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The general pseudocode foer Djikstra’s algorithm is:

* Set the distance of start vertex to zero
* Set distance of other vertices to infinity
* Until all vertices are visted :

Visit the unvisited vertex with smallest distance

For each unvisited neighbour of that vertrx:

Calculate distance from start vertex

If the calculated distance is less than the known distance:

Change the shortest distance to this vertex

Update the previous vertex with the current vertex

Go to the next unvisited neighbour

Remove the current vertex from the list of unvisited vertices.

Since we all know by now that Djikstra’s algorithm is a greedy one (it selects the unvisited vertex which has the shortest distance from the visited one although we could have used other criterias)as it tries to get closer to the global optimal solution through these locally optimal solutions.

However ,this algorithm isn’t applicable when it comes to directed graphs with a negative cycles as we can see from the example given below

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The summation of the weighted directed cycle between A->B->C is negative (100-100-2=-2).

Therefore, it is advantageous to go through this cycle when searching for our destination as it will reduce the total weight required(since it is negative).But there can not be minimum distance because we can go through the cycle as many times as we want (A->B->C ->A) before going to D and that’s why Djikstra’s algorithm comes short.

General Formula = n(A->B->C->A)->D

|  |  |
| --- | --- |
| n(number of cycles through A,B,C) | Distance from A to D |
| 0 | 50 |
| 1 | 48 |
| 2 | 46 |
| 3 | 44 |
| 4 | 42 |

The minimum distance to the destination D is depe ndent on the number of cycles and Djikstra’s algorithm is not applicable for such kinds of graphs.

Next assume we add 50 on each weight.

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Here the sum in the cycle between (A,B,C ) becomes positive(150-50+48=148) .In this case there is no point in going through the cycle many times as it will only increase the distance and we can apply Djikstra’s algorithm to find the minimum distance between point A and any other points.

|  |  |
| --- | --- |
| Vertices | Minimum distance from A |
| A | 0 |
| B | 150 |
| C | 100 |
| D | 100 |