greedy algorithm applied is efficient to find a solution, but it is not effective to identify the best one. The main idea is to avoid looking all the possibilities which guarantees the best solution, and instead it only searches the most probable conditions. Furthermore, an algorithm always achieves a solution if it goes through all the clients and it goes back to the deposit.

**3.3** In the case to solve this problem around Medellin city, one possible solution is by exploring only the nodes that represent a client. In this way, the distance between two nodes could be finding the Euclidean distance between two points and focusing the problem only in what is necessary.

**3.4** For this solution was used three arrays. The first one was used to store day routes, the second one to store the night routes, and the last one to indicate assigned routes. This algorithm consists in finding the minimum overtime payment. The main idea of this algorithm is that at each iteration is evaluated if the sum of the day route and the night route surpass the previous sum and, in this way, the route is assigned to each driver. After that, it is determinate if the sum exceeds the limit and if that happens, it indicates how much should pay for extra hours.

**3.5** The complexity of the algorithm 2.1 is  $O(n^2)$ . It is necessary that each driver get a route in the day and a route in the night.

**3.6** The variable in the complexity is  $n$ . It's represent the number of drivers available in the company.

### 4) Practice for midterms

**4.1**  $i = j;$

**4.2**  $Min > adjacencyMatrix[element][i]$

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ESTRUCTURA DE DATOS 2  
Código ST0247

**4.4**

4.4.1  $temp = \text{Math.max}(\text{minimo}, temp);$

4.4.2 *return temp*

4.2.3  $O(1)$

**4.6**

4.6.1  $\text{if}(x[i] == (i+1))$

4.6.2  $res = res + 1;$

4.6.3  $last = i;$

4.6.4 *la respuesta es 2*

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