

# MST-PRIM( $G, w, r$ )

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1  for each vertex  $u \in G.V$ 
2       $u.key = \infty$ 
3       $u.\pi = \text{NIL}$ 
4   $r.key = 0$ 
5   $Q = \emptyset$ 
6  for each vertex  $u \in G.V$ 
7      INSERT( $Q, u$ )
8  while  $Q \neq \emptyset$ 
9       $u = \text{EXTRACT-MIN}(Q)$            // add  $u$  to the tree
10     for each vertex  $v$  in  $G.Adj[u]$  // update keys of  $u$ 's non-tree neighbors
11         if  $v \in Q$  and  $w(u, v) < v.key$ 
12              $v.\pi = u$ 
13              $v.key = w(u, v)$ 
14             DECREASE-KEY( $Q, v, w(u, v)$ )
```