Transportation of Company workers for the reduction of traffic and pollution

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Inspira Crea Transforma

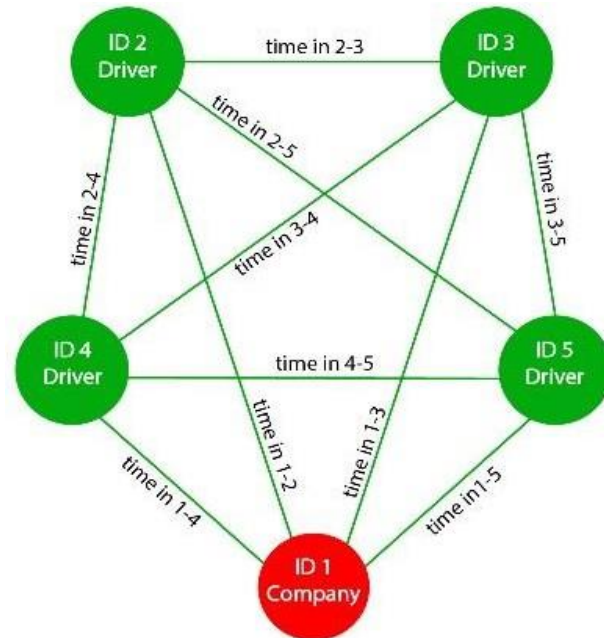**UNIVERSIDAD EAFIT®**

Data Structures

Figure 1: A matrix with the weights of the paths.
Figure 2: Structure of a complete graph
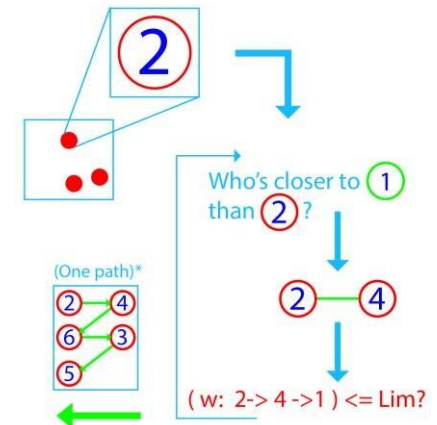
Algorithm and Complexity

```
332  Algorithm assign (Graph, initial, increment)
333       assigned cars = new List
334       Successors = new List in range(2, size of Graph)   |
335       ordered successors = sort(Successors)
336       While ordered successors not empty do
337            driver = last from ordered successors
338            car = new List
339            time limit = increment * get Weight(Graph, driver, initial)
340            closest from driver = sort(ordered successors)
341            for every successor in closest from driver do
342                 if size of car = 5 then
343                     stop
344                 end if
345                 if can take (successor, car, time limit, Graph) then
346                     push(successor, car)
347                     erase(successor, ordered successors)
348                 end if
349            end for
350            push(car, assigned cars)
351       end while
352       return assigned cars
353  end
```

Method	Complexity
Graph creation	O(n2)
Sorting	O(n2)
Erase	O(n)
canTake	O(n)
Assign	O(n3)
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Total =	O(n3)

Algorithm design criteria

-It is fast

-Only uses the related data, and that reduces completely the needed storage.

-Reduces the traffic in a 69.5% for the worst case P=1.1

Execution

Time and Memory Consumption

j) Time: 0.456 seconds

Memory consumption: 3.4 MB
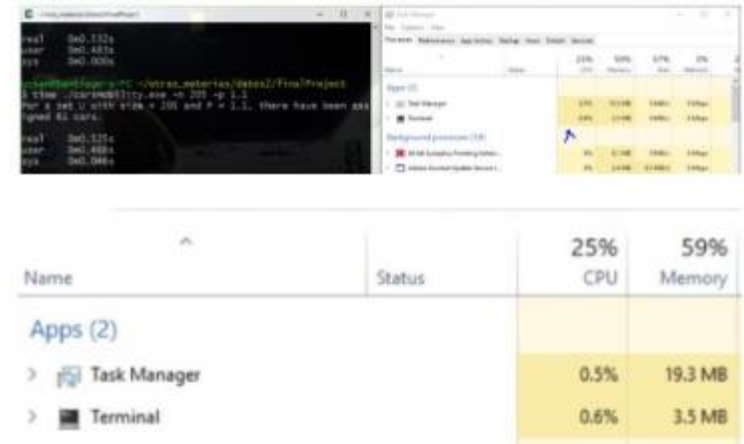
Structure complexity: O(N^2)
   In the biggest dataset= (32*205)^2 = 43.033.600 bits
Algorithm complexity: O(N)
   In the biggest dataset= (32*205) = 6560 bits