Dijkstra algorithm

input : $\mathbb{R}^{\geq 0}$-weighted graph $G = (V, E, \lambda)$, source vertex $s \in V$

output: for every $t \in V$, the shortest path weight $d_{s,t}$

variables: $Q, U \subseteq V$: sets of vertices v for which the shortest-path weight $d_{s,v}$ is already determined/is not yet determined;
$\delta : V \rightarrow \mathbb{R}^{\geq 0}_{\infty}$

begin
  for every $u \in V$ **do** $\delta(u) := \delta^{in}(u)$;
  $Q := \emptyset$;
  $U := V$;
  while $U \neq \emptyset$ **do**
    begin
      select and delete $u \in U$ such that $\delta(u) = min\{\delta(v) \mid v \in U\}$;
      $Q := Q \cup \{u\}$;
      for every $v \in U$ such that $(u, v) \in E$ **do** $relax(u, v)$
    end
  for every $v \in V$ **do** $d_{s,v} := \delta(v)$
end

where

$$\delta^{in}(u) = \begin{cases} \infty & \text{if } u \neq s \\ 0 & \text{otherwise} \end{cases}$$

and

$relax(u, v)$:
if $\delta(v) > \delta(u) + \lambda(u, v)$ **then** $\delta(v) := \delta(u) + \lambda(u, v)$.