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Analysis of Algorithms II: Q3

Bellman-Ford and Floyd-Warshall algorithms are Dynamic programming example while Dijkstra is a greedy algorithm example. Bellman-Ford and Dijkstra algorithms are yields paths from single source to other nodes, while Floyd-Warshall algorithm yields paths from each node to other nodes. Dikstra algorithm does not work for graphs that contain negative weighted edges; On the contrary, Floyd-Warshall and Bellman-Ford works for the negative weighted graphs. Unlike Floyd-Warshall, Bellman-Ford can even detect negative weighted cycles.

Efficiency comparision of these 3 algorithms:

Bellman-Ford: $O(|V|*|E|)$ if we say $n = |V|$ then in a dense graph it will be $O(n^3)$

Dijkstra: $O(|E|+|V|*\log|V|)$ if we say $n = |V|$ then in a dense graph it will be $\sim O(E) = O(n^2)$

Floyd-Warshall: $O(|V|^3)$ if we say $n = |V|$ then in a dense graph it will be $O(n^3)$

As seen from the calculations above Dijkstra more efficient than other 2 algorithms from a source to destination (algorithm will be used for once, for further calculations other 2 algorithm became advantageous since the table is once constructed, it can be used further).