

Example illustrating why Dijkstra's Algorithm for shortest path does not work with negative values.

A-->B 5
B-->C 2
C-->B -6

Start vertex is A.

Shortest path to B according to Dijkstra's is 5 (predecessor A).
We could do a lower cost by using the path: A-->B-->C-->B (cost of 1)

Once we add a node to the set S we cannot change its cost/predecessor, but edges with negative values that have not been seen yet can produce a path that has a lowest cost (what example above illustrates).

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Also you can add that the question of shortest path with negative edges is very odd anyway since, if you allow to traverse an edge many times, you can get cost $-\infty$.