Discussion 3

Sunday, September 16, 2018 8:41 PM

Topics: Shortest Paths Algorithms

Find the shortest path from one source vertex to all other vertices

Dijkstra

- main idea: BFS with priority queue
- guarantee to work for positive edge weights
- might not work on graphs with negative edge weights
- runtime: $O((|V|+|E|)\log|V|)$ (priority queue)

Bellman-Ford

- Main idea: update all edges $|V|-1$ times
- guarantee to work for all graphs that have shortest paths (i.e. no negative cycles)
- runtime: $O(|V||E|) = O(|V|^3)$

- early stopping: when nothing gets changed, stop
- detect negative cycle: run for one more iteration