Laboratory practice No. 2: Greedy algorithms

Juan Sebastián Pérez Salazar
Universidad Eafit
Medellín, Colombia
jsperezs@eafit.edu.co

Yhoan Alejandro Guzmán García
Universidad Eafit
Medellín, Colombia
yaguzmang@eafit.edu.co

3) Practice for final project defense presentation

3.1 The algorithm starts at the initial node and it starts going through the nearest nodes until it reaches the initial point again.

3.2 The algorithm not always gives the optimal path since it does not calculate every possible path. The graph has to be complete since we are solving a travel agent problem variant, and in that problem you can go from each city to all the others (complete graph), this is because when we go to the nearest successor, if the graph is not complete, that successor could not have other successors and there would be no way to go back to the initial node.

3.3 Assuming that we are given Medellin's map as a graph and the nodes where the deliveries must go, we would have to calculate the shortest path in the city that visits the delivery target nodes and goes back to the initial point, which is basically the same we did in this algorithm, but with the city we could also use geolocation as a another factor when going through nodes between targets.
The objective would be to go through all the delivery targets and back to the initial point, going through all the graph would be a mistake since the graph itself is the whole city. The distance between targets can be approximated using the geolocation coordinates.

3.4 The algorithm is greedy. It calculates the minimum number of hours that a company have to pay to its driver because of extra hours that they do. First of all, the algorithm reads the file, from the file gets the parameters and the routes. It assigns the first routes to the drivers, then, it sorts them from highest to lowest and sorts the afternoon routes from lowest to highest. After that this algorithm assigns in order the second routes to the drivers. Later it finds the hours that exceed the limit and calculates how much the company have to pay.ç

3.5 O(nlog(n)), however, n < 100, so complexity can be O(n)

3.6 n is the number of drivers, this complexity is due to the sort algorithm of python.

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

4) Practice for midterms

4.1 i = j

4.2 if(min > adjacencyMatrix[element][i])

4.3 4.3.1

PASO	A	B	C	D	E	F	G	H
1	A	20, A	∞	80, A	∞	∞	90, A	∞
2	B	20, A	∞	80, A	∞	30, B	90, A	∞
3	F	20, A	40, F	70, F	∞	30, B	90, A	∞
4	C	20, A	40, F	50, C	∞	30, B	90, A	60, C
5	D	20, A	40, F	50, C	∞	30, B	70, D	60, C
6	H	20, A	40, F	50, C	∞	30, B	70, D	60, C
7	D	20, A	40, F	50, C	∞	30, B	70, D	60, C
8	H	20, A	40, F	50, C	∞	30, B	70, D	60, C

4.3.2 The mínimum path cost 70. This is A, B, F, C, D, G

4.4 4.4.1 temp/2
4.4.2 return mínimo + temp;
4.4.3 B) O(1)

4.5 4.5.1 D) La pareja dos tiene razón y su justificación es verdadera

4.6 4.6.1 i + 1
4.6.2 (res + 1)
4.6.3 i
4.6.4 2

5) Recommended reading (optional)

The greedy method is a way to approach optimization problems. This method uses a series of decision-making processes, always choosing the next piece that offers the most obvious and immediate benefit, in order to keep the complicity low, due to the fact that this method, unlike brute force or backtracking, does not calculate each possible set of the problem.
This method is used a lot when managing graphs and trees, since it often provides optimal answers while keeping the complexity low.

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6) Team work and gradual progress (optional)

6.1 Meeting minutes

Member	Date	Done	Doing	To do
Sebastián	13/04/2019	**Point 2.1**		test for points 2.1
Sebastián	13/04/2019	**test for point 2.1**	a better solution	Practice for final project defense presentation
Sebastián	13/04/2019	**Practice for final project defense presentation**	Practice for midterms	point 1.1
Sebastián	13/04/2019	**Practice for midterms**	point 1.1	
Yhoan	14/04/2019	**Point 1.1**		test for point 1.1
Yhoan	14/04/2019	**test for point 1.1**		points 3.1, 3.2 and 3.3
Yhoan	14/04/2019	**points 3.1, 3.2 and 3.3**		recommended reading
Yhoan	14/04/2019	**recommended reading**		upload the laboratory

6.2 History of changes of the code

History changes of code		
Version	Code	Status
1.0	1.1	
2.0	1.1	
1.0	2.1	
2.0	2.1	

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