Algorithm 1 Modified Dijkstra's Algorith

Input: A graph $G(V, E)$, weights $w : E \to \mathbb{R}_{\geq 0}$, source vertex s,
time threshold t and i denotes the index of the service type
Output Assign $v.r[i] = 1$ for vertices that can reach to s within threshold t

$Q \leftarrow \emptyset$
INSERT(Q, s)
while $Q \neq \emptyset$ **do**
  $v \leftarrow$EXTRACT-MIN(Q)
  if $v.d > t$ **then**
    $Q \leftarrow \emptyset$
  else
    $v.r[i] \leftarrow 1$
    for each vertex $u \in Adj[v]$ **do**
      if $u \notin Q$ **then**
        $u.d \leftarrow v.d + w(u, v)$
        INSERT(Q, u)
      else if $u.d > v.d + w(u, v)$ **then**
        $u.d \leftarrow v.d + w(u, v)$
        DECREASE-KEY$(Q, u, u.d)$
      end if
    end for
  end if
end while

Algorithm 2 15-Minute City Algorithm

Input: A graph $G(V, E)$, weights $w : E \to \mathbb{R}_{\geq 0}$, a time threshold t
and a list S of service vertices of p types
Output Set $R \subseteq V$ representing the t-Minute City

for all vertex $v \in V$ **do**
  $v.r \leftarrow \{\mathbf{0}\}^p$
  $v.l \leftarrow \{\mathbf{0}\}^p$
end for
for all service $v \in S$ **do**
  $v.l[i] \leftarrow 1$ for each service type i which belongs to vertex v
end for
for each service type $i \in \{1, ..., p\}$ **do**
  Create a new vertex s
  Add edges from s to all vertices v where $v.l[i] = 1$ and $w(s, v) \leftarrow 0$
  Modified_Dijkstra(G, w, s, t, i)
  Remove s and all edges connected to it
end for
$R \leftarrow \emptyset$
for each vertex $v \in V$ **do**
  if $v.r = \mathbf{1}$ **then**
    $R \leftarrow R \cup \{v\}$
  end if
end for